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Title: Coronary heart disease knowledge and health behaviour in student nurses

Date: October 2010

Originally published as: University of Chester MSc dissertation

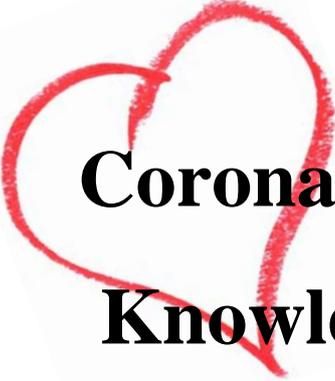
Example citation: Murfin, R. L. (2010). *Coronary heart disease knowledge and health behaviour in student nurses*. (Unpublished master's thesis). University of Chester, United Kingdom.

Version of item: Submitted version

Available at: <http://hdl.handle.net/10034/125057>



'A dissertation submitted in partial fulfilment of the requirements for the Masters degree in Cardiovascular Rehabilitation by the University of Chester'



**Coronary Heart Disease
Knowledge and Health
Behaviour in Student Nurses**

by
Rosemary Murfin
0909345

October 2010

17,301

Declaration

This work is original and has not been submitted previously in support of a degree qualification or other course.

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Signed

Date

Abstract

Introduction: Coronary heart disease (CHD), a gradual build up of fatty deposits in the coronary arteries, occurs as a result of several risk factors (RFs) with 75% attributable to lifestyle choices. Accordingly, CHD prevention focuses on the three lifestyle RFs; smoking, physical activity/exercise and diet/weight management. As CHD prevention is a complex process, it adopts social cognition theories that have established knowledge as an essential component for behaviour change. Despite the widespread acceptance of CHD prevention, CHD still kills more people than any other disease accounting for 7.2 million global deaths per year and thus, there is an obvious need for prevention development. Student nurses, potential advocate for such initiatives, could effectively help make an impact on CHD through the use of health education/promotion but research has determined substantial knowledge gaps and that nurses do not practice what they preach. **Aim(s):** To evaluate CHD knowledge and the health behaviour (HB) of student nurses by identifying whether they have sufficient knowledge, whether they practice HBs, whether there is a relationship between the student nurses' CHD knowledge and HB and whether the age or gender of the student nurse affects CHD knowledge and HB. **Methods:** Third year student nurses from Universities in the north of England were asked to complete an online CHD Knowledge and Health Behaviour Questionnaire (CHDKHBQ). CHD knowledge and HB scores were generated (0-16 and 10-29, respectively) and subsequently categorised as poor, average and good. **Results:** 54 third year student nurses from five Universities took part in the study. The CHD knowledge of the third year student nurses was classified as good (mean = 13) and the HB of the third year student nurses was found to be average (mean = 19). There was no significant relationship ($p=0.44$) between the student nurses' CHD knowledge and HB reported. No age-related differences were established between third year student nurses straight from school education and mature students and their CHD knowledge ($p=0.21$) and HB ($p=0.71$). No CHD knowledge and gender differences occurred ($p=0.51$) but there was significant gender differences in relation to HB ($p=0.04$). **Conclusion:** Third year student nurses do possess a sufficient level of CHD knowledge to provide health education/promotion through CHD prevention however, do not fully practice these HBs and thus there is a requirement to development promoting HBs in nurses. This would ultimately benefit health education/promotion as it is unlikely that individuals would take advice if the person delivering crucial CHD information contradicts this through their own behaviour. Knowing that there are gender specific differences also identifies that health education/promotion may need to develop as gender specific.

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List of Abbreviations

| | |
|---------|---|
| BP | Blood Pressure |
| CHD | Coronary Heart Disease |
| CHDKHBQ | Coronary Heart Disease Knowledge and Health Behaviour Questionnaire |
| HB(s) | Health Behaviour(s) |
| RF(s) | Risk Factor(s) |

Acknowledgements

Throughout the compiling of this thesis, I have been fortunate to have received a great deal of support and guidance. Thank you to my family and friends for the constant encouragement, motivation and perseverance, I hope I make you proud. Specific recognition must go to my fellow peer; Siobhan, who has not only made this year very memorable but you were always available to listen, advise, and support me with great enthusiasm. Gratitude must also go to my dissertation tutor; Dr Stephen Fallows, who has been a constant support throughout the completion of this thesis. Thank you for your time and advice, your guidance has been very much appreciated. I would additionally, like to show appreciation to Mr Mike Morris, specifically in relation to the data analysis and results of the thesis, as I know this would have been a more difficult task without your advice and guidance. Finally, I would like to thank the participants of the study, as without your time and co-operation this thesis would have not been completed.

Chapter One:

Introduction

1.1. Coronary Heart Disease

Coronary heart disease (CHD) is caused by the process of atherosclerosis (American Association for Cardiovascular and Pulmonary Rehabilitation [AACVPR], 2006), a gradual build up of fatty deposits in the walls of the coronary arteries (British Heart Foundation [BHF], 2010). Initially formed as a result of damage to the inner lining of the artery (endothelium), these fatty deposits; known as plaques, cause the artery to narrow and obstruct the flow of blood to the heart (Mullany, 2003). Over time, the artery may become so narrow that blood supply to the heart is insufficient and can lead to angina (BHF, 2010). Furthermore, if a fragment of the plaque breaks away from the endothelium it can result in the formation of a clot, which blocks the artery and starves the heart of blood and oxygen (BHF, 2010). This is known as a myocardial infarction (MI) (BHF, 2010). Figure 1 illustrates this process.

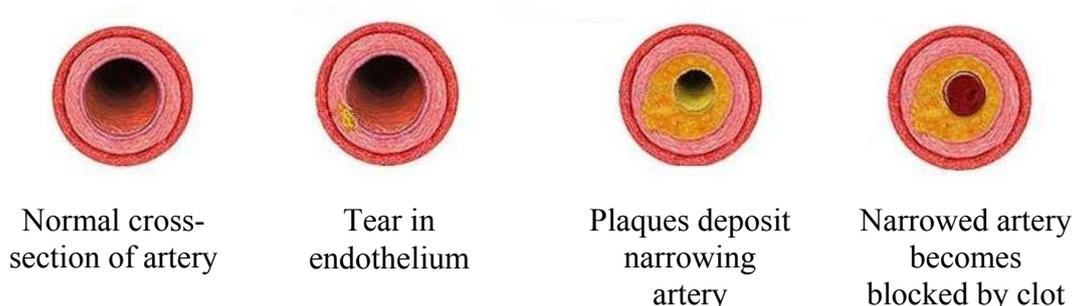


Figure 1 - The Process of Atherosclerosis

1.2. Risk Factors

Extensive clinical and statistical studies have acknowledged several factors that increase the risk of developing CHD (American Heart Association [AHA], 2010). While each factor is important independently, the risk of developing CHD is also strongly related to a combination of factors and it appears that the effect is synergistic (Scottish Public Health Observatory, 2010). CHD risk factors (RFs) can be either classified as major RFs; those that have shown to significantly increase CHD, or contributing RFs; those only associated with CHD and have yet to be precisely determined (AHA, 2010).

1.2.1. Major Risk Factors

Major RFs include both modifiable and non-modifiable RFs. Modifiable RFs are those that can be changed, controlled or treated by changing lifestyle habits or taking medication (AHA, 2010). Table 1 details the modifiable RFs as well as describing how each factor increases CHD development.

Table 1 – Coronary Heart Disease Major Modifiable Risk Factors

| Risk Factors | How does the risk factor increase CHD development? |
|--|--|
| Tobacco Smoke | Causes impairment to endothelial function for plaque formation, induces an inflammatory response to promote plaque rupture and increases the clotting property of blood (Ambrose and Barua, 2004). Tobacco smoke also reduces the amount of oxygen the blood is able to carry (Cutting, 2004) and thus increases blood pressure (BP) (AHA, 2010). |
| High BP (also termed Hypertension) | Increases the heart's workload (AHA, 2010). Over time this can induce extraordinary 'wear and tear' on endothelial function, contributing to plaque formation (Escobar, 2002). The increased pressure exerted within the vessels can also exacerbate the atherosclerotic process; due to the prolonged exposure to circulating particles (AACVPR, 2006), as well as making the atherosclerotic plaque more unstable (Escobar, 2002). |
| High Blood Cholesterol | Increases plaque formation and plaque progression in the arteries, given that the process of atherosclerosis is dependant on the accumulation of cholesterol (AACVPR, 2006). |
| Physical Inactivity | Although not an autonomous risk of CHD, being physically active helps prevent or delay the onset of high BP, lowers blood cholesterol levels, helps to control weight, increases physical fitness and helps to control blood glucose in persons with diabetes mellitus (AHA, 2010). |
| Obesity and Overweight | Increases the heart's work load and subsequently raises BP (AHA, 2010). Since obese or overweight individuals typically have high fat diets there is also an association with high blood cholesterol (AHA, 2010). Furthermore, being obese or overweight increases the likeliness of developing diabetes mellitus (AHA, 2010). |
| Diabetes Mellitus | High blood glucose levels in persons with diabetes mellitus damage blood vessels and subsequently lead to the formation of plaques (National Institute of Health, 2005). |

Non-modifiable RFs are unchangeable and consist of increasing age, male gender and heredity (AHA, 2010). Largely based on the assumption that a cumulative measure of a lifetime of coronary risk increases the likeliness of atherosclerosis (Vliegenthart et al. 2005), older individuals (65+ years) are more likely to have CHD and die as a result (AHA, 2010). Males have a greater risk of CHD compared to females and are also more likely to have coronary events earlier in life (AHA, 2010). This is due to the fact that the female hormone oestrogen provides a consistent protective effect against CHD, through its association with lipid metabolism (Williams, 1997). Once past the menopause however, a woman's risk becomes similar to a man's (Mackay & Mensah, 2004).

Children of parents with CHD are also more likely to develop the disease themselves as they typically present with one or more of the same RFs (AHA, 2010). The occurrence of a coronary event in a first-degree blood relative before the age of 55 years (in a male relative) or 65 years (in a female relative) can additionally, increase the risk of developing CHD (Mackay et al. 2004). African Americans have more severe high BP than Caucasian Americans and thus tend to have a higher risk of developing the disease (AHA, 2010). CHD risk is also higher among Indians and other Asians, partly due to higher rates of obesity and diabetes mellitus (AHA, 2010).

1.2.2. Contributing Risk Factors

Contributing RFs to CHD development comprise of stress and alcohol consumption (AHA, 2010). Stress is thought to affect CHD through the direct and prolonged activation of the autonomic system (Chandola, Britton, Brunner, Hemingway, Malik, Kumri et al. 2008). This exposes the body to persistent elevated levels of stress hormones like adrenaline, which accelerate the development of atherosclerosis (Johansson, Wickman, Skott, Gan & Berstrom, 2006). Johansson et al. (2006) suggests this persistent exposure to stress hormones can also change the way blood clots, increasing the risk of an MI. Additionally, stress is said to

contribute to high BP and often leads to neglect of a healthy lifestyle; such as poor eating habits (Heart UK, 2004). This consequently increases such factors as obesity and overweight and high blood cholesterol (Heart UK, 2004).

Alcohol consumption is also said to increase the risk of atherosclerosis directly and may involve such processes as inflammation or cholesterol oxidation (Pletcher, Varosy, Kiefe, Lewis, Sidney & Hulley, 2005). But it is thought that the likeliness of CHD is increased through its association with such factors as obesity and overweight, high blood cholesterol and diabetes mellitus (AHA, 2010); given its calorie content, and high BP as alcohol is shown to increase the sheer stress and turbulent flow of blood (Pletcher et al. 2005).

1.3. Risk Factor Modification

Knowing that CHD development is caused by several RFs, prevention of CHD concentrates on risk factor modification; reducing the extent of the RF or reducing the number of RFs one presents with (AHA, 2010). As approximately 75% of RFs are attributable to lifestyle choices (Mackay et al. 2004), risk factor modification focuses on three main 'lifestyle' RFs; smoking cessation, physical activity/exercise and diet/weight management (British Association for Cardiac Rehabilitation [BACR], 2007). The BACR (2007) state exercise and physical activity coupled with a healthy diet and avoidance of obesity and smoking represents a lifestyle that is strongly associated with good cardiovascular health, and a large body of evidence shows that modification of these can significantly reduce the risk of CHD (Kannel & Wilson, 1995).

In order to achieve smoking cessation, make healthier food choices and become physically active (Ford & Jones, 1991) however, requires an individual to give up or modify a behaviour that is firmly established (Miller & Taylor, 1995) and thus promoting a healthy lifestyle is a complex phenomenon (Sanderson, Waller, Jarvis, Humphries & Wardle, 2009).

Risk factor modification consequently, adopts theories derived from social cognition models of health behaviour (HB) which posit a range of factors that influence behaviour (Marteau & Weinman, 2006). Since the basic factor for these cognitions is 'knowing the negative consequence of the behaviour' (Parker & Assaf, 2005), knowledge of CHD is viewed as an essential component in risk factor modification and in the prevention of CHD (Ford et al. 1991; Jafray, Aslam, Mahmud, Waheed, Shakir, Afzal et al. 2005).

1.4. Coronary Heart Disease Prevention

CHD prevention exists as primary or secondary prevention. Primary prevention generally means the effort to modify or prevent the development of CHD RFs to delay or prevent new-onset CHD (Grundy, Balady, Criqui, Fletcher, Greenland, Hiratzka et al. 1998). Typically provided through the use of media; both electronic and print (Khan, Jafray, Jafar, Faruqi, Rasool et al. 2006), primary prevention informs those at risk about CHD and its RFs as well as trying to encourage a better lifestyle behaviour (Hardcastle, Taylor, Bailey & Castle, 2008). Examples of primary prevention could be smoking cessation resources like the 'Quit Kit' or the 'Change 4 Life' campaign which promotes better eating and more physical activity.

The term secondary prevention denotes therapy to reduce recurrent coronary events and decrease CHD mortality in patients with established CHD (Grundy et al. 1998). Its aim is therefore, at both the control of RFs and the direct therapeutic protection of coronary arteries from plaque eruption (Grundy et al. 1998). Since this population have been typically admitted to hospital following a coronary event, first hand information about CHD is communicated by health professionals (Khan et al. 2006). In addition, patients with CHD are enrolled onto Cardiac Rehabilitation (CR), a scheme which aims to achieve and maintain optimal physical and psychosocial health (Scottish Intercollegiate Guidelines Network [SIGN], 2003) through exercise, education and psychological support (Dinnes, Kleijnen, Litner & Thompson, 1999).

Informing patients about CHD, its RFs, the benefits to exercise and healthy eating, and medication, could be examples of CR education.

Widespread acceptance of the benefits of CHD prevention initially came in secondary prevention (Smith, Blair, Criqui, Fletcher, Fuster, Gersh et al. 1995), which has shown to significantly reduce recurrent coronary events and CHD mortality rates (Taylor, Brown, Ebrahim, Joliffe, Noorani, Rees et al. 2004). The United Kingdom (UK) alone has seen a 40% decline in CHD deaths (BHF, 2008). In doing so, health education has also been found to be an effective prevention strategy (Taha, Al-Almai, Zubeir, Mian & Hussain, 2004) by significantly improving a patient's overall HB (Salamonson, Everett, Davidson & Andrew, 2007). Less is known about the effect of primary prevention, as it is difficult to adequately estimate the incidence of people admitted to hospital with new-onset CHD (Mathur, 2002), but the use of media messages have shown to significantly improve HB (Chew, Palmer, Slonska & Subbiah, 2002).

1.5. Coronary Heart Disease Prevalence

Despite an improved survival rate with the introduction of CHD prevention, CHD still kills more people than any other disease accounting for 7.2 million global deaths per year (Mackay et al. 2004). Figure 2 illustrates the global prevalence (per 100,000) for CHD.

Figure 2 – The Global Prevalence of Coronary Heart Disease in 2004

Source: Mathers, Bernard, Iburg, Inoue, Ma Fat, Shibuya et al. (2008) Global Burden of Diseases: data sources, methods and results, as cited in WHO (2010)

In industrialised countries CHD is the most common cause of morbidity and mortality (Sebregts, Falger & Bar, 2000). In the UK approximately 1.4 million suffer from angina, annually around 3 million suffer an MI (SIGN, 2003), and more than 103,000 die per year as a result of CHD (National Institute for Health and Clinical Excellence [NICE], 2007). In the US approximately every 26 seconds an American will experience an acute coronary event and approximately every minute an American will die from one (AHA, 2004). This accounts for over 400,000 deaths per year (AHA, 2010). CHD also takes the lives of 2 million Europeans (Koutoubi, Huffman, Ciccazzo, Himburg & Johnson, 2005) and over 200,000 people in Australia (AHA, 2004), each year.

In developing countries, which were once seen less affected by the disease (Jafray et al. 2005), CHD is also now high on the top 10 mortality list (Mackay et al. 2004). The AHA (2004) reported that in 2004, over 700,000 people in China, over 140,000 people in Brazil, nearly 1.5 million people in India and approximately 350,000 in all regions of Africa died as a result of CHD. Largely attributable to 'western' influences (Jafray et al. 2005) this is particularly problematic as some developing populations face a double burden of risk, grappling with the problems of under nutrition and communicable diseases (Mackay et al. 2004).

1.6. Rationale for Study

Evident that the prevalence of CHD is still high in most countries and also on the rise globally (Khan et al. 2006); a true pandemic that respects no borders (Mackay et al. 2004), there is an obvious need to develop current CHD prevention. This would include focusing on the established findings that knowledge of CHD is essential for risk factor modification (Crouch & Wilson, 2010).

Nurses play a key role in the prevention of CHD viewing their responsibility not only as carers but as health educators (Steptoe, Doherty, Kendrick, Rink & Hilton, 1999). One

might expect that, given the education background and hands on experience, nurses would have a heightened awareness of CHD and consequently provide sufficient health education/promotion to facilitate better HB. However, there seems to be evidence that suggests substantial CHD knowledge gaps in nurses (Wilt, Hubbard & Thomas, 1990) and thus it is important to determine if nurses are suitably equipped to provide such health education/promotion.

Additionally, one would also expect nurses to adopt a healthier lifestyle (Undertaking Nursing Intervention throughout Europe [UNITE], 2002), though a large body of evidence suggests that nurses do not practice what they preach and demonstrate unhealthy behaviours (Jaarsma, Stewart, De Geest, Fridlund, Heikkila, Martensson et al. 2004). Does the knowledge to behaviour relationship therefore exist with regards to CHD prevention? Or alternatively, are nurses good role models to provide health education/promotion, as there is little doubt that people are unlikely to follow advice if the person delivering crucial information about CHD appears to contradict this through their own lifestyle (Jaarsma et al. 2004).

Providing this evidence is being established for the future development of CHD prevention, it is consequently important to determine CHD knowledge and HBs within the future population of nurses that will provide such strategies, that is student nurses. Student nurses could be potential advocates for CHD prevention and possibly effectively help make an impact on the CHD prevalence that we see today.

Chapter Two:

Literature Review

2.1. Introduction to Literature Review

The purpose of this literature review is to identify and discuss those studies that relate to CHD knowledge and its association with HB. To understand this association, the review will initially consider the social cognition models for HB that have established knowledge as a pre-requisite for behaviour change (Jafray et al. 2005). Given that knowledge is the basis for behaviour change, the review will also examine CHD knowledge in different populations; the general population, patients, health professionals and students, as well as providing evidence for their HBs. Furthermore, as some studies have shown that demographic variables such as age and gender have modified disease prevention behaviours (Chew, Palmer & Kim, 1998), this literature review will also identify any age-related or gender differences in CHD knowledge and the subsequent effects on HB. This will put the present study into context, establishing the aims and proposed hypotheses of the study.

2.2. Defining Coronary Heart Disease Knowledge and Health Behaviour

Prior to an extensive evaluation into CHD knowledge and HB research, it is firstly important to consider and identify what CHD knowledge and HB entails. After reviewing a vast array of literature it is clear that the following terminologies can be used as definitions for both variables.

CHD Knowledge is an understanding, awareness, perception, or conception of the general pathophysiology, RFs, symptoms, prevention and treatments associated with CHD.

(Mosca, Jones, King, Ouyang, Redburg, Hill et al. 2000; MacInnes 2005; Byrne, Walsh & Murphy, 2005; Lin, Furze, Spilsbury & Lewin, 2008; Kayaniyil, Arden, Winstanley, Parsons, Brister, Oh et al. 2009; Ayres & Myers, 2010; Crouch et al. 2010).

HB is recognised as an action taken by an individual to maintain, attain, or regain good health, and to prevent illness. This includes stopping smoking, making healthy food choices, becoming physically active, achieving an ideal weight, consuming alcohol in moderation, achieving 'normal' BP levels and achieving total cholesterol levels within the recommended range

(Alm-Roijer, Stagmo, Uden & Erhardt, 2004; Koutoubi, Huffman, Ciccazzo, Himburg & Johnson, 2005; Byrne et al. 2005; Ford et al 1991; Stampfer, Hu, Manson, Rimm & Willet, 2000).

2.3. Social Cognition Models for Health Behaviour – The Association between Knowledge and Behaviour

Health psychology offers a number of models that seek to help us understand the association between knowledge and behaviour (Byrne et al. 2005). Although there are several, the most commonly used approach is the health belief model (Diefenbach & Leventhal, 1996; Troein, Rastam & Selander, 1997). The health belief model is constructed of five basic factors that influence disease prevention behaviours; perceived susceptibility, which refers to a person's beliefs about the possibility of getting the disease; perceived seriousness of the consequences of the disease, such as a disability or mortality; perceived benefits of performing the recommended behaviour, like feeling healthier or living longer; perceived barriers to the suggested actions, which may include cost or time; and finally, cues to action, which may constitute a physician's advice, print or electronic advertisement (Chew et al. 2002).

The health belief model states that the cumulative affect of an individual's readiness to act (presence of perceived susceptibility and perceived seriousness) and efficacy of the recommended response (perceived benefits outweigh perceived barriers) results in preventive HB (Chew et al. 2002), however, in order to activate such effect an individual requires cues

to action (Glanz, Marcus-Lewis & Rimer, 1997). Using a modified version of the health belief model, Ali (2002) found that the predictors of CHD prevention tended to be largely attributable to the knowledge of RFs, which in turn improved the susceptibility and seriousness of an individual. Hewstone, Fincham and Foster (2005) and Chew et al. (2002) also found that knowledge about CHD RFs increased an individual's seriousness of the disease, as well as their susceptibility to the negative unhealthy behaviour consequences; for example having an MI. Furthermore, Chew et al. (2002) found that as a result of gaining health information, individuals recognised the benefits of and barriers to practicing HBs.

Additional to the health belief model, several studies have outlined the self-regulatory model of illness perception and the common-sense model of representation as alternative approaches (Diefenbach et al. 1996). Both are similar in the assumption that an increased awareness of health threats leads to representations of preventive behaviour (Petrie & Wienmann 1997; Hamner & Wilder, 2008). MacInnes (2005) states that an improved perception of CHD through social messages can consequently, contribute to the development of five illness cognitions. These include the cause(s), which refers to beliefs about why one contracts the illness; time-lime, which is the perception about whether the illness is acute or chronic; identity, which includes the understanding of symptoms; consequence, which refers to the belief about the outcome of the illness; and cure, which relates to beliefs about how one recovers (MacInnes, 2005). MacInnes (2005) and Hamner et al. (2008) explain that increasing one's knowledge of CHD would assume that a health threat is recognised and that subsequently, an individual will change to a state of health.

Knowledge is therefore, evidently essential as an adjunct to preventative HBs (MacInnes, 2005). Hamner et al. (2008) found that, after testing 112 women in rural Alabama, the first and foremost consideration to promote HBs is that the population must be taught the RFs of CHD. In addition, MacInnes (2005) found that with a limited knowledge regarding the causes of an MI patients had more negative consequences for how they dealt

with the illness in terms of making behavioural changes. Furthermore, it is noted by Kayaniyil et al. (2009) that there was a significant correlation between higher knowledge and perception of greater negative illness consequences and a greater perception of CHD as a chronic condition.

2.4. Coronary Heart Disease Knowledge in the General Population

Public awareness and understanding of CHD is essential for both primary and secondary prevention (Nash, Mosca, Blumenthal, Davidson, Smith & Pasternak, 2003), however, the general population is shown to only understand some of the main aspects of CHD (Ayers et al. 2010). Jafray et al. (2005) found that 792 individuals accompanying or visiting patients across a wide demographic spectrum had a striking lack of knowledge about CHD, only achieving a median knowledge score of 3 out of a possible maximum of 15. Just 14% were able to correctly describe what they thought CHD meant, 20% were not able to identify even a single RF and only a minority were able to correctly identify symptoms of angina (chest pain 36% and dyspnoea 24%) (Jafray et al. 2005). Mochari, Ferris, Adigopula, Henry and Mosca (2007) also reported that over half of a sample of minorities in New York (59%) was unaware that CHD was a leading cause of death.

Sanderson et al. (2009) reported that 1,747 adults in the UK were only able to identify a mean of 2.1 RFs and that a small proportion of the population (9%) did not recognize any RFs for CHD. But, then again it could be argued that mean scores are not the best indicator to use. The awareness of the role CHD RFs was also reported by Salamonson et al. (2009) to be discriminating with most respondents identifying that eating an unhealthy diet and physical inactivity were RFs for CHD yet, failed to recognise the importance of smoking cessation. Nash et al. (2003) found that less than half of adults aged ≥ 40 years (40.2%) were unaware of the national guidelines for cholesterol management and that 53.1% either did not know or overestimated the desirable total cholesterol level for healthy adults. A study about

consumers understanding of salt, additionally found that 188 female respondents from Scotland were significantly ($p < 0.01$) unaware of their daily salt intake or of the recommended intake (Marshall, Bower & Schroder et al. 2007).

Thought to be largely attributable to a limited CHD knowledge (Biswas, Calhoun, Bosworth & Bastian, 2002), consequently few individuals in the general population practice healthy lifestyles. Jafray et al. (2006) reported that 314 out of 810 patient attendees (defined as persons accompanying patients to hospital) were smokers, and similarly, in apparently healthy German men Maas, Schulze, Baumert, Lowel, Hamraz, Schwedhelm et al. (2007) determined 41% were current smokers. The AHA also indicates that less than half (49.1%) of US adults meet the American College for Sports Medicine [ACSM] physical activity recommendations (30 minutes, 3 to 5 times a week) (Haskell, Lee, Pate, Powell, Blair, Franklin et al. 2007). Wong, Garcia, Barr, Glazier and Abramson (2008) determined that from a sample of 807, 37% of participants in Toronto were physically inactive and equally, Maas et al. (2007) found that only 36% of individuals living in Germany were active. Furthermore, it has been found that 361 men living in Northern France were overweight (26.6 kg/m^2) (Dallongeville, Marecaux, Cottell, Bingham & Amouyel, 2000) and that women from the US, were found to be almost obese (29.6 kg/m^2) (Thanavaro, Moore, Anthony, Narsavage & Delicath, 2006).

Evidence that knowledge of CHD is important to the HB of the general population can be seen in Lynch, Liu, Kiefe and Greenland (2006) who found that persons with greater knowledge of CHD RFs showed less of an increase in their body mass index than people without such knowledge. Hardcastle et al. (2008) also determined that two physical activity and diet counselling sessions significantly improved the body mass index ($p < 0.01$), physical activity level ($p < 0.05$) and daily fat intake ($p < 0.01$) in participants with one CHD RF. Additionally, Dallongeville et al. (2000) determined that nutritional knowledge was influential with regards to food consumption and nutritional intake, as the higher knowledge

score attained the greater the consumption of vegetables ($p<0.05$) as well as consuming significantly less total fat ($p=0.01$). However, despite the better nutritional behaviour in individuals with better knowledge the absolute intake of fat was still above the recommended guidelines (Schwartz & Borra, 1997).

Personal awareness in the general population can however, be attributable to the fact that many do not know they have CHD RFs. Mochari et al. (2007) demonstrated that although 24% of people who had either high BP or high blood cholesterol almost 2 out of 3 (63%) were unaware that they had such conditions. Harkins, Shaw, Gillies, Sloan, MacIntyre, Scoular et al. (2010) also found that participants who expressed a lack of understanding about CHD were more likely to turn down the opportunity to engage in CHD prevention because they felt they were in good health and did not need it. Individuals are therefore, unlikely to adopt a healthy lifestyle unless they are told they are at high risk for developing CHD (Mochari et al. 2007). In contrast however, several studies have found that the knowledge of CHD RFs is low even in the high risk population (Murphy, Worcester, Higgins, Le Grande, Larritt & Goble, 2005; Zerwic, King & Wlasowicz, 1997) and that CHD knowledge in obese individuals did not differ significantly from individuals' with a normal weight (Andersson, Sjoberg, Ohrvik & Leppart, 2006).

There seems to be circumstantial evidence that CHD knowledge may be associated with education level (Andersson & Leppart, 2001) as Dallongeville et al. (2000) found that nutritional knowledge was significantly related to the level of education ($p<0.02$). In addition, level of education was found to be the strongest predictor of the number of RFs identified for CHD, with educated individuals being able to identify more RFs (2.1) compared to those with no formal qualifications (1.6) (Sanderson et al. 2009). Low educational level has been additionally associated with an increased risk for metabolic syndrome (Wamala, Lynch, Horsten, Mittlem, Schnek-Gustat & Ort-Gomer, 1999) as well as a higher proportion of obese individuals among the less educated ($p<0.002$) (Andersson et al. 2006).

2.5. Coronary Heart Disease Knowledge in Patients

In view of the fact that patients' CHD knowledge can strongly influence advocacy for physician screening and provide motivation for individual behaviour changes (Ford et al. 1991; Stewart, Abbey, Shnek, Irvine & Grace, 2004), and likewise, an inadequate understanding of the disease may cause non-compliance with medical advice and unnecessary disease progression (Kayaniyil et al. 2009), CHD knowledge is pivotal to the survival of patients (Crouch et al. 2010). Yet, most literature determines that there is a striking lack of knowledge among patients (Khan et al. 2006) and that patients' knowledge is suboptimal (Momtahan, Berkman, Sellick, Keams & Lauzon, 2004).

Khan et al. (2006) reported that only 42% of patients had a 'good' level of knowledge and similarly, Kayaniyil et al. (2009) found that patients presented with moderate CHD knowledge. In addition, Khattab, Abolfotouh, Alakija, al-Humaidi and al-Wahat (1999) found that only a small percent (16.5%) of obese individuals perceived their body build to be a health risk, and 22.6% of inactive people perceived their inactivity as harmful to health. Karner, Garansson & Bergdahl (2003) also found a substantial variation in patients' understanding of the disease with some patients unaware that an MI was lack of oxygen supply. It was additionally reported by Tod, Read, Lacey and Abbott (2001) that patients with angina lacked the awareness about the causes, treatment and risks associated with CHD. Nonetheless, compared to the general population there is evidence that states CHD knowledge is higher in patients with established CHD (Wong et al. 2008).

The HB of this population has consequently been seen to be inadequate. Alm-Roijer et al. (2004) determined that from a sample of CHD patients from Sweden, the mean body mass index signified an overweight population (27.8 kg/m^2) and that 34% reported they were not participating in physical activity. Among 351 cardiac patients in the US, Kayaniyil et al. (2009) also found that the mean body mass index was nearly obese (29.0 kg/m^2) and additionally, Salamonson et al. (2007) found that 31% of patients were smoking and that 86%

had inadequate physical activity levels. In addition, Khan et al. (2006) reported that only 4.3% of patients with an acute MI in Pakistan exercised at all.

Evidence that knowledge benefits HB can be shown in Salamonson et al. (2007) who found that there was a significant overall improvement in behaviour as a result of CR; increased non-smoking behaviour ($p<0.001$), adequate physical activity ($p<0.001$) and low dietary fat ($p<0.002$). Equally, Redfern, Ellis, Briffa and Freedman (2007) found that patients enrolled onto CR were less likely to have total cholesterol levels <4 mmol/L ($p<0.05$), less likely to be obese ($p<0.05$), more likely to be physical active ($p<0.001$) and less likely to smoke ($p<0.001$). However, it has been found that no significant differences in HB changes occur as a result of CR but that CR attendees report feeling healthier (Salamonson et al. 2007).

Several studies have also identified that patients are selective in the fact that they are more aware of certain RFs compared to others. Khan et al. (2006) determined that a larger proportion of patients were able to associate fatty foods (92%) and smoking (83%) to CHD and that only a minority could identify obesity (42%) or lack of exercise (25%). Zerwick et al. (1997) and Wong et al. (2008) also found that few patients were able to identify hypertension and diabetes as RFs for CHD compared to other behaviour factors like smoking and fatty foods. Furthermore, it has been determined that patients are more knowledgeable about the fact that heredity and stress are the cause of their disease (35% and 36%, respectively) compared to other lifestyle RFs (Byrne et al. 2005).

Accordingly, this relates to patients also being selective of the HBs they practice (Salamonson et al. 2007). Following 6 months after an acute MI, Salamonson et al. (2007) found that patients showed significant improvements in three of the four HBs that were examined; smoking ($p<0.001$), physical activity ($p<0.001$) and dietary fat ($p<0.002$), however failed to significantly achieve a normal body mass index ($p=0.807$).

This pattern of knowledge may however, be due to relatively more aggressive advertising campaigns as well as educational programs discouraging the use of saturated fats and tobacco and a relative dearth of the same for obesity (Khan et al. 2006). Yet, despite the attention in the media around these topics (Oliver-McNeil & Artinian, 2002) it is evident that this does not necessarily relate to an increase in CHD knowledge. Current or ex smokers are shown to be less aware smoking is a RF for CHD than those who have never used tobacco (Woodward, Bolton-Smith & Tunstall-Pedoe, 1994), which could be apparent since tobacco users adopt such behaviour because they are unaware of the adverse consequences of their habit (Khan et al. 2006). But it has also been proposed that tobacco users are simply less prepared to admit the health implications of what is commonly perceived as an unhealthy behaviour, at least in regard to their own health (Woodward et al. 1994). This can also be suggested in relation to diet and physical activity.

Another theory might however, be due to difficulties articulating such knowledge as the level of patients education is shown to be a predictor of CHD knowledge (Karner et al. 2003; Khan et al. 2006). Karner et al. (2003) found that most patients were not able to express a deep understanding of their disease despite comprehensive information given to them and Kayaniyil et al. (2009) also determined that there was a significant correlation between the patients knowledge score achieved and the patients educational background of <high school and \geq high school ($p < 0.001$). Moreover, it is suggested that the more knowledgeable patients will alternatively seek out information about CHD in an attempt to better manage their illness (Kayaniyil et al. 2009).

It has also been suggested that the education material that is provided has not always been written at an appropriate reading level for most patients to understand (Safeer, Cooke & Keenan, 2006). In a study determining the benefits of educational materials in an Emergency Department, it was found that only 10% of these materials were written at a level (8th grade or below) that was understandable to the majority of patients (Spandorfer, Karras, Hughes &

Caputo, 1995) and similarly, Evanski (1990) found that, on the whole, educational reading material was written at a high level. This is particularly apparent and problematic when the patient presents with complicated cardiac disorders; such as ventricular arrhythmias or heart failure, as a result of CHD (Evanski, 1990).

2.6. Coronary Heart Disease Knowledge in Healthcare Professionals

Healthcare professionals play an important role in the management of CHD through health promotion/education in CR (Gray, Bowman & Thompson, 1997) and via more influential roles in the primary care of risk factor modification (Thompson & Stewart, 2002). Extensive research into health professionals has broadly reported satisfactory levels of CHD knowledge (Moore & Adamson, 2001). Moore et al. (2001) determined that most staff (65%), in a primary care setting, are clear on the dietary recommendations for the general population; reduction in total dietary fat and an increase in fruit and vegetables, and nurses are also in general found to be cognisant in CHD RFs (Barnett, Norton, Busam, Boyd, Maron & Slovis, 2000) and of the message they typically give patients (Jaarsma et al. 2004).

As a result, it has been noted that cardiac nurses (n=130) from a range of European countries, were found to have adopted a healthier lifestyle than the general population (UNITE, 2002). However, there is the assumption that these cardiac nurses, who were attending a scientific meeting in Glasgow, would be more likely to participate in the study than those nurses with a worse RF profile and thus may not be entirely representative of cardiac nurses in general (Jaarsma et al. 2004). Jaarsma et al. (2004) has reported that a small percentage of 112 nurses do, actually, have unhealthy lifestyle behaviours with 11% of nurses reporting they were current smokers, 27% stating they had a body mass index $>25 \text{ kg/m}^2$ (overweight) and over a quarter (27%) stating they did not regularly participate in exercise. In addition, Hodgetts, Broers and Godwin (2004) found that of 273 physicians working in Eastern Europe 45% were current smokers and Tucker, Harris and Pipe (2007) demonstrated

that less than one third of nurses reported to engage in moderate physical activity of 30 minutes/day and 85% stated they ate fast food or snacks one to three times a week.

This suboptimal HB could be attributable to the fact that there are however, substantial CHD knowledge gaps in health professionals (Moore et al. 2001). Moore et al. (2001) found that in relation to nutritional knowledge the area of lipid lowering diets and dietary fats were where a significant amount of confusion existed in healthcare professionals, as over half of the 109 staff surveyed stated that egg consumption should be restricted to no more than two per week; a recommendation that can no longer be justified (Department of Health [DOH], 2004). In addition, Lin et al. (2008) found that nurses had poor understanding of the disease process and physiology of CHD and furthermore, Heidrich, Behrens, Raspe and Keil (2005) found that nearly one third of 1,023 physicians working in Germany were unaware of secondary prevention guidelines.

Standards for health-enhancing behaviours are widely published in various guidelines and are a useful tool for healthcare professionals to bridge the gap between evidence based research and clinical medicine (Heidrich et al. 2005). However, even when sufficient guideline knowledge exists in physicians a substantial amount stated they would only start RF treatment at levels well above those recommended in current guidelines. For instance, only a quarter of physicians (24.4%) reported to start comprehensive weight counselling at a body mass index of 25 to 29.9 kg/m² (overweight) and just over half (63.7%) of physicians at a body mass index of ≥ 30 mg/m² (obese) (Heidrich et al. 2005). Additionally, Heidrich et al. (2005) found that only 48.6% reported making use of smoking cessation, and it has been reported that between 1992 and 2000 diet and physical activity counselling took place in fewer than 45% and 30%, respectively, of primary care visits by adults with CHD RFs (Ma, Urizar, Alehegn & Stafford, 2005). Thus, physicians fail to provide effective behaviour change counselling to their patients even when they are aware that CHD risk exists (Ma et al. 2005).

There are also suggestions that regardless of the knowledge, it is actually beliefs and misconceptions about living with CHD held by healthcare professions that influence behaviour change outcomes (Lin et al. 2008). Newens, McColl, Lewin and Bond (1996) found that cardiac-related symptoms and cardiac conceptions were significantly inaccurate in nurses. Lin et al. (2008) additionally, detail that this lack of knowledge and misconception may not only cause nurses to adopt unhealthy behaviours but can cause patients to have unnecessarily frightening images of living with CHD. Consequently, patients adopt profoundly sedentary and avoidant lifestyles which would increase their risk of future cardiac events (Cooper, Jackson, Weinman & Horne, 2005; Byrne et al. 2005).

Regardless of CHD knowledge, there is also the challenge of effectively delivering health information which is compounded by the poor communication skills of physicians (Safeer et al. 2006). Safeer et al. (2006) detail that it is not uncommon for patients to have difficulty understanding the information given to them by their physicians, as they feel they are using medical terminology (Bourhis, Roth & McQueen, 1989). Mayeaux, Murphy, Arnold, Davis, Jackson and Sentall (1996) details that generally, the medical terms used by physicians in America are not very well understood by patients and Ong, de Haes, Hoos and Lammes (1995) states that this results in patients not being able to recall half of the information given to them during consultation. Ni, Nauman, Burgess, Wise, Crispell and Hershberger (1999) also reported that, even when patients received information from their healthcare provider about how to take care of themselves, only about half knew 'some' or 'little or nothing' about their condition (48% and 38%, respectively) and just 14% knew 'a lot'. There is therefore, a clear chasm between patient receiving information and patients understanding the content (Safeer et al. 2006). In contrast, however, Moore et al. (2001) found that 90% of patients in England felt the advice they had been given was understood and they knew what was expected from them to make the changes that were suggested to them.

2.7. Coronary Heart Disease Knowledge in Students

The major RFs leading to CHD have their roots in childhood and adolescence (Manios, Moschandrea, Hatzis & Kafatos, 2002). With this in mind, several primary initiatives have been put in place to improve CHD awareness through schools and have resulted positively (Manios et al. 2002). Koutoubi et al. (2005) found that out of 300 college students 98.3% were knowledgeable about the RFs for CHD correctly identifying high BP, high blood cholesterol, smoking, obesity and physical inactivity. Felimban (1993) and Bayat, Pillay and Cassimjee (1998) also found that 99.7% and 49%, respectively, of students were aware of the adverse effect of smoking and that smoking was associated with CHD. This is suggested a result of the widespread publicity or the emphasis placed on curriculum design (Taha et al. 2004).

Conversely, there is also evidence to show that the knowledge of modifiable CHD RFs can be very low (Lynch et al. 2006). Lynch et al. (2006) reported that as little as 20% of students in the US were able to recognise high BP, overweight and lack of exercise as RFs and that as few as 17% were able to identify high blood cholesterol. In addition, Taha et al. (2004) determined that in Al-Khobar students' knowledge on hypertension, diabetes mellitus and obesity as RFs was rather inadequate and Manios et al. (2002) reported that health, nutrition and physical activity awareness was limited in primary schools of Crete.

The lack of knowledge however, could be suggested attributable to the educators, as the overall effect on students' HB can be particularly influential (Koutoubi et al. 2005). Although teachers are shown to have a significantly better knowledge about CHD risk than their students the knowledge is still unsatisfactory (Taha et al. 2004). Only around 19% teachers in Saudi Arabia were able to identify diabetes mellitus as a RF, less than half (42.4%) were able to recognise lack of physical activity as a RF and 39.4% of teachers were able to identify hypertension as risk for CHD (Taha et al. 2004). Furthermore, Maziak,

Mzayek and Al-Moushareff (2000) determined that less than 10% of teachers in the north of Syrian Arab Republic recognized smoking as a health hazard for CHD.

Moreover, a parents' level of CHD knowledge is important determinants for HB (Rasanen, Niinikoski, Keskinen, Helenius, Talvia, Ronemaa et al. 2003). Rasanen et al. (2003) determined that 45.7% of parents in Finland had only a moderate nutritional knowledge and that just over half of parents (57.1%) knew the causal relationship between CHD and diet, and consequently affected the nutritional intake of the children. On the other hand, it was determined by Taha et al. (2004) that in actual fact the main source of health knowledge for students, was television (58% males and 61% females) and that parents and teachers were less of an influence.

Determining the knowledge of adult students (university students) who are less influenced by teachers or parents shows a high knowledge of CHD RFs (Belardinelli, Georgiou, Cianci & Purcano, 1999). Almas, Hameed and Tipoo-Sultan (2008) found that adult students from University graded smoking as the top most RF for CHD (84.5%) and that they correctly identified hypertension (89%), high blood cholesterol (91.5%), a sedentary lifestyle (63), obesity (72%), and diabetes mellitus (63%) as modifiable RF. Using a CHD awareness questionnaire Almas et al. (2008) also found that the mean knowledge score of adult students was 11.5 out of a maximum 16 (71%). On the other hand, it has been found that adult students have less knowledge in relation to the treatments of CHD than patients; such as angiography, as less than half were able to correctly define the procedure and almost 16% had never heard of it (Almas et al. 2008). Yet, it could be suggested that in adult students who require only primary prevention, knowledge of treatments for established CHD is not as essential as the knowledge of CHD RFs.

University students often represents the first time many young adults assume responsibility for their HBs (Koutoubi et al. 2005) and given the increased awareness of CHD it could be assumed that better HBs are practiced. However, there seems to be evidence

which suggests that students of this age do not adopt positive HBs. Pan, Dixon, Himburg and Huffman (1999) state, largely attributable to financial and time constraints, students skip meal-times and tend to consume large amounts of salty, sweet and high fat foods, as well as consuming less dietary fibre and vegetables (Pan et al. 1999). Brevard and Ricketts (1996) also found that University students took in higher amounts of total fat, and saturated fat than the recommended levels and Wiley, James and Fordan-Belver (1996) determined that students' diets are low in fruit and vegetables.

Students are also less likely to engage in physical activity, with only 14% reporting participating in at least 60 minutes of moderate to vigorous activity each day (Scully, Dixon, White & Beckmann, 2007). The participation in the recommended three to five sessions a week (ACSM, 2006) is also overseen by students as Haase, Steptoe, Sallis and Wardle (2004) found that University students from 23 countries (North-Western Europe and the US) were significantly participating in low frequency activity ($p=0.001$) as well as significantly more being inactive ($p=0.001$). Additionally, it has been noted in the UK the freedom of being away from home combined with lots of socialising and the ability of cheap drinks does mean many students drink heavily (Gill, 2002), yet for medical students in the US, general alcohol consumption is found non-excessive with most drinking one (53%) or two drinks per day (37%) (Frank, Elon, Naimi & Brewer, 2008). Furthermore, it is suggested that students are the most vulnerable group to begin smoking (Safeer et al. 2006).

2.8. Age-related Differences in Coronary Heart Disease Knowledge

Age appears to have a positive linear relationship with knowledge (Jafray et al. 2005). Mosca et al. (2000) determined that younger women (25 to 34 years) were less likely to respond that they did know CHD was the leading cause of death compared with women aged 45 to 64 years, and mean knowledge scores have also shown to significantly ($p=0.03$) increase from the ≤ 30 year age group to the >60 year age group (Jafray et al. 2005). In

addition, individuals younger than 55 years were more likely to be unaware that they had high BP (Mochari et al. 2007) or that high BP was a leading cause of CHD (Mosca et al. 2000). Jafray et al. (2005) explains this pattern is a result of, as years go by, individuals are more likely to accrue knowledge as well as it becoming more relevant to their lifestyle.

Older individuals are said to acquire an increased perception of CHD as a result of an increased vulnerability compared to younger individuals (Petrie et al. 1997) and are more likely to view or consider the seriousness of poor health and becoming ill (Chew et al. 2002). The same also applies to all health lifestyle issues and subsequently, relates to the elderly becoming more aware of their mortality and thus taking better care of themselves (Hamner et al. 2008). Chew et al (2002) also states that this increased vulnerability drives older individuals to increase health promoting behaviours such as eating a healthy diet and avoiding emotional distress which can benefit CHD. On the other hand, it has been determined that vulnerability of CHD is demonstrated in all age groups and additionally, this perception was not enough to promote lifestyle changes (MacInnes, 2005).

Conversely, Gump (2001) found that older CHD patients were more likely (70%) to believe 'old age' was the cause of their illness rather than their personally health damaging behaviours compared to younger patients. This corresponded to older patients being more likely to believe they have no control over their illness and that their illness could only be cured by a medical intervention (Gump, 2001). For example, Scully et al (2007) found that fruit consumption and physical activity levels declined with age as a result of believing they did not need to practice these HBS; suggested a result of them believing the damage was already done.

There is however, some evidence that suggests the knowledge about CHD RfCs decreases as age increases (Potvin, Richard & Edwards, 2000). Potvin et al. (2000) found that individuals aged 18-24 years had a significant increased awareness of CHD than those in aged 65-75 years. Equally Mosca et al. (2000) found that significantly less women ≥ 65 years

identified a sedentary lifestyle as a major risk for CHD compared to younger women ($p=0.05$). In addition, Sanderson et al. (2009) found that adults in the UK aged over 60 years significantly identified fewer lifestyle RFs for CHD than those younger ($p=0.001$). Jafray et al. (2005) suggests this occurs as a result of current school education initiatives which have developed over time to spend substantially more time on health education. As a consequence individuals that attend school nowadays are more knowledgeable than the elderly who may not have received such instruction during their schooling years (Jafray et al. 2005).

2.9. Gender Differences in Coronary Heart Disease Knowledge

CHD has been socially constructed as a gender-specific disease (MacInnes, 2005) with the misconception is that CHD is a ‘man’s disease’ (Lockyer, 2002). However, recent evidence highlights that CHD prevalence is significantly higher in women compared to men (Hamner et al. 2008). In fact, in the US CHD kills one woman a minute, causing more deaths in women than the next six causes of death combined (Hamner et al. 2008).

These misconceptions of CHD however, seem to occur predominantly in the women themselves as they typically underestimate their personal CHD risk (Hart, 2005). Thanavaro et al. (2006) determined that women had a low CHD knowledge and Mosca et al. (2000) Oliver-McNeil et al. (2002) found that women across the US only a minority were able to name the major RFs for CHD; smoking (3%), obesity (9%) and high blood cholesterol (12%). Furthermore, Crouch et al. (2010) found that women situated in rural Australia were nearly completely unaware of the risk of CHD and that CHD was the leading cause of death. This is particularly problematic as non-metropolitan areas of Australia have a significantly higher (up to 70%) mortality rate from CHD than the metropolitan areas (Australian Institute of Health and Welfare, 2007).

Women limited in their awareness of their personal risk are consequently not prepared to deal with health promoting practices (Oliver-McNeil et al. 2002; Thanavaro et al. 2006).

Oliver-McNeil et al. (2002) found that women with CHD did not practice HBs and it is also reported that 85% of the women with known CHD did not make lifestyle changes in response to their diagnosis (Marcuccio, Loving, Bennett & Hayes, 2003). Similarly, Thanavaro et al. (2006) found that HBs were not performed by women on a regular basis which was additionally seen to be significantly correlated with CHD knowledge ($p=0.01$). Conversely, it has been established that even with a greater knowledge of CHD and personal RFs, this not an indication that the women will engage in HBs (Oliver-McNeil et al. 2002).

The fact that women do not practice a healthy lifestyle is suggested attributable to the fact that women have a lack of concern about CHD (Thanavaro et al. 2006). Legato, Padus and Slaughter (1999) reported that 44% of women surveyed in the US believed that it was somewhat or very unlikely that they would suffer a heart attack, and 58% believed they were as likely as or even more likely to die of breast cancer than CHD. Similarly, Mosca et al. (2000) found that only 9% of women said that the condition they most feared was CHD, in contrast to 61% of these women who reported that they most feared breast cancer. Thus, many women underestimate the importance of CHD risk (Crouch et al. 2010).

Mosca et al (2000) also determined that the heightened awareness of breast cancer reflects the possibility that women feel uniquely related to the disease and that the plethora of information for breast cancer is targeted at women. Breast cancer awareness is also highly visible in the community, being the topic of television dramas and documentaries (Crouch et al. 2010). In contrast however, women's magazines have many columns devoted to losing weight, exercise and reducing fat intake but these are never presented in terms of preventing CHD (or other conditions) and packaged with a focus on glamour and slimness (Crouch et al. 2010).

Evidence to suggest differences in CHD knowledge between males and females can be apparent across all populations. Jafaray et al. (2005) reported that in a population of individuals visiting patients in a Pakistan hospital, females had significantly ($p=0.01$) more

CHD awareness compared to males. In addition, Koutoubi et al. (2005) reported that female students from the US were significantly more likely than males to correctly answer that lowering blood cholesterol can help those who have already had an MI and that significant more females were able to identify that high blood cholesterol was related to CHD ($p=0.00$). On the other, it has also been found that there are no significant differences in the amount of CHD RFs identified by male and female adults in the UK ($p=0.21$) (Sanderson et al. 2009).

The HB of males and females can also be seen to differ significantly with student males being more likely to consume fast foods ($p=0.00$), but also more likely to consume at least four serves of fruit and vegetables ($p=0.00$), and more likely to meet the physical activity recommendation ($p<0.00$) compared to female students (Scully et al. 2007). As well as being less active, females are also currently surpassing males in relation to smoking behaviour, being less likely to give up through fear of gaining weight (Thanavaro et al. 2006).

2.10. Aim(s)

To evaluate CHD knowledge and HB in student nurses with respect to the three modifiable 'lifestyle' RFs; smoking cessation, physical activity/exercise and diet/weight management (BACR, 2007). This includes identifying:

1. Whether student nurses have sufficient knowledge of CHD.
2. Whether the student nurses practice HBs.
3. Whether there is a relationship between the student nurses CHD knowledge and the HB.
4. Whether the age or gender of the student nurse affects CHD knowledge and HB.

2.11. Hypotheses

2.11.1. Experimental Hypothesis

1. Student nurses will have sufficient CHD knowledge.

2. Student nurses will be practicing positive HBs.
3. There will be a positive relationship between CHD knowledge and positive HB in student nurses.
4. There will be evidence of age-related differences in CHD knowledge and HB in student nurses.
5. There will be evidence of gender differences in the CHD knowledge and HB of student nurses.

2.11.2. Null Hypothesis

1. Student nurses will not have sufficient CHD knowledge.
2. Student nurses will not be practicing HBs.
3. There will be no relationship between CHD knowledge and HB in student nurses.
4. There will be no age-related differences for CHD knowledge and HB in student nurses.
5. There will be no gender differences in the CHD knowledge and HB in student nurses.

Chapter Three:

Methods

3.1. Introduction to Methods

The purpose of this methods chapter is to communicate and rationalise the methods of the present study. This includes considering the participants from whom CHD knowledge and HB information was collected from, the kind of data collection tool that was used to collect CHD knowledge and HB, the way in which CHD knowledge and HB was collected and how CHD knowledge and HB was statistically analysed.

3.2. Participants

The sample comprised of third year student nurses attending University. The exclusion of student nurses in their first or second year of study was based on the understanding that CHD knowledge is provided as a module to student nurses during their second year (Informal communication with representative from University, April 2010). The knowledge of the third year student nurses was therefore, seen to be similar providing a comparable baseline for association with HB as well as also reassuring the completion of the study. It was also determined by further informal communication with representatives of University staff (April, 2010) that CHD knowledge should be similar in third year students regardless of the institute of study. Universities must abide by current national curriculum programmes in accordance with the DOH and thus 'Nursing' studies are fairly consistent throughout different Universities (Informal communication with representative from University, April 2010).

Given the vast range of institutions from which student nurses could be obtained from it was determined that the study's sample population would be selected only from Universities in the north of England. The inclusion of universities situated in this region was based on statistics from the BHF (2008) which states CHD death rates are significantly higher in the north of England compared to the rest of the country. The students would therefore, have a similar risk for CHD being located in this area for at least three years whilst at

University. In addition, as student nurses tend to obtain their first qualified nursing job within the same area as they have studied (Informal communication from representative of University, April 2010) student nurses in the north of England would also be potential advocates for coronary care in a patient population with an increased risk of CHD.

The north of England comprises of 9 counties as illustrated in figure 3, and a University subject search (www.ucas.ac.uk), determined that 18 Universities in this region offered at least one type of ‘Nursing’ study. These 18 Universities were subsequently approached, initially via telephone; where an appropriate contact name and email address was acquired, and then by email; to secure permission



Figure 3 – The North of England

from the University to include their third year student nurses as well as their cooperation to send out and distribute the data collection tool on the studies behalf (See Appendix 1 for Specimen Email). Five of the 18 Universities in the north of England confirmed consent; the University of Bradford, University of Huddersfield, University of Liverpool, Manchester Metropolitan University, and Northumbria University (See Appendix 2a, 2b, 2c, 2d, and 2e for Confirmation Emails), and collectively approximated a potential study sample size of 696 third year student nurses (See Appendix 3 for Sample Size Summary).

3.3. Data Collection Tool

Following a review of the methodological traditions available to use for data collection and the methods of data collection used in similar research studies it was determined that the present studies data collection tool was a questionnaire (See Appendix 4 for Review of Methodology). The questionnaire; a Coronary Heart Disease Knowledge and Health Behaviour questionnaire (CHDKHBQ), consisted of 30 questions split into three

sections; personal details (4 questions), CHD knowledge (16 questions) and HB (10 questions) (See Appendix 5 for Questionnaire) and, following a pilot study, was shown to take no more than 12 minutes to complete.

Personal details of the CHDKHBQ establishes the third year student nurses' institute of study (University name), age, gender and the type of 'Nursing' currently being studied. Since there is no robust knowledge questionnaire validated for non-patient populations (Kayaniyil et al. 2009), the CHDKHBQ attained CHD knowledge using a combination of items from two existing validated questionnaires and four investigator generated questions to include areas of CHD knowledge which the other two sources failed to contain; fruit and vegetables, oily fish, alcohol and salt. The validated questionnaires were the modified CHD Knowledge questionnaire used by Oliver-McNeil et al. (2002) and the Coronary Awareness and Knowledge questionnaire derived from Kayaniyil et al. (2009). All CHD knowledge questions were formatted as multiple-choice with either four answers or true or false options. The HB questions of the CHDKHBQ were investigator generated and were formatted as either multiple-choice options or yes or no answers. These generated questions related to the existing knowledge questions, for example 'What is the recommended daily amount of fruit and vegetables?' was rephrased to ask 'How many portions of fruit and vegetables do you eat a day?'. Appendix 6 provides the justification behind the questions selected for both the CHD knowledge and HB sections of the CHDKHBQ.

The scoring of the CHDKHBQ was divided into two sections; knowledge and HB. Knowledge questions consisted of one correct answer so knowledge scores ranged from 0 to 16 while HB scoring used a ranking system that established a better behaviour gaining a higher score. Consequently HB scores ranged from 10 to 29 (See Appendix 7 for Questionnaire Scoring Sheet). The grouping of the scores for each section followed a similar method to Thanavaro et al. (2006) where cut-off percentages determined categories. 'Good' knowledge was achieved by a score $\geq 80\%$ of the total, 'average' knowledge achieved by a

score $\geq 40\%$ but $< 80\%$ of the total and ‘poor’ knowledge archived by a score of $< 40\%$ of the total. As behaviour scores ranged from 10 to 29 a total percentage of the score could not be generated directly, so accordingly the same percentage cut-offs were used on a total of 19; which equates to the same range if values started from zero. Once percentages were calculated a value of 10 was added to incorporate scores of up to 29. Figure 4 demonstrates the two calculations that were used to categorise the HB scores as poor, average and good (80% and 40%), and table 2 illustrates the scoring categories for both CHD knowledge and HB.

| | |
|-----------------------------|-----------------------------|
| Calculation 1 – 80% cut off | Calculation 2 – 40% cut off |
| 19.0 | 19.0 |
| <u>x 0.8</u> | <u>x 0.4</u> |
| 15.2 | 7.6 |
| <u>+ 10.0</u> | <u>+ 10.0</u> |
| = 25.2 | = 17.6 |

Figure 4 – Calculations for Health Behaviour Cut-Off Percentages

Table 2 - CHDKHBQ Scoring Categories

| Category | CHD Knowledge (out of 16) | Health Behaviour (between 10 and 29) |
|----------|------------------------------|---|
| Poor | 1 – 5 | 10 – 17 |
| Average | 6 – 12 | 18 – 24 |
| Good | 13+ | 25+ |

3.4. Data Collection Procedure

Following confirmation from Universities in the north of England and of ethical approval by the Faculty of Applied and Health Science Research Ethics Committee at the

University of Chester (See Appendix 8 for Confirmation Letter), a researcher generated email (See Appendix 9 for Specimen Email) was sent to the five Universities that agreed to take part in the study. This email was intended for the third year student nurses of that University, detailing the nature of the study and invited them to take part. Once forwarded on by the University staff member the third year student nurse had the opportunity to click on a link which would allow them to complete the CHDKHBQ online through a survey administrator; Survey Monkey (See Appendix 10 for Specimen of Questionnaire in Survey Monkey).

The email also included an attached participant information sheet which gave further information about why the research was being undertaken and highlighted the third year student nurses' voluntary participation, confidentiality of results and provided researcher contact information (See Appendix 11 for Participant Information Sheet). Two out of the five Universities required a follow up email when it was recognised that no third year student nurses from that institute had completed the CHDKHBQ online a month following the initial email (See Appendix 12 for Specimen of Follow-up Email).

3.5. Data Analysis

All data was analysed using the Statistical Package for Social Sciences [SPSS] for Windows version 17.0 (2009) and significance was set at the 0.05 level.

The CHD knowledge of the third year student nurses (hypothesis 1) was determined using descriptive statistics which was then related to one of the scoring categories; good, average or poor. As detailed in Table 2, good CHD knowledge was categorised as a score higher than 13, average CHD knowledge by a score between 6 and 12 and poor CHD knowledge by a score less than 5. To establish the responses provided by the third year student nurses (correct/incorrect) differed significantly chi-squares analysis were used.

To determine the HB of the third year student nurses (hypothesis 2) the overall HB was also analysed using descriptive statistics and like with CHD knowledge related to one of

the three scoring categories. Good HB was classified by a score over 25, average by a score of 18 to 23 and poor by a generated score less than 18 (see table 2). HB was additionally then analysed using chi-squares analysis to verify that the responses provided by the third year student nurses were significantly different.

To analyse the relationship between CHD knowledge and HB in student nurses (hypothesis 3), a Spearman's Rho correlation was conducted since the data for CHD knowledge failed to assume a normal distribution (Shapiro Wilk) (see Appendix 13 for SPSS output). For further analysis, cross tabulations were also performed in relation to the three lifestyle RFs; smoking, physical activity/exercise and diet and weight management, to determine any significant associations between the knowledge and behaviour of the third year student nurses.

In order to determine any age-related and gender differences in CHD knowledge and HB (hypotheses 4 and 5) the data was analysed in relation to a normal distribution (Shapiro Wilk) and a normal variance (Levene's Test) by category. Normal distributions were met with regards to age and CHD knowledge, gender and CHD knowledge, and gender and HB, but not for age and HB, while normal variances were met for all (see Appendix 13 for SPSS output also). Consequently, separate Independent T-Test were performed for the analysis of differences between age and CHD knowledge, gender and CHD knowledge and gender and HB whilst the non-parametric equivalent; a Mann Whitney U Test, was performed on age and HB. Cross tabulations were then additionally conducted to establish differences within the responses provided by the third year student nurses, and chi-squares analysis verified these were significant. With regards to the analysis of age-related and gender differences, age was categorised as those 'straight from school education' (ages 18 to 22) and 'mature students' (ages ≥ 23), and gender was categorised as males and females.

Additionally to the analysis of the studies hypotheses, the questions of the CHDKHBQ were also analysed using descriptive statistics, to establish any specific area of

lack of knowledge or 'poor' HB within the third year student nurses. This would be influential evidence for development needs in curriculum design or awareness of CHD.

Chapter Four:

Results

4.1. Introduction to Results

The purpose of this results section is to determine the demographics of the third year student nurses that took part in the study and to identify the outcomes of CHD knowledge and HB in relation to the studies aims and hypotheses. This entails detailing the overall CHD knowledge and HB of the third year student nurses, whether there is evidence of an association between CHD knowledge and HB in third year student nurses and if any age-related or gender differences in the CHD knowledge and HB of the third year student nurses occurred.

4.2. Demographics

Fifty four out of a potential 696 third year student nurses voluntarily took part in the study and completed the CHDKHBQ online. This equates to an 8% response rate. The distribution of the third year student nurses varied, although not significantly ($p=0.12$), among the five institutes of study. There were nine third year student nurses from the University of Bradford (17%), 18 from the University of Huddersfield (33%), seven from the University of Liverpool (13%), 12 from Manchester Metropolitan University (22%) and eight from Northumbria University (15%). This distribution is illustrated in figure 5.

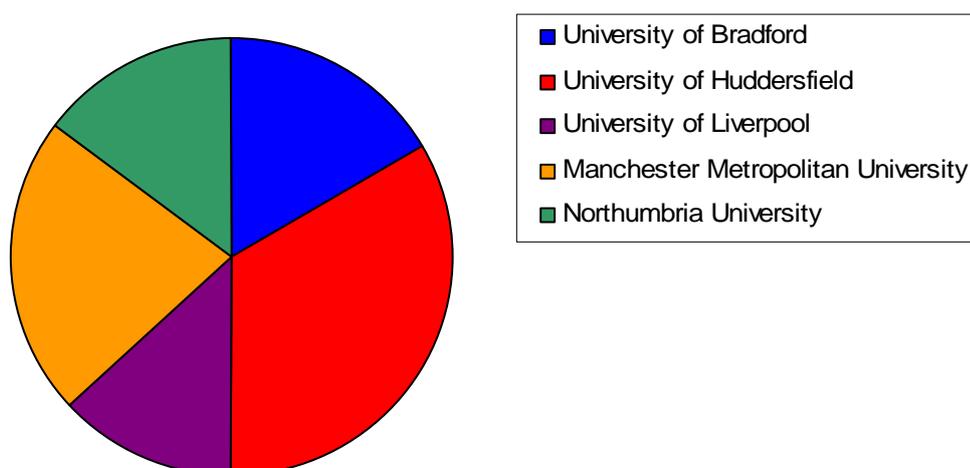


Figure 5 – Distribution of Student Nurses between the Five Different Universities

The mean age of the responding third year student nurses was 26 ± 5 years. Notably more responding student nurses were classified as ‘mature students’ (n=33, 61%) compared to those ‘straight from school education’ (n=21, 39%), as demonstrated in figure 6. However, this characteristic was found to be not significantly different within the sample of student nurses (p=0.10).

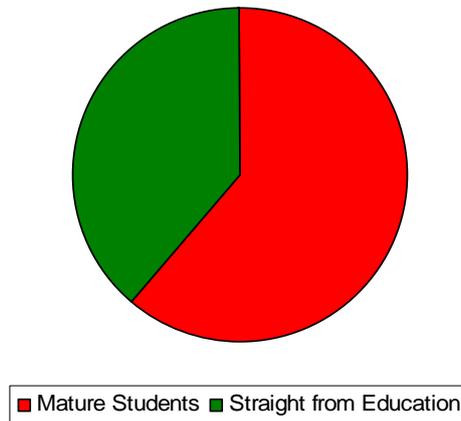


Figure 6 – The Student Nurses by Age

The gender of the responding third year student nurses on the other hand, was determined significantly different (p=0.00), as a substantially larger proportion of females (n=47, 87%) compared to males (n=7, 13%) took part in the study. Figure 7 illustrates this.

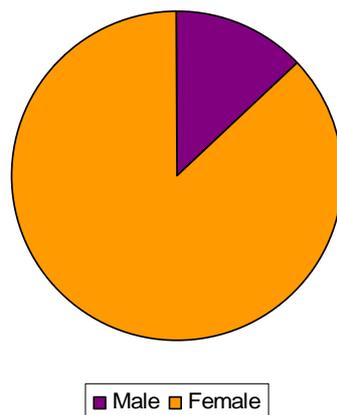


Figure 7 – The Student Nurses by Gender

The branch of nursing that was being studied by the third year student nurses was additionally found to be significantly different (p=0.00). Figure 8 demonstrates that the responding third year student nurses were mainly studying ‘Adult Nursing’ (n=40, 74%) with

very few studying ‘Child Nursing’ (n=7, 13%) or ‘Mental Health Nursing’ (n=7, 13%), and no third year student nurses studying ‘Learning Disability Nursing’ or ‘Other’.

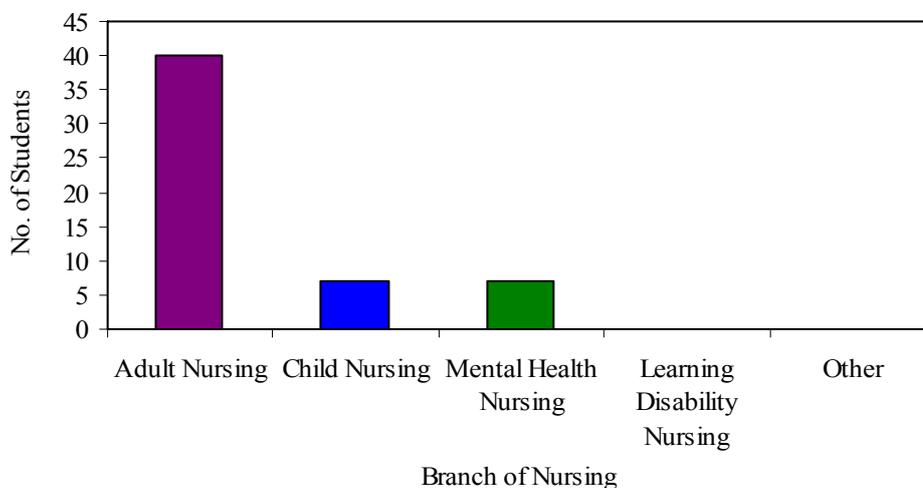


Figure 8 – The Branch of Nursing Studied by the Student Nurses

4.3. Coronary Heart Disease Knowledge

The CHD knowledge of the responding third year student nurses was classified as good with a mean score of 13 ± 2 . Table 3 demonstrates that the majority (15/16) of the CHD knowledge questions were answered correctly by the third year student nurses except for question 13, where a larger proportion of the student nurses (n=42, 78%) answered incorrectly. There is also evidence that two of the CHD knowledge questions, question 12 and question 17 were answered correctly by all of the third year student nurses (n=54, 100%) (See table 3 also).

Table 3 – Summary of Coronary Heart Disease Knowledge Questions

| Questions | Correct n (%) | Incorrect n (%) | Sig. p value |
|--|--------------------------|----------------------------|-------------------------|
| Q5. What is coronary heart disease? | 39 (72) | 15 (28) | 0.00* |
| Q6. A risk factor of coronary heart disease that you cannot change is? | 50 (93) | 4 (7) | 0.00* |
| Q7. The single most preventable cause of death and disease in the United States is? | 45 (83) | 9 (17) | 0.00* |
| Q8. Which of the following blood fats is thought to lower the risk of coronary heart disease? | 36 (67) | 18 (33) | 0.01* |
| Q9. Which of the following is a direct benefit of exercise? | 42 (78) | 12 (22) | 0.00* |
| Q10. The best type of physical activity to maintain cardiovascular fitness is...exercise? | 50 (93) | 4 (7) | 0.00* |
| Q11. Most people could benefit from diets...? | 34 (63) | 20 (37) | 0.06 |
| Q12. What is the recommended daily amount of fruit and vegetables? | 54 (100) | 0 (0) | 0.00* |
| Q13. Women who persistently drink more than... units of alcohol a day and men who drink more than... are more likely to suffer from the risk factors associated with coronary heart disease? | 12 (22) | 42 (78) | 0.00* |
| Q14. The average daily intake of salt by adults in the United Kingdom is 9g, is this? | 48 (89) | 6 (11) | 0.00* |
| Q15. People who are physically active on a regular basis can cut their risk of heart disease in half? | 46 (85) | 8 (15) | 0.00* |
| Q16. Small changes in what you eat can lower blood cholesterol? | 52 (96) | 2 (4) | 0.00* |
| Q17. A person can reduce their chances of dying from heart disease through lifestyle changes? | 54 (100) | 0 (0) | 0.00* |
| Q18. It does not help to quit smoking after many years because one's health is already damaged? | 51 (94) | 3 (6) | 0.00* |
| Q19. To get cardiac benefit from exercise, you need to get sweaty and out of breath? | 41 (76) | 13 (24) | 0.00* |
| Q20. Eating fish rich in 'Omega 3' can improve your chances of not developing coronary heart disease? | 33 (61) | 21 (39) | 0.10 |

*significant difference (<0.05)

Table 3 also demonstrates that the responses provided by the third year student nurses for the CHD knowledge questions were generally (14/16) seen to differ significantly ($p < 0.05$). However, the responses to question 11 and question 20 were found to have similar quantities of correct and incorrect responses from the student nurses ($p = 0.06$ and $p = 0.10$, respectively).

4.4. Health Behaviour

The overall HB of the responding third year student nurses was determined as average with a mean score of 19 ± 3 . A significant proportion ($p = 0.00$) of the third year student nurses were non-smokers ($n = 38$, 70%) compared to smokers ($n = 16$, 30%), as demonstrated in figure 9.

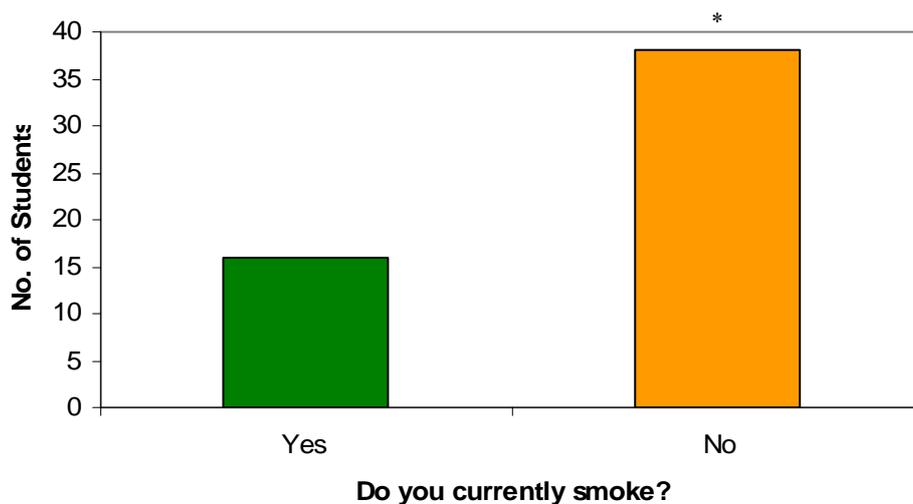


Figure 9 – Smoking Behaviour of the Student Nurses
*significant difference

Figure 10 illustrates that more third year student nurses were participating in either none ($n = 20$, 30%) or one to two ($n = 20$, 30%) sessions of exercise per week, compared to three to five ($n = 10$, 19%) or five to seven times a week ($n = 4$, 7%). This was also shown to be significantly different with the sample of third year student nurses ($p = 0.00$).

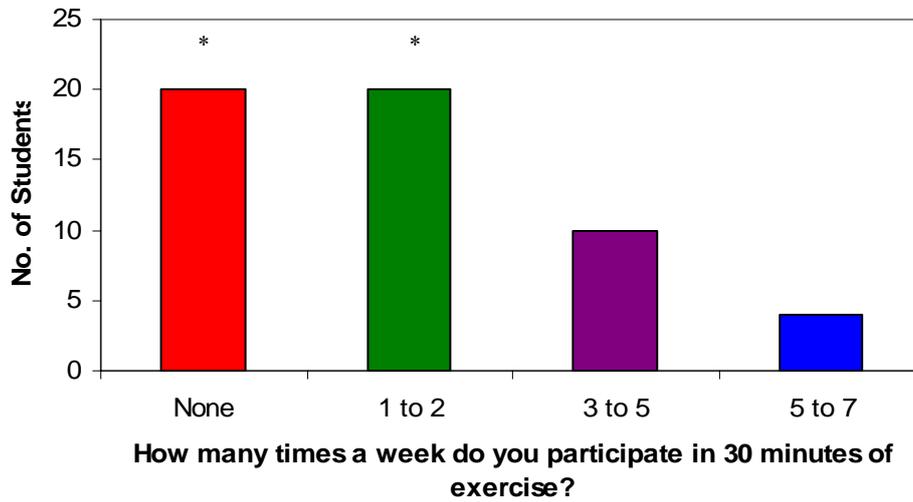


Figure 10 – Physical Activity/Exercise Behaviour of the Student Nurses
*significant difference

In relation to the salt intake of the third year student nurses it was found to be not significantly different; whether the student nurses did or did not add salt to their food both during cooking and at the table ($p=0.59$ and $p=0.41$, respectively). Figure 11 demonstrates that almost equal responses provided by the third year student nurses about adding salt to food when cooking (yes $n=25$ and no $n=29$) and whilst at the table (yes $n=24$ and no $n=30$).

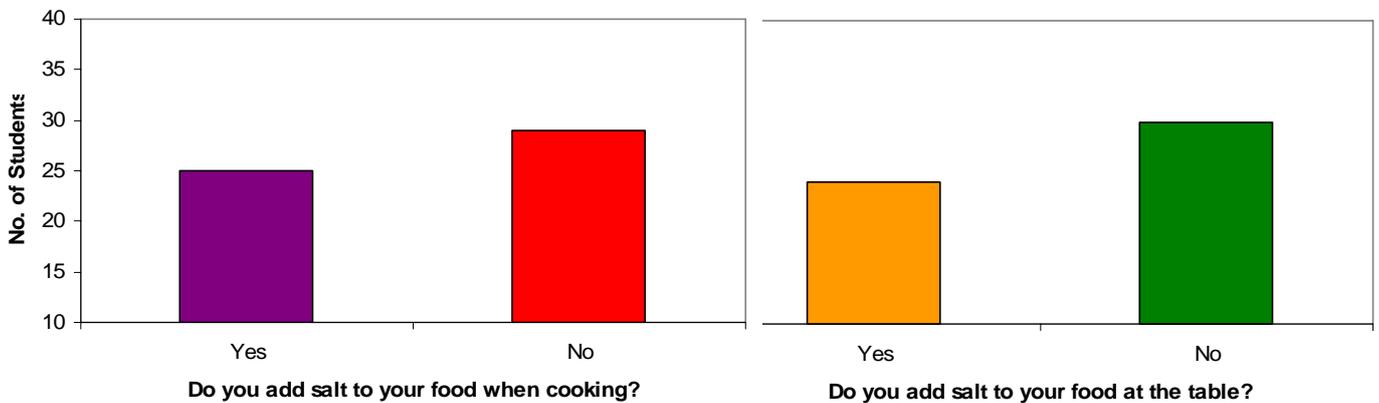


Figure 11 – Salt Intake of the Student Nurses

There was also no significant difference in the third year students weekly fish consumption ($p=0.79$) and daily fruit and vegetable intake ($p=0.29$). Figure 12 demonstrates that almost equal numbers of student nurses did ($n=28$) and did not ($n=26$) consume one portion of oily fish per week, and figure 13 details that a larger proportion of student nurses

ate one to two portions of fruit and vegetables a day (n=26, 48%), with a small proportion consuming three to four portions a day (n=18, 33%) and five a day (n=10, 19%), and no student nurses consuming more than five a day.

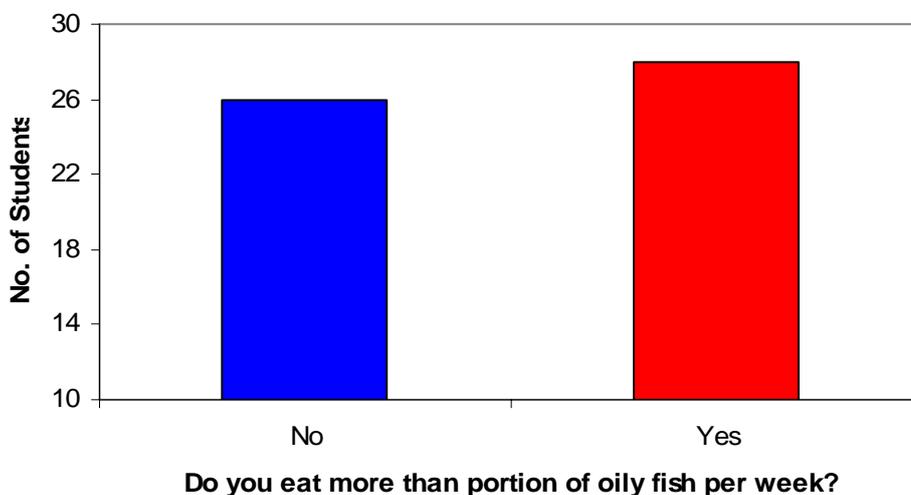


Figure 12 – Weekly Fish Consumption of the Student Nurses

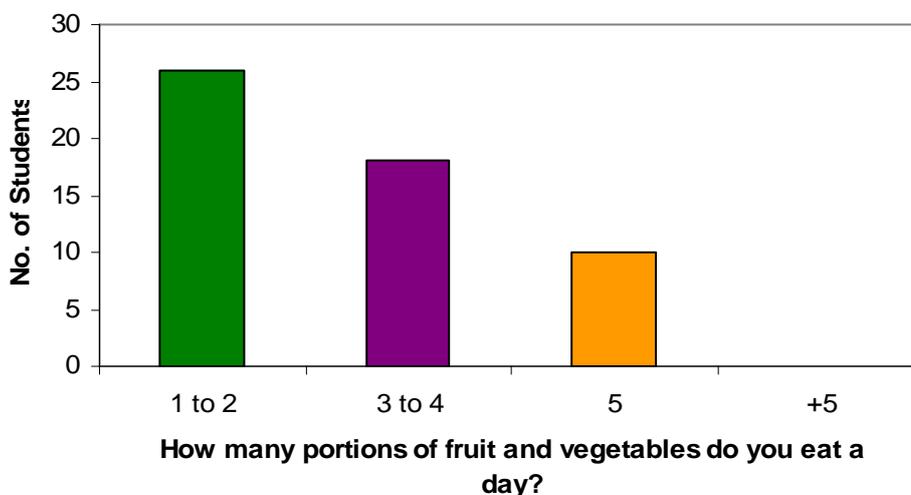


Figure 13 – Daily Fruit and Vegetable Intake of the Student Nurses

Figure 14 illustrates that significantly ($p=0.00$) more third year student nurses ($n=36$) reported consuming one unit of alcohol per day (67%), 13 reported consuming two units per day (24%), only five consuming three units per day (9%) and no student nurses responded that they consumed equal to or more than the alcohol limit for CHD development (four units per day).

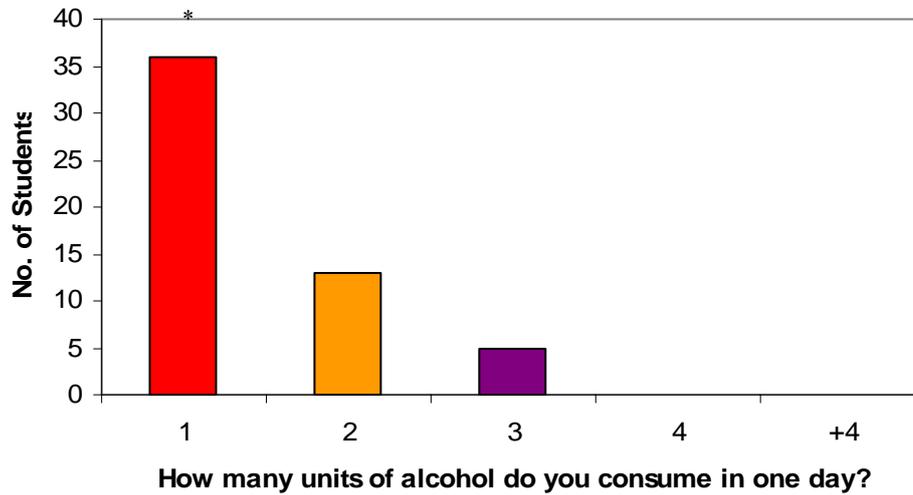


Figure 14 – Alcohol Consumption of the Student Nurses
*significant difference

Figure 15 and 16 shows that the third year student nurses were also predominantly using the healthier low fat or cholesterol lowering spreads (70%) and either vegetable/sunflower oil or olive oil (54% and 46%, respectively). However, these generated responses were only significantly different in relation to the spread used ($p=0.00$) and not oil used ($p=0.59$). The significance generated for oil used nonetheless, was evidently between the use of vegetable/sunflower oil and olive oil as no student nurse responded to using lard or dripping (See figure 16).

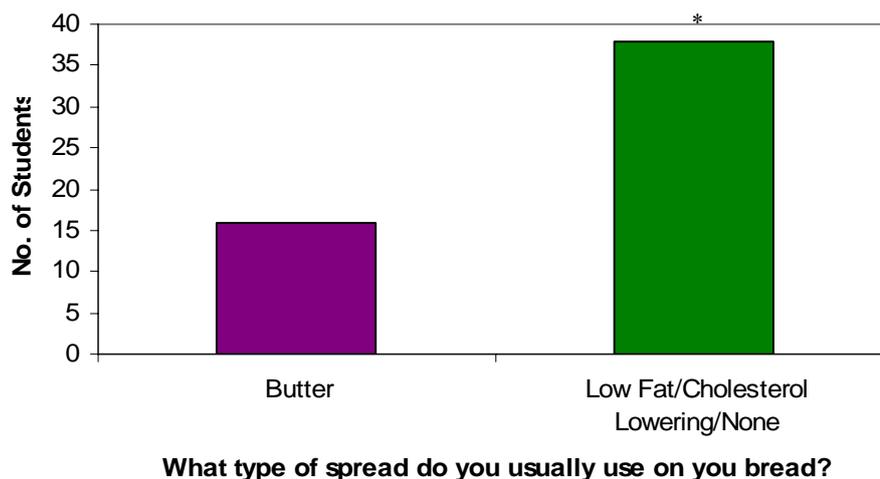


Figure 15 – Spread Use of the Student Nurses
*significant difference

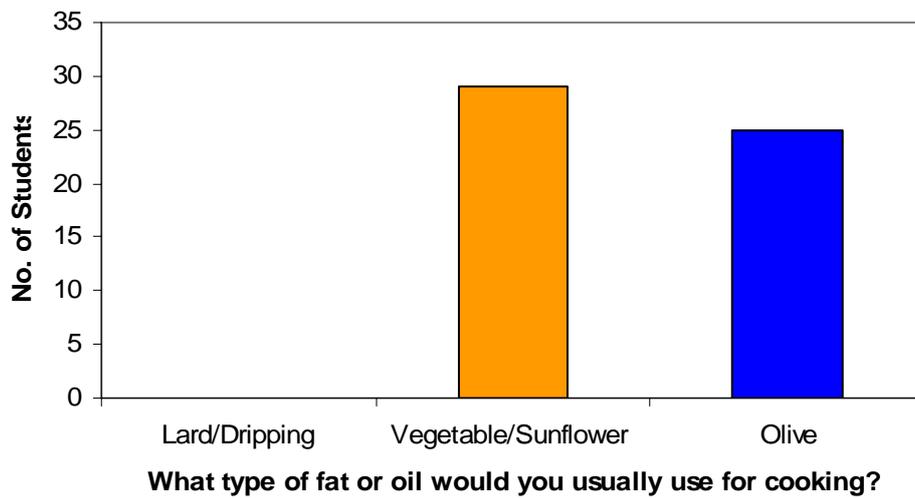


Figure 16 – Oil Use of the Student Nurses

Crisps (n=25), fruit (n=23) and chocolate (n=25) were evidently viewed as the main selected snack choice by the third year student nurses and two student nurses reported that they did not snack in-between meals. Furthermore, when a overall snack score was calculated for the usual in-between meal snack consumption of the third year student nurses (using the score of ‘one’ for crisps, chocolate, biscuits, sweets, and cake, a score of ‘two’ for yoghurt, and a score of ‘three’ for fruit and none), significantly more generated a medium ‘snack score’ (p=0.01), which can be demonstrated in figure 17.

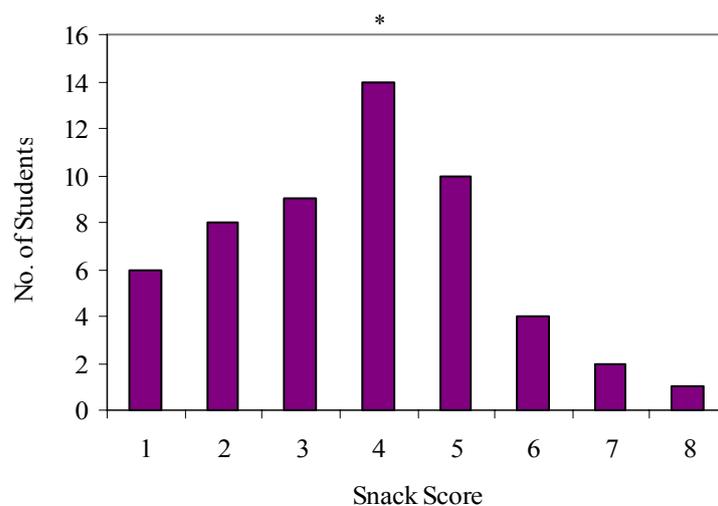


Figure 17 – Snack Score for the In-between Meal Snacks Consumed by the Student Nurses

*significant difference

4.5. The Association between Coronary Heart Disease Knowledge and Health Behaviour

Using the total CHD knowledge and HB scores generated by the third year student nurses (13 ± 2 and 19 ± 3 , respectively) it was determined that there was no significant correlation between the two variables ($p=0.44$). Figure 18 illustrates this relationship.

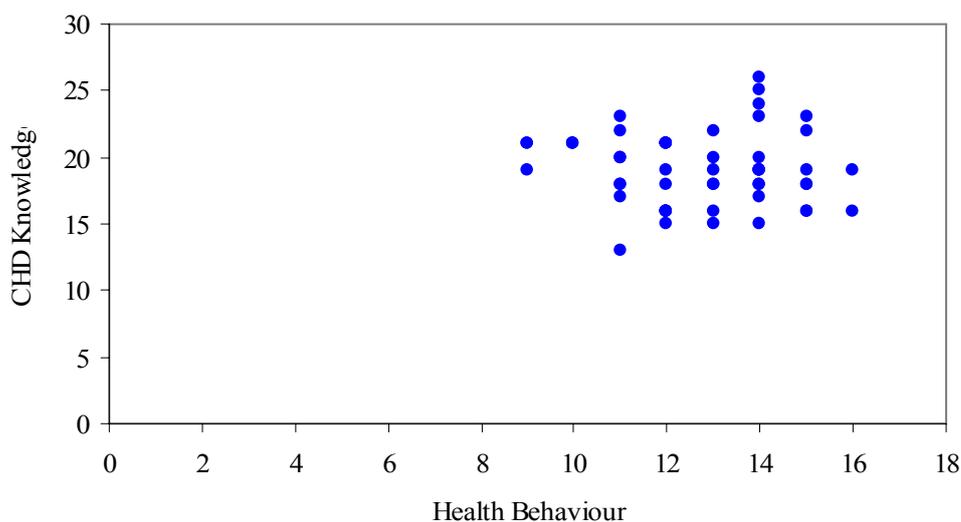


Figure 18 – The Relationship between Coronary Heart Disease Knowledge and Health Behaviour in Student Nurses

4.5.1. Smoking

The third year student nurses' knowledge of the risk of smoking; which can be shown through the use of questions 6, 7, and 18 from the CHDKHBQ, was found to relate to a non-smoking behaviour. Table 4 illustrates that believing smoking was not a RF for CHD that you cannot change, or that smoking is the single most preventable cause of death and disease in the western world, as well as being aware that it does not help to quit smoking after many years because one's health is already damaged was a false statement, was predominantly answered correctly by non-smoking student nurses ($n=34$, $n=30$ and $n=38$, respectively). However, the association between smoking knowledge and smoking behaviour was found to be only significant for question 18 ($p=0.01$), whereby although the majority of correct

answers were generated by non-smoking student nurses, all the incorrect answers were generated by third year student nurses who were smokers (See table 4 also).

Table 4 – Smoking Knowledge vs. Smoking Behaviour

| Question | Response | Do you currently smoke? | | Sig. p value |
|---|-----------|-------------------------|----|--------------|
| | | Yes | No | |
| Q6. A risk factor of coronary heart disease that you cannot change is? | Correct | 16 | 34 | 0.18 |
| | Incorrect | 0 | 4 | |
| Q7. The single most preventable cause of death and disease in the United States is? | Correct | 15 | 30 | 0.18 |
| | Incorrect | 1 | 8 | |
| Q18. It does not help to quit smoking after many years because one's health is already damaged? | Correct | 13 | 38 | 0.01* |
| | Incorrect | 3 | 0 | |

*significant difference

4.5.2. Physical Activity/Exercise

The third year student nurses' physical activity/exercise participation and knowledge of physical activity/exercise was found to be non-significantly associated, determined through the use of question 9 (p=0.79), question 10 (p=0.40), question 15 (p=0.82), and question 19 (p=0.19) from the CHDKHBQ. Table 5 demonstrates that although the majority of third year students that correctly answered the four physical activity/exercise related questions were participating in either none or, one or two sessions a week most of the student nurses, if not all, that did exercise more often; three to five and five to seven session a week, were also more knowledgeable in relation to the four physical activity/exercise questions.

Table 5 – Physical Activity/Exercise Knowledge vs. Physical Activity/Exercise

Behaviour

| Question | Response | How many times a weeks do you participate in 30 minutes of exercise? | | | | Sig. p value |
|---|-----------|--|-----|-----|-----|--------------|
| | | None | 1-2 | 3-5 | 5-7 | |
| Q9. Which of the following is a direct benefit of exercise? | Correct | 17 | 15 | 7 | 3 | 0.79 |
| | Incorrect | 3 | 5 | 3 | 1 | |
| Q10. The best type of physical activity to maintain cardiovascular fitness is...exercise? | Correct | 19 | 17 | 10 | 4 | 0.40 |
| | Incorrect | 1 | 3 | 0 | 0 | |
| Q15. People who are physically active on a regular basis can cut their risk of heart disease in half? | Correct | 17 | 17 | 8 | 4 | 0.82 |
| | Incorrect | 3 | 3 | 2 | 0 | |
| Q19. To get cardiac benefit from exercise, you need to get sweaty and out of breath? | Correct | 12 | 17 | 9 | 3 | 0.19 |
| | Incorrect | 8 | 3 | 1 | 1 | |

4.5.3. Diet/Weight Management

The third year student nurses' dietary intake and knowledge of diet can be evidently non-significantly associated ($p > 0.05$) by using five separate categories; salt, fish, fruit and vegetables, alcohol, and fat. Table 6 demonstrates that knowing the average daily intake of salt by adults (9g) was too much, related to a non significant response to whether the third year students used salt when cooking ($p = 0.85$) or added salt to food at the table ($p = 0.25$), and table 7 determines that the perception that eating fish rich in Omega 3 (fatty acids) can improve your chances of not developing CHD was non-significantly related to the third year student nurses' fish consumption ($p = 0.54$).

Table 6 – Salt Knowledge vs. Salt Intake

| Question | Response | Do you add salt to your food when cooking? | | Sig. p value | Do you add salt to your food at the table? | | Sig. p value |
|---|-----------|--|----|--------------|--|----|--------------|
| | | Yes | No | | Yes | No | |
| Q14. The average daily intake of salt by adults in the United Kingdom is 9g, is this? | Correct | 22 | 26 | 0.85 | 20 | 28 | 0.25 |
| | Incorrect | 3 | 3 | | 4 | 2 | |

Table 7 – Fish Knowledge vs. Fish Consumption

| Question | Response | Do you eat 1 portion of oily fish per week? | | Sig. p value |
|---|-----------|---|----|--------------|
| | | Yes | No | |
| Q20. Eating fish rich in ‘Omega 3’ can improve your chances of not developing coronary heart disease? | Correct | 16 | 17 | 0.54 |
| | Incorrect | 12 | 9 | |

While all third year student nurses identified that the recommended daily amount of fruit and vegetables is five a day, only a small minority (n=10) actually carried out this behaviour. More student nurses were consuming one to two portions (n=26) or three to four portions (n=18) of fruit and vegetables a day (See table 8). But, given that the response to question 12 was constant (100% correct) no statistical significance could be obtained in relation to the association between fruit and vegetable knowledge and behaviour.

Table 8 – Fruit and Vegetable Knowledge vs. Fruit and Vegetable Intake

| Question | Response | How many portions of fruit and vegetables do you eat a day? | | | |
|--|----------|---|-----|----|----|
| | | 1-2 | 3-4 | 5 | +5 |
| Q12. What is the recommended daily amount of fruit and vegetables? | Correct | 26 | 18 | 10 | 0 |

Table 9 illustrates that although the majority of third year student nurses answered incorrectly to question 13, they also generally were consuming low amounts of alcohol per day; 1 unit (n=36), 2 units (n=13) and 3 units (n=5). Consequently, the association was found to be non-significant (p=0.53).

Table 9 – Alcohol Knowledge vs. Alcohol Consumption

| Question | Response | How many units of alcohol do you consume in one day? | | | | | Sig. p value |
|--|-----------|--|----|---|---|----|--------------|
| | | 1 | 2 | 3 | 4 | +4 | |
| Q13. Women who persistently drink more than... units of alcohol a day and men who drink more than... are more likely to suffer from the risk factors associated with coronary heart disease? | Correct | 8 | 2 | 2 | 0 | 0 | 0.53 |
| | Incorrect | 28 | 11 | 3 | 0 | 0 | |

While more student nurses chose the healthier options in relation to spread and oil use, knowing that high density lipoproteins lowered the risk of CHD (question 8) did not significantly relate to the type of spread used on bread (p=0.40), or the type of oil used for cooking (p=0.44) (See table 10). Table 10 also shows similarly, that non-significant associations with spread and oil use were found in response to question 11 (spread p=0.97, cooking oil p=0.33) and question 16 (spread p=0.52, cooking oil p=0.92).

Table 10 – Fat Knowledge vs. Spread and Oil Use

| Question | Response | What type of spread do you usually use on bread? | | Sig. p value | What type of fat or oil do you usually use for cooking? | | | Sig. p value |
|---|-----------|--|----------|--------------|---|------|-------|--------------|
| | | Butter | †LF/CL/N | | Lard | ‡V/S | Olive | |
| Q8. Which of the following blood fats is thought to lower the risk of coronary heart disease? | Correct | 12 | 24 | 0.40 | 0 | 18 | 18 | 0.44 |
| | Incorrect | 4 | 14 | | 0 | 11 | 7 | |
| Q11. Most people could benefit from diets...? | Correct | 10 | 24 | 0.97 | 0 | 20 | 14 | 0.33 |
| | Incorrect | 6 | 14 | | 0 | 9 | 11 | |
| Q16. Small changes in what you eat can lower blood cholesterol? | Correct | 15 | 37 | 0.52 | 0 | 28 | 24 | 0.92 |
| | Incorrect | 1 | 1 | | 0 | 1 | 1 | |

†LF/CL/N = Low Fat or Polyunsaturated spread/Cholesterol Lowering spread/None
‡V/S = Vegetable/Sunflower Oil

Furthermore, the snack score (generated using the usual in-between snacks consumed by the third year student nurses) was also found to be non-significantly associated to the knowledge that, high density lipoproteins lowered the risk of CHD (question 8), that most people could benefit from diets higher in carbohydrates and lower in fats (question 11) and that small changes in what you eat can lower blood cholesterol was a true statement (question 16) (p=0.62, p=0.70 and p=0.53, respectively) (See table 11).

Table 11 – Fat Knowledge vs. In-between Meal Snack Score

| Question | Response | Snack Score | | | | | | | | Sig. p value |
|---|-----------|-------------|---|----|----|---|---|---|---|--------------|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | |
| Q8. Which of the following blood fats is thought to lower the risk of coronary heart disease? | Correct | 3 | 5 | 9 | 10 | 6 | 1 | 1 | 1 | 0.62 |
| | Incorrect | 2 | 3 | 2 | 4 | 3 | 3 | 1 | 0 | |
| Q11. Most people could benefit from diets...? | Correct | 4 | 6 | 5 | 8 | 7 | 2 | 1 | 1 | 0.70 |
| | Incorrect | 6 | 2 | 6 | 6 | 2 | 2 | 1 | 0 | |
| Q16. Small changes in what you eat can lower blood cholesterol? | Correct | 4 | 8 | 10 | 14 | 9 | 4 | 2 | 1 | 0.53 |
| | Incorrect | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | |

4.6. Age-related Differences between Coronary Heart Disease and Health Behaviour

The CHD knowledge and HB scores generated by the responding third year student nurses were not significantly different in relation to the age of the student. Table 12 details the mean CHD knowledge and HB scores by age category; straight from school education (ages 18 to 22 years) and mature students (aged 23 and over), as well as highlighting the non-significant values.

Table 12 – Coronary Heart Disease Knowledge and Health Behaviour Scores by Age

| | CHD knowledge | Health behaviour |
|--------------------------------|---------------|------------------|
| Straight from School Education | 12 ± 2 | 19 ± 2 |
| Mature Students | 13 ± 3 | 19 ± 3 |
| Significance (p value) | 0.21 | 0.71 |

The responses provided by the third year student nurses straight from school education and those mature students were found to be non-significant in relation to the two

age categories ($p>0.05$). The responses to the HB questions of the CHDKHBQ were also found to be non-significantly different between both age categories ($p>0.05$).

4.7. Gender Differences between Coronary Heart Disease and Health Behaviour

The mean CHD knowledge score generated by the third year student nurses was not significantly different in relation to gender ($p=0.51$), with equal values of 13 ± 2 . The HB however, was shown to differ significantly between males and females ($p=0.04$). Table 13 demonstrates the mean scores attained for both CHD knowledge and HB by gender, and highlights the non-significant/significant findings.

Table 13 - Coronary Heart Disease Knowledge and Health Behaviour Scores by Gender

| | CHD knowledge | Health behaviour |
|------------------------|----------------------|-------------------------|
| Males | 13 ± 2 | 17 ± 2 |
| Females | 13 ± 2 | 19 ± 3 |
| Significance (p value) | 0.51 | 0.04* |

*significant difference

The responses to the CHD knowledge questions provided by male and female student nurses were in general seen to be significantly similar, as with the overall CHD knowledge score ($p>0.05$). Yet, a significant difference did occur between the responses given by male and female student nurses for question 8 ($p=0.05$), as a larger proportion of females ($n=29$, 85%) were aware that high-density lipoproteins were beneficial to reduce CHD compared to males ($n=5$, 15%) (See figure 19).

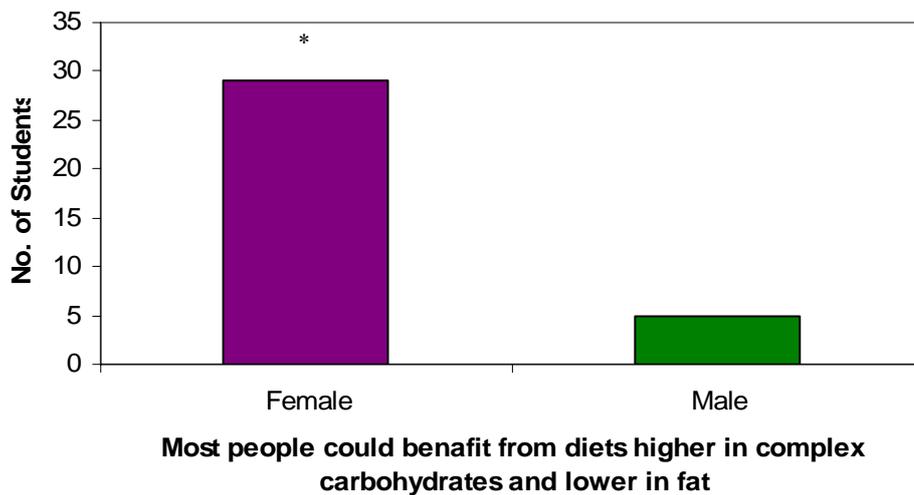


Figure 19 – Amount of Correct Answers Provided for Question 8 by Gender
*significant difference

In relation to the behaviour of the third year student nurses the majority of responses were also alike, except for the smoking behaviour ($p=0.01$) and the fish consumption ($p=0.00$) of the third year student nurses where significant differences occurred between genders. Figure 20 demonstrates that a significantly larger proportion of the males smoked (71%) compared to male non-smokers (29%) and figure 21 illustrates that all of the male student nurses that took part in the study ($n=7$) did not consume oily fish.

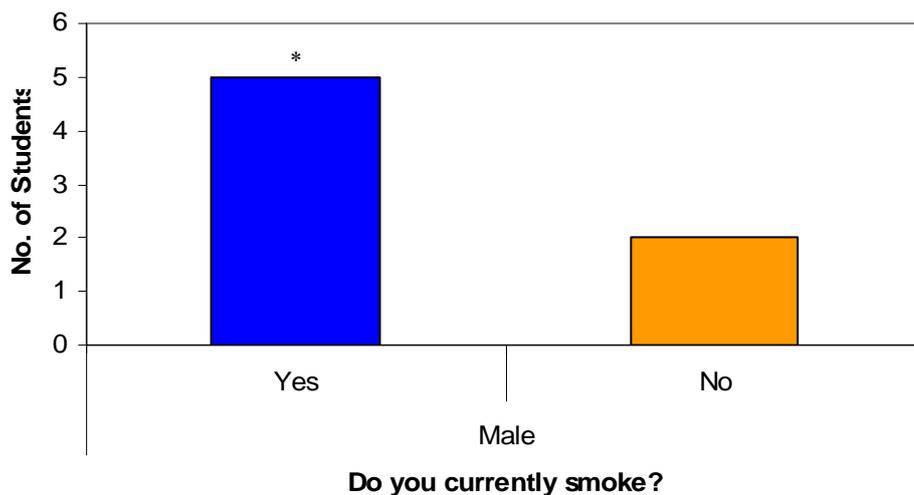


Figure 20 – Smoking Behaviour of the Male Student Nurses
*significant difference

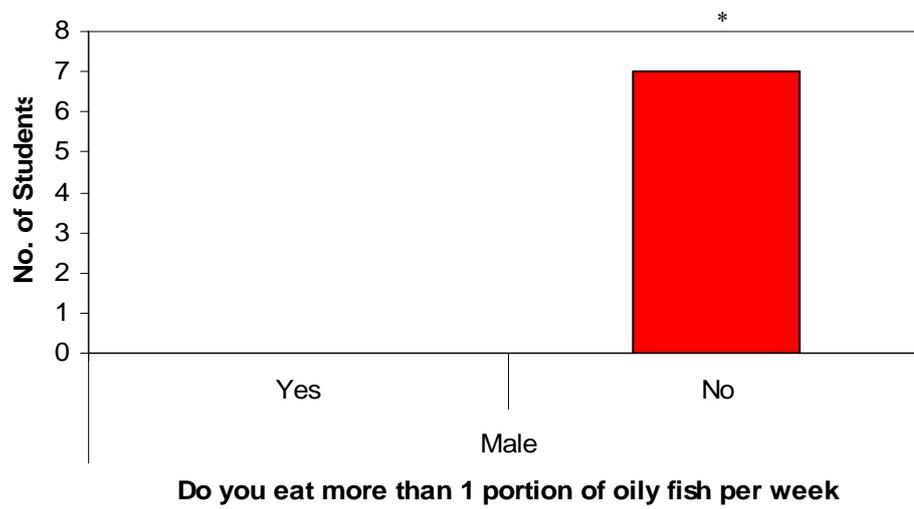


Figure 21 – Fish Consumption of the Male Student Nurses
 *significant difference

Chapter Five:

Discussion

5.1. Introduction to Discussion

The purpose of this discussion is to summarise and interpret the findings of the present study in relation to previous similar research. This involves focusing on the aims and hypotheses of the study; whether CHD knowledge in third year student nurses is sufficient, whether the third year student nurses practice HBs, whether there is a relationship between CHD knowledge and HB of the third year student nurses and whether there is evidence of any age-related and/or gender differences in the CHD knowledge and HB of the third year student nurses.

5.2. Coronary Heart Disease Knowledge

The study demonstrates that overall CHD knowledge of the third year student nurses is good. This finding is consistent with those literatures, which indicate that CHD awareness in students is positive (Manios et al. 2002) and that healthcare professionals generally have satisfactory levels of CHD knowledge (Moore et al. 2001). The mean total CHD knowledge score of 13 which was achieved by the studies third year student nurses also resembles that reported in recent research by Almas et al. (2008), where University students achieved a mean knowledge score of 11.5 out of 16. However, if both studies did adopt the same scoring categorisation as that used in the present study the mean CHD knowledge found by Almas et al. (2008) would be classified as average not good.

Nonetheless, in comparison to previous studies conducted on the general population; where the average CHD knowledge score was found to be only 3 out of a possible 15 (Jafray et al. 2005), and in patients; where CHD knowledge was found to be only moderate (Kayaniyil et al. 2009), the CHD knowledge of the third year student nurses is evidently greater than these populations. Consequently, it can be assumed that third year student nurses have gained sufficient knowledge to provide health education/promotion through both primary and secondary prevention. Experimental hypothesis 1 can therefore, not be fully

rejected. However, given the considerable low response rate from the third year student nurses in the study (8%), it is unlikely that these findings can be fully representative and be generalised to the wider population of student nurses.

The examination of the CHD knowledge questions in this study shows that third year student nurses seem knowledgeable in a variety of CHD topics. Significantly, the third year student nurses were aware that CHD is a reduced blood flow to the heart. This finding strengthens the assumption that student nurses are equipped to provide health education/promotion, since Jafray et al. (2005) found that only 14% of individuals from a wide demographic spectrum were able to correctly describe what CHD meant and that substantial variations in patients' understanding of the disease have been reported (Karner et al. 2003). But, given that the present studies questions were formatted as multiple choice, compared to the use of open-ended questions in Karner et al. (2003) or interviews in Jafray et al. (2005), it could be assumed that the present study provided an easier means to describe CHD correctly as there is evidence to suggest that low knowledge levels occur as a result of difficulties articulating such knowledge (Karner et al. 2003).

The third year student nurses were also evidently able to identify that heredity was a RF that cannot be changed. This is supported by previous research from Byrne et al. (2005) where patients were also found to be more knowledgeable about heredity as a RF for CHD. However, the same study also stated that the increase knowledge of heredity was compared to a lack of knowledge about other lifestyle RFs. Through the significant response from the student nurses that heredity is a non-modifiable RF also suggests that the third year student nurses were just as aware of the other RFs; smoking, obesity, and exercise, being modifiable RFs. This is consistent with studies identifying students are significantly knowledgeable about several RFs for CHD (Koutoubi et al. 2005; Taha et al. 2004; Almas et al. 2008).

Additionally, the third year student nurses were collectively aware that lifestyle changes can considerably reduce the risk of dying from CHD. This further reinforces the

suggestion that student nurses are equipped to provide health education/promotion as they are clear and cognisant of the message they must deliver to patients, as previously determined by Jaarsma et al. (2004). The general population have also been noted to fail to recognise the importance of smoking cessation in the reduction of CHD (Sanderson et al. 2009), and thus it can also be proposed that third year student nurses would be well-resourced to encourage HBs, especially smoking behaviour, through an increased awareness that CHD can be reduced by making lifestyle changes.

In relation to the three modifiable lifestyle RFs, the third year student nurses were significantly knowledgeable regarding smoking and physical activity/exercise but were less aware of diet/weight management. Knowing that smoking was the single most preventable cause of death and disease in the western world was significantly identified by the third year student nurses, as well as them correctly determining that stopping smoking even after many years, can benefit one's health as, at least some of, the damage is reversible. This finding supports past research from Felimban (1993) and Bayat et al. (1998) who found that students were aware of smoking and the adverse effects of smoking. Similar to propositions from Khan et al. (2005) it could be suggested that this finding is a result of relatively more aggressive advertising campaigns as well as educational programmes discouraging the use of tobacco.

Equally, the third year student nurses were significantly aware that a reduced work of the heart was a direct benefit of exercise, that aerobic exercise was the best type of exercise, that one does not need to exert to sweatiness and breathlessness to gain the cardiac benefit from exercise and that regular physical activity could potentially cut the risk of CHD in half. This finding however, differs from that of the study by Manios et al. (2002) which reported that physical activity/exercise awareness was limited in students. Yet, in opposition to this finding, it is assumed that the student nurses heightened awareness of physical activity/exercise was a result of the educational resources available to the third year student

nurses through University; in addition to the widespread publicity of physical activity/exercise.

The CHD dietary knowledge of the student nurses varied substantially. All third year student nurses were cognisant of the recommended fruit and vegetable consumption (five a day) which is supported by researchers who found that healthcare professionals are clear on the dietary recommendations of fruit and vegetables (Moore et al. 2001). Again this finding may be a result of the widespread publicity associated with fruit and vegetable consumption through the television advertisement '5 a day'. Significantly more of the third year student nurses were also found to correctly identify that high density lipoproteins are a form of blood cholesterol thought the lower the risk of CHD and that small changes in one's diet can help lower blood cholesterol, which contradicts previous findings by Nash et al. (2003) were individuals were reported being unaware of blood cholesterol management. The student nurses additionally had some idea what the average daily intake of salt was (lower than 9g), which is different from the findings of Marshall et al. (2007) who determined that generally individuals are not aware of their salt intake and the recommended salt intake.

In contrast, however, the third year student nurses were not significantly aware that most people could benefit from diets high in complex carbohydrates and low in fat and that eating fish rich in Omega 3 can reduce the chances of developing CHD. Given the extensive exposure of diets in magazines or television programmes and the broad promotion of Omega 3, in general, through advertisements like 'Flora' margarine it is also assumed that these topics of CHD knowledge would be known by the student nurses. These findings are contrasting to previous research performed by Moore et al (2001) where most primary care staff, were clear on the dietary recommendations for patients with CHD; increase in starchy foods, reduction in fatty foods.

Furthermore, significantly more student nurses were uninformed about the daily alcohol unit limits that relate to the increased risk of CHD development. As there is limited

data regarding the specific alcohol knowledge of students or healthcare professionals this finding could support previous researchers that have identified substantial knowledge gaps (Moore et al. 2001). There is therefore, a need to develop current curriculum designs so that student nurses not only have a good overall knowledge but have an understanding of all topics related to CHD. The focus for these would consequently relate to diet/weight management; specifically alcohol consumption, as well as clarifying the confusion around fish consumption and the most appropriate types of diet.

5.3. Health Behaviour

The present study demonstrates that the HB of the third year student nurses was average and thus overall provides evidence that student nurses do not fully practice HBs (experimental hypothesis 2 is rejected). These findings are consistent to previous research carried out on University students; were it is thought students do not typically demonstrate HBs (Koutoubi et al. 2005), and that qualified nurses regularly practice unhealthy lifestyle behaviours (Jaarsma et al. 2005). Though, the overall HB of third year student nurses can be seen to surpass that of the patient population and the general population whose HBs are shown to be inadequate (UNITE, 2002). Alike the assumption made by Jaarsma et al. (2005) it is however, unclear whether the findings of the HB of third year student nurses can be entirely representative. Along with a low response rate demonstrated in the present study, the suggestion is that those who did take part in study would be more likely to adopt healthy lifestyles than those with poorer HBs.

The smoking behaviour of the third year student nurses was significantly a non-smoking behaviour. This finding agrees with several studies that have found low rates of smokers in healthcare professionals (Jaarsma et al. 2004), but, also contradicts others that have found a higher prevalence of smoking in nurses (Tucker et al. 2007). This finding also differs to that of the study by Safeer et al. (2006) where it was initially thought students

would be more vulnerable to begin smoking. Yet, there is still evidence that suggest some student nurses (30%) practice a smoking behaviour and in actual fact have similar proportions compared to apparently healthy members of the general public (Maas et al. 2007) and the patient population (Salamonson et al. 2009). Therefore, this study provides evidence to suggest that some nurses do not practice HBs.

The physical activity/exercise behaviour of the third year student nurses was significantly low with more participating in none or only one to two sessions a week and very little reaching the recommended amount of weekly physical activity for adults (ACSM, 2006). This finding is in agreement with a number of studies that have determined that students and healthcare professionals are less likely to engage in physical activity (Scully et al. 2007; Haase et al. 2004; Tucker et al. 2007; Jaarsma et al. 2005). These proportions of low activity are also similar to the amount of physical activity/exercise performed by the general population (Wong et al. 2008), which further supports the assumption that nurses do not practice HBs. However, unlike the smoking behaviour of the student nurses, their physical activity/exercise behaviour is shown to be greater than that performed by the patient population (Salamonson et al. 2009; Khan et al. 2005).

Like the diet knowledge of the third year student nurses the student nurses dietary behaviour also varied substantially. The student nurses were found to have non significant differences in the salt consumption, the weekly fish consumption and the daily fruit and vegetable consumption, which contradict research by Pan et al. (1999), Brevard et al. (1996) and Wiley et al. (1996) who stated that students tend to consume significant amounts of salty foods, as well as consuming significantly low amounts of fruit and vegetables.

Significantly more third year student nurses were however, drinking low amounts of alcohol per day. This finding differs to that of Gill (2002) where students are reported to drink excessively but, is consistent with previous research by Frank et al. (2008) which state medical students are more likely to consume lower levels of alcohol daily. Consequently, it is

unsure whether this finding is credible. The use of a self-reported questionnaire could be suggested detrimental to the results of the study, in that fact that the student nurses were able to provide alleged daily alcohol levels. They may therefore, have been simply less prepared to admit to unhealthy alcohol behaviour, alike the findings previously detailed by Woodward et al. (1994). Students are a population that consume large amounts of alcohol as a result of lots of socialising and the relatively cheap drinks (Gill, 2002), and thus it is assumed that the response provided is untrustworthy. However, it could be assumed the wording of the investigator generated question to attain the daily alcohol consumption of the third year student nurses actually affected the response. Asking the third year student nurses how many they consumed at one time rather than per day may have gained a true value of units consumed, not an average alcohol intake which is what was thought to be provided by the student nurses.

In addition, significantly more third year student nurses chose the healthier spread and oil compared to the unhealthier options. This finding differs from studies by Pan et al. (1999) and Brevard et al. (1996) which found that students tend to consume food high in fat. Yet, there could be suggestions that a generation hitch occurred in relation to the investigator generated question used for fat or oil use, as lard or dripping; one of the options, are very old fashioned methods for cooking food and maybe not an option that the third year student nurses could relate to. Consequently, the third year student nurses had to choose vegetable, sunflower or olive oil as their usual oil use. Furthermore, it could be argued that as the quantity of spread or oil used by the student nurses was not assessed a true dietary fat HB was not gained, as using even the healthier options in large quantities could potentially effect cholesterol levels.

The snack intake of the third year student nurses was predominantly crisps and chocolate. Although, a lack of research has been conducted into the types of snacks consumed by students, this finding is somewhat consistent with that of Pan et al. (1999) and

Brevard et al. (1996) who found students tend to eat foods high in fat. However, the average snack score of the amount of in-between snack consumed by the third year student nurses suggests that although they do tend to choose to eat several snacks, this is not an everyday occurrence. This is consistent in the findings with literature of healthcare professionals by Tucker et al. (2007) where nurses on average consumed snacks one to three times a week. However, this average snack consumption was self-reported by the nurses and thus again could be assumed that they may have been less prepared to admit to an unhealthy dietary behaviour (Woodward et al. 1994).

5.4. The Association between Coronary Heart Disease Knowledge and Health Behaviour

The present study identifies that there was no significant relationship between total CHD knowledge and HB of the third year student nurses and consequently, contradicts with the established findings from social cognition models of HB that knowledge is an essential pre-requisite for behaviour (MacInnes, 2005). Accordingly, hypothesis 3 can be rejected. However, given the third year student nurses low response rate the findings are not well representative of a wider population. Also the assumption that individuals are unlikely to adopt a healthy lifestyle unless they are told they are at high risk for having CHD (Mochari et al. 2007) could be apparent within the studies population of student nurses. Although no risk profile was conducted it is assumed given the student nurses age and overall average HB score that the student nurses would not be at risk, or know they were at risk of CHD and thus a reason for them not fully practicing HBs.

The increased awareness of smoking however, was seen to affect the smoking behaviour of the third year student nurses which suggests that there is some non-significant association between CHD knowledge and HB. The majority of correct responses to the smoking questions were found to be largely answered by the non-smoking third year student

nurses, which is supported by Salamonson et al. (2007) and Redfern et al. (2007) who found that better CHD knowledge significantly generated a non-smoking behaviour in patients. However, the present study found this to be only significantly apparent in the statement 'it does not help to quit smoking after many years because one's health is already damaged' and thus suggests it is more important to make individuals aware of why and when one should stop smoking rather than a statement that smoking is the single most preventative cause of death and disease.

Conversely, a heightened knowledge of physical activity/exercise did not correspond to better physical activity/exercise behaviour as significantly more of the student nurses were either not exercising or not meeting the recommended amount of daily exercise (ACSM, 2006). This supports previous research by Scully et al. (2007) and Haase et al. (2004) who state that students are less likely to engage in physical activity. This finding on the other hand, differs from the studies by Khan et al. (2006) and Salamonson et al. (2007) which determined that an increased awareness about the benefits of physical activity/exercise resulted in a better physical activity/exercise behaviour. Yet, these studies were conducted on a patient population who had had acute myocardial infarctions and thus were identified at high risk for CHD. It could therefore, further suggest that HBs only occurs as a result of knowing you are at high risk for CHD development as previously determined by Mochari et al. (2007).

The dietary behaviour and knowledge of diet in relation to CHD was shown to be non-significantly related, that is with regards to the salt intake, fish consumption, alcohol consumption and fat intake. Knowing that an intake of 9g of salt was greater than the average recommended daily intake did not significantly correlate to the student nurses consuming a high or low salt intake and the fish consumption of the third year student nurses was not related to the fact that they understood that fish rich in Omega 3 can reduce the chances of CHD development. Being knowledgeable about blood cholesterol and diets was also shown

to be not associated with the choice of spread and oil used, and amount of snacks consumed in-between meals. The alcohol consumption was additionally found to be unrelated to the fact that the third year student nurses were unaware of the unit limits to greater the risk of CHD as they consumed low amounts. These findings are inconsistent with previous research that has determined nutritional knowledge, in general, is influential with regards to food consumption and nutritional intake (Dallongeville et al. 2000).

Although not able to significantly determine the linkage between fruit and vegetable knowledge and intake since all third year student nurses answered correctly to the recommended daily intake, only a small proportion of them achieve this recommendation and consumed five a day. This suggests that knowledge alone may not be sufficient to provide HBs and supports suggestions that beliefs and misconceptions influence behaviour change outcomes (Lin et al. 2008). In support of Lin et al. (2008) it is assumed that a misconception or belief that fruit and vegetables do not have an effect on CHD development may cause the student nurse to adopt less healthy fruit and vegetable behaviours. Consequently, this finding provided evidence that there needs to be more research implemented to determine, what other than CHD knowledge, what can influence HB.

5.5. Age-related Differences in Coronary Heart Disease Knowledge and Health Behaviour

This study outlines that there is no significant age-related difference in CHD knowledge and HB and thus experimental hypothesis 4 can be rejected. This finding differs from previous research which has shown that as age is linearly related to CHD knowledge (Jafray et al. 2005). Furthermore, this finding disagrees with the findings from Gump (2001) and Chew et al. (2002) which determines that older individuals increase HBs as a result of feeling more vulnerable or aware of the disease. Yet, most studies examining the age differences between CHD knowledge and HB determine that the younger population are

individuals under the age of 55 years (Mochari et al. 2007) or even under the age of 34 (Mosca et al. 2000). The ages of the third year student nurses in the present study was averaged at below both of these classifications (26 years) and thus the third year student nurses were possibly not old enough to make significant age comparisons.

Although not related to a specific CHD knowledge questions like in Mosca et al. (2000) the younger third year student nurses (straight from education) were less likely to complete the CHDKHBQ and thus this finding supports the assumption that as a result of getting older individuals view or consider the seriousness of CHD (Chew et al. 2002). Mature student nurses could have felt that CHD was more relevant to them and consequently took the time to complete the CHDKHBQ. Alternatively, this finding could be attributable to the fact that the younger straight from school education student nurses felt they were already knowledgeable about CHD through the use of school education initiatives which currently spend time on health education (Jafray et al. 2005). The older more mature students may not have received such information during their schooling years and felt completing the CHDKHBQ would benefit them in relation to their nursing knowledge.

5.6. Gender Differences in Coronary Heart Disease Knowledge and Health Behaviour

The present study identifies that significantly more females took part in the study compared to males. Although this could be seen to be unrepresentative of a population it is assumed to reflect the gender distribution within normal nursing practice. The general CHD knowledge of the third year student nurses was seen to non-significantly differ between genders. However, there was a significant difference between the HB of the male and female third year student nurses and consequently, experimental hypothesis 5 cannot be fully rejected. This is supported by Sanderson et al. (2009) where the knowledge of CHD RFs was not significantly related to the gender of adults situated in the UK and also relates to the

previous findings that differences in HBs can occur among men and women (Thanavaro et al. 2006).

The present study's finding that significantly more females were aware that high-density lipoproteins were beneficial compared to male, is consistent with the fact that females were significantly more likely to be able to answer correctly about blood cholesterol and its association with CHD, as previously found by Koutoubi et al. (2005). The fact that significantly more males and fewer women smoked but fewer males and more women consumed one portion of oily fish per week is however, inconsistent with reports that women, on a regular basis, do not practice healthy lifestyles (Thanavaro et al. 2006). Furthermore, the finding that females were predominantly non-smokers differs from the study by Thanavaro et al (2006) which suggested females currently tend to smoke more than men through fear of gaining weight.

Chapter Six:

Conclusion

6.1. Conclusion

In conclusion, the present study identifies that CHD knowledge in third year student nurses is sufficient to provide health education/promotion. This is in view of the fact that CHD knowledge of third year student nurses is greater than that attained by the general population and CHD patients. The student nurses were significantly knowledgeable in a variety of CHD topics; specifically that of fruit and vegetables and lifestyle modification, but also demonstrated substantial confusion around what diets could benefit most people and in relation to fish rich in Omega 3 and CHD. Furthermore, the student nurses were significantly uninformed about alcohol and CHD. Like many previous studies have suggested, the present study therefore, provides evidence for the fact that CHD knowledge gaps exist in students and suggests that developing the nursing curriculum or in fact improving the media attention surrounding CHD and its RFs is a requirement that must be achieved if the prevalence of CHD is going to be reduced.

The HB of the third year student nurses was evidently shown to be average and thus the present study provides verification that nurses do not fully practice HBs. This was particularly apparent in the physical activity/exercise participation of the student nurses were very few were meeting the recommended weekly physical activity/exercise amounts. Consequently, the study suggests that more needs to be done to promote HBs in the nursing population to help effectively make an impact on the CHD prevalence as it is unlikely that individuals would take advice if the person delivering health education/promotion contradicts the information through their own behaviour.

The present study also identifies that there is no evidence of a relationship between CHD knowledge and HB. Although evident that the third year student nurses attained a good overall knowledge about CHD this was found to non-significantly relate to good overall HB. Specific to each lifestyle RF there was some indication that the increased CHD knowledge may have affected the HB practiced by the third year student nurses; smoking behaviour.

Consequently, the present study provides substantiation in that knowledge may not be the only essential component which must be tackled through health education/promotion but that it may be a combination of items which need to be focused on (misconceptions and beliefs).

Furthermore the present study identifies that there is no age-related differences in the CHD knowledge and HB of the third year student nurses. However, given that the age of the third year students, regardless of whether they were straight from school education or mature students, was still evidently classed as young (26 years) so comparisons between older individuals are not likely to show. Thus, it could be suggested that a wider demographic age study into student nurses needs to be conducted to fully investigate the effect of age on CHD knowledge and HB. Conversely, the present study does substantiate previous research in that CHD knowledge and HB was significantly different in relation to the gender of the third year student nurses. Males are shown to be less knowledgeable but more likely to adopt unhealthier behaviours and thus, suggests that the education of nurses, and consequently the health education/promotion of the public, needs to be gender specific.

6.2. Limitations and Recommendations

The most important limitation of the study is the extremely low response rate generated from the third year student nurses and consequently, the findings of the study cannot be seen as fully reliable. As only 8% of the student nurses took part and completed the studies questionnaire the results are not necessarily representative of the wider population and cannot be provided as rich evidence into the CHD knowledge and HB of third year student nurses. As a future recommendation to increase the response rate of student nurses, it could be proposed that the data collection tool was sent out to the student nurses earlier on in the academic year and thus they would have more time to complete the questionnaire. Providing follow-up emails through this increased time would also ensure that the student nurses were prompted to complete the studies questionnaire; CHDKHBQ. Furthermore, if an incentive

was provided to the third year student nurses, for example being entered into a prize draw to win a voucher, this could potentially result in a much higher response rate.

Another limitation of the study is the use of the CHDKHBQ. Although this questionnaire did attain questions from two previously validated questionnaires, the questionnaire in general was not a validated means of data collection. In addition, the use of several investigator questions ensured that validity was further reduced, as the wording of these questions could have affected the third year student nurses responses to the question. Moreover, the use of multiple choice questions could have prompted the student nurses into correctly answering the CHD knowledge questions; however the use of interviews or open ended questions could have resulted in a lesser response. Consequently, it could be proposed that future development of research in this area adopts a closed questionnaire format with the choice to elaborate on the answers for richer detail.

To improve the validity of the study and ensure that the findings can be determined rich data, a full previously validated questionnaire could be used to collect both CHD knowledge and HB. This would ensure that the responses generated by the third year student nurses were more reliable than those in the present study and also the results were comparable with research that had used the same questionnaire. Alternatively, the CHDKHBQ could be put through a test-retest investigation to determine whether the questionnaire was a valid method of data collection which could then be used in future research. Furthermore, it could be proposed that a future study used qualified healthcare professionals and University lecturers to create a valid CHD knowledge and HB questionnaire. This would ensure that the questionnaire corresponded to the nursing curriculum and the aims of health education/promotion, and could potentially create a valid data collection tool which can be used specifically on student nurses.

Chapter Seven:

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Chapter Eight:

Appendices

Specimen Email to University

Dear Sir/Madam,

I hope you do not mind me contacting you, I have been advised to contact you following a telephone conversation today.

I am currently studying an MSc in Cardiovascular Rehabilitation at the University of Chester (www.chester.ac.uk/cens).

As part of my dissertation assignment, I am going to produce a study to determine the coronary heart disease knowledge and behaviour in third year student nurses from Universities in the north of England, using a questionnaire. I therefore require the recruitment of students and in order to obtain this sample population I am proposing that an email could be sent on my behalf by someone in the nursing department at your University. Is this something you would be happy to do? The email would be comprised by myself and contain a brief summary of the study and a link to a web-based survey administrator, whereby the students click the link to complete the questionnaire if they wish to do so.

I have proposed my study to my tutors at the University of Chester and they are happy for it to go to ethics early next month which I am currently applying for. For ethics I require confirmation that you are happy to participate and thus send out an email on my behalf in order for me to gain my sample population. I understand that this maybe subject to ethical approval. Please reply to this email with confirmation, or alternatively send a confirmation letter to:

Can I please request that this is on University headed paper.

If you do confirm to participating can you also please advise who my contact would be if and when ethics accept my application of the study and as a proposed sample size, can you please advise approximately how many third year student nurses the email would be sent to? To improve my sample size I will be sending to all branches of nursing studies.

If you require any further information please do not hesitate to contact me

Many Thanks in Advance,

If you happen to not be the correct contact for this request can you please advise who I should be contacting instead?

Best Regards

Rosemary Murfin
MSc Student
Centre for Exercise and Nutrition Science
University of Chester



University of Bradford Confirmation Email

From: "Fiona Cunnane" Thursday - April 15, 2010 12:34
To: "ROSEMARY LUCY MURFIN"
CC:
Subject: Re: Dissertation request: emailing questionnaire to student nurses on my behalf

Yes I do not mind you approaching our students to be involved in your study. Just one question, are you interested in just adult students (who will know the most about cardiovascular disease) or are you intending to also include students from other branches of nursing as well?

I will be the contact person.

Fiona Cunnane,
Lead, Pre-Registration Nursing Programmes,
Division of Nursing,
School of Health Studies,
University of Bradford
Tel: (01274) 235998



University of Huddersfield Confirmation Email

From: "Karen Ousey" Friday - April 16, 2010 14:37
To: "ROSEMARY LUCY MURFIN"
CC:
Subject: Re: Dissertation request: emailing questionnaire to student nurses on my behalf

Good afternoon Rosemary,

Dr Wood, Head of Nursing and Health Studies has sent me your request. Yes I am happy to send out your request to the 3rd year students, subject to ethical clearance. There will be approximately 110 students consisting of Diploma and Degree nursing students.

Please do not hesitate to contact me if you require any further information.

Best Wishes,

Karen

Dr. Karen Ousey

Divisional Head Acute and Critical Care

Department of Nursing and Health Studies

University of Huddersfield

Queensgate

Huddersfield

HD1 3DH

Tel: 0044 (1) 484473462



University of Liverpool Confirmation Email

From: Thursday - April 22, 2010 11:13

To: "ROSEMARY LUCY MURFIN"

CC:

Subject: Re: Dissertation request: emailing questionnaire to student nurses on my behalf

Dear Rosemary,

Tom has forwarded your email to me as Co-Director of Studies for the programme. I am happy to email the students on your behalf once you have gone through the necessary approvals process. There are 36 third students who could potentially take part.

Best wishes and good luck with the study,

Julie



Manchester Metropolitan University Confirmation Email

From: Wednesday - April 14, 2010 13:13

To: "ROSEMARY LUCY MURFIN"

CC:

Subject: Re: Dissertation request: emailing questionnaire to student nurses on my behalf

Dear Rosemary,

I am writing to confirm that if ethical approval is given by an approved ethics committee then I will distribute the questionnaire to the third year pre-registration nursing students at Manchester Metropolitan University.

Regards

Paul

Paul J Tubbs

Head of Department: Nursing

Faculty of Health, Psychology & Social Care

Elizabeth Gaskell Campus

Manchester Metropolitan University

Manchester

M13 0JA

0 (44) 161 247 2955



Northumbria University Confirmation Email

From: Monday - April 26, 2010 15:08

To: "ROSEMARY LUCY MURFIN"

CC:

Subject: Re: Dissertation request: emailing questionnaire to student nurses on my behalf

Yes. Please send info and I will circulate as requested.

With regards,

Debbie

Debra Porteous

Academic Head

Pre-registration nursing

Northumbria University

Coach lane Campus

Benton

Newcastle upon Tyne

NE7 7AX

Tele; 2156358

E Mail;

Sample Size Summary

Following confirmation from the five Universities in the north of England that have agreed to participate in the study it was estimated that potentially 696 third year student nurses could be included within the study. The table below details this distribution by University name.

| University Name | Sample Size (cc) |
|--|------------------|
| University of Bradford | 150 |
| The University of Huddersfield | 110 |
| The University of Liverpool | 36 |
| The Manchester Metropolitan University | 150 |
| Northumbria University | 250 |
| Total | 696 |

Review of Methodology

The purpose of this review is to identify and consider the most appropriate method for data collection to obtain CHD knowledge and health behaviour. This includes discussing the research traditions that are available to use; research designs and methods of data collection, as well as reviewing data collection methods that have been previously used by similar research studies.

Research Traditions

Research Designs

Collecting data can adopt either a quantitative or a qualitative research design (Gratton & Jones, 2004). Quantitative research uses numerical measurements and analysis to measure social phenomena to provide facts (Gratton et al. 2004). It assumes a single, objective social reality which is constant across different times and settings and can therefore, be used with the intention to generalise to populations (Gratton et al. 2004). Quantitative data is typically collected using inanimate objects; like pen and paper, is often attained in a contrived setting where the researcher is 'detached' from the subjects under investigation, and also uses statistical analysis to determine causal relationships (Gratton et al. 2004).

Qualitative research, on the other hand, relies on non-numerical analyses to provide understanding (Gratton et al. 2004). It assumes social reality is a subjective experience that is continuously constructed and related to the immediate social context (Gratton et al. 2004). Qualitative research is a more flexible approach that aims to gain description, understanding and meaning within small samples or 'cases' and is often collected in a natural location (Gratton et al. 2004). Qualitative data is

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also rich and, since the researcher is the data collection instrument, the data is additionally seen as subjective (Gratton et al. 2004).

Gratton et al. (2004) determines that there is no one 'better' research design to use and that the decision to collect either quantitative or qualitative data depends largely on the research question and the objectives of the study. Information on CHD knowledge and health behaviour could in actual fact be obtained using both research designs; obtaining a knowledge and behaviour score (quantitative) or using description to provide an interpretation of the knowledge and behaviour of an individual (qualitative). But as the intention of the study is to use a large sample size of third year student nurses and then to generalise to a larger population, as well as one of the studies aims being to determine whether there is a causal relationship between CHD knowledge and health behaviour, it is suggested that the most suitable research design is a quantitative approach.

Methods of Data Collection

Questionnaires and interviewing are perhaps, the most commonly used method of data collection in research (Gratton et al. 2004). A questionnaire is defined simply as a standardised set of questions used to gain information from a participant (Hart, 2005) and is often associated with collecting quantitative data (Gratton et al. 2004). A questionnaire can be administered personally, via post or email (Hart, 2005) and the design can use a number of different formats; open-ended questions, closed-ended or pre-coded questions, scales, ranking questions, lists or filter questions (Gratton et al. 2004). The basis of interviewing is to talk to selected respondents on a specific topic to find answers (Hart, 2005) and although largely associated with the collection of qualitative research when contrasted with a structured nature can also be used to

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obtain quantitative data (Gratton et al. 2004). In addition to structured interviews, interviews can also be classified as semi-structured or unstructured interviews or as focus groups (Gratton et al. 2004; Hart 2005).

The advantages and disadvantage of using questionnaires and interviews are widely published by research literature. Questionnaires allow data to be collected from a geographically dispersed sample group at a much lower cost than interviewing and as the researcher does not need to be present to ask the questions it allows a larger sample to be investigated (Gratton et al. 2004). Although interviews result in the use of smaller samples and consequently are less representative of the wider population they do however, allow the investigation of specific target groups that may be less able to complete questionnaires; such as the low educated or older/younger respondents (Gratton et al. 2004).

With the researcher not necessarily present in the completion of a questionnaire, this method of data collection has also little opportunity to introduce bias into the results (Gratton et al. 2004). Gratton et al. (2004) explains that interviews often increase bias as a result of unconscious verbal and non-verbal reactions which encourage the subject to answer in the manner that they think they should. This could include nodding at certain responses or a shake of the head after each response (Gratton et al 2004). The presence of a researcher can additionally inhibit the respondent in their answer and thus a questionnaire provides anonymity (Gratton et al. 2004). Gratton et al. (2004) determines this may therefore, improve the validity of the response.

A questionnaire tends to provide highly structured data which is easily comparable and often relatively straight forward to analyse, while an interview requires more in-depth analysis (Gratton et al. 2004; Hart, 2005). Interviews are

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however, an obtrusive method which generates substantial in-depth information (Hart, 2005), allowing for elaboration on areas of particular interest, or even enabling unexpected data to emerge (Gratton et al. 2004). The structured nature of the questionnaire restricts answers providing no opportunity to expand upon or explain any of the points that have been made (Gratton et al. 2004). Yin (1994) also states that interviews provide more insightful information that provides perceived causal inferences yet, on the other hand, the quality of the data is dependant upon the responses of the interviewee which can be subject to problems of recall, misperception and incorrect knowledge and the spoken words always have a residue of ambiguity about them (Gratton et al. 2004).

Questionnaires allow respondents to complete the data collection at a convenient time but for that reason, can potentially result in a low response rate which may seriously effect on the reliability of the study (Gratton et al. 2004). Questionnaires are also more likely to be completed by an inappropriate party and be potentially problematic if participants do not understand the questions they are being asked, provided that they are typically completed without the presence of a researcher (Gratton et al. 2004). Face-to face interviewing controls these aspects as well as allowing the researcher to access body language, facial expressions and tone of voice which may be useful in analysis (Gratton et al. 2004).

Having established the advantages and disadvantages to both questionnaires and interviewing as methods of data collection, there seems to again be no one 'better' method than the other. But given that the most suitable research design for the present study has been established as quantitative, it is assumed that the best method to adopt would be the use of a questionnaire. The study is therefore, aiming to investigate a large population at low cost and generalise to a wider population, and although the

data could prove unreliable with a low response rate the validity of the studies findings can be enhanced through the fact that a researcher is not present.

Evidence for Methods of Data Collection

Extensive evidence into the collection of CHD knowledge and/or health behaviour can be seen to use both questionnaires and interviews as data collection methods. The ensuing sections; separated by author, summarise the methods of data collection that have been used by past researchers as well as identifying any limitations or discussions that occurred as a result of the method they used.

Mosca, Jones, King, Ouyang, Redburg, Hill et al. (2000)

To assess the knowledge of CHD risks and the perception of CHD and its prevention in women, telephone interviews were conducted. The interviews were developed from a 38-questionnaire and consisted of both open-ended and scale questions. The use of telephone interviews however, were deemed as a limitation for the study since inclusion could only occur in households with telephones and thus it was likely that the study failed to survey women in the lowest socioeconomic group.

Dallongeville, Marecaux, Cottell, Bingham and Amouyel (2000)

The nutritional knowledge of middle-aged men from Northern France was evaluated with a 10-question form concerning food consumption and nutritional practices. The questionnaire was piloted for understanding and difficulty to avoid ceiling and floor effects in scoring.

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Andersson and Leppart (2001)

A questionnaire was constructed containing items pertaining to background variables and items concerning knowledge about important risk factor of CHD. The questions were divided into three main groups; behaviours, factors, and knowledge and used closed-ended/pre-coded questions. Since there were non-respondents to the questionnaire it was suggested that some participants may have perceived the questions too difficult to answer or that they may have felt that they had too little time to answer the questions fully.

Rasanen, Niinikoski, Keskinen, Helenius, Talvia, Ronnema et al. (2003)

A nutritional knowledge test was used to assess parental nutritional knowledge. Three domains of knowledge were assessed; factual knowledge, behavioural capability and nutritional-related attitudes, using true/false questions, scale questions and closed-ended/pre-coded questions, respectively. As a limitation to the knowledge attained it was however, proposed that the use of only one score to represent achievements in the test may underestimate the overall level of knowledge.

Karner, Goransson and Bergdahl (2003)

Patients' conceptions of CHD were generated by semi-structured open ended interviews. The progression of the interview varied according to the follow-up questions; could you explore that a little further? or how do you think about this?, and patients were encouraged to express themselves in their own words when answering the questions. It is discussed however, how the credibility of using a qualitative approach is difficult as the results are regarded as discoveries and not fact.

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Alm-Roijer, Stagmo, Uden and Erhardt (2004)

After completing an interview to determine demographic variables and medication, smoking habits and family history of CHD, patients were assessed by questionnaire. Stating that there is no 'gold standard' questionnaire for measuring knowledge of risk factors the study developed a questionnaire using a panel of three cardiologists and one nurse specialist. An ordinal scale was used to illustrate patients knowledge questions; 0 being less important for the progress of CHD and 9 being very important for the progress of CHD. A relevant issue with regards to the limitation of the study was determined as the response rate since those that were not participating in secondary prevention programs failed to participate in the study.

Byrne, Walsh and Murphy (2005)

Four lifestyle factors of patients with CHD were assessed using four different questionnaires. Exercise behaviour was measured using the Godin Leisure Time Exercise Questionnaire (Petrie, Cameron, Ellis, Buick & Weinmann, 2002) which provides a total weekly score reflecting frequency and vigorousness of normal leisure time exercise behaviour, smoking status was determined by categorising current smokers, ex-smokers or never smoked, alcohol consumption was measured using a four-item questionnaire which asked the duration between the last drink, the frequency of drinking in a typical week and the quantity of drink consumed, and dietary habits were assessed using the Dietary Instrument for Nutrition Education (Roe, String, Whiteside & Mant, 1994). Furthermore, the patients' illness perceptions were assessed using the revised Illness Perception Questionnaire (Moss-Morris, Weinmann, Petrie, Horne, Cameron & Buick, 2002) and the Beliefs about Medicines Questionnaire (Horne, Weinmann & Hankins, 1999) was used to assess patients'

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cognitive representations of their treatment. While attempting to achieve a high response rate (69%) however, the study identifies that the reliance on self-reported measures can be a limitation to the findings. The use of self-reported questionnaires is subject to self-presentational and recall bias (Rudd, 1993).

Jafray, Aslam, Mahmud, Waheed, Shakir, Afzal et al. (2005)

Study subjects were surveyed using a structured questionnaire that was developed to contain questions on four basic themes; understanding of what CHD was, knowledge of risk factors for CHD, knowledge of the symptoms of CHD, and preventative practices relating to CHD. The questionnaire consisted of open-ended questions only and consequently subjects were asked at each question whether they wished to add anything to their response. The use of open-ended questions was however, seen as a limitation to the study as it introduces the potential of recall bias on the part of the respondents and may underestimate the knowledge state of the study group. Furthermore, the computation of a knowledge score based on correct answers to a set of questions is somewhat arbitrary; does not incorporate differential weightage that be placed on different questions but it was also noted that this score does nonetheless, provide a fair estimate of the degree of knowledge of an individual.

Heidrich, Behrens, Raspe and Kiel (2005)

A self-administered questionnaire was designed to explore the knowledge of and attitudes and treatment practices towards risk factors in patients with CHD. Potential items were identified from previous research and adapted for the purpose of this study. Questions were formatted using scales and all were closed-ended. As all information was based on self reports it is identified that the study however, cannot

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exclude the possibility of bias. In addition, although the response rate was relatively high (66.6%) non-participation with the study could have biased the results in that responding patients were more motivated and might have expressed more positive attitudes.

Khan, Jafray, Jafar, Faruqui, Rasool, Hatcher et al. (2006)

A structured questionnaire was used to collect knowledge of modifiable risk factors of CHD among patients with acute MI. Components of the questionnaire derived from various published studies and the majority of the questions were closed-ended. Since the level of knowledge was assessed using structured questions this may however, prove to be a possible limitation to the study. Subjects may have responded positively to all risk factors introduced, knowing that the study was about CHD and risk factors, so the total level of knowledge may have been overestimated. The study also reports that although the components of the questionnaire had been validated by previous studies the questionnaire used on the whole was not validated.

Thanavaro, Moore, Anthony, Narsavage and Delicath (2006a)

Women's health promoting behaviour and knowledge level of CHD were assessed using the Health Promoting Lifestyle II (Walker, Sechrist & Pender, 1995) and a modified version of the Coronary Heart Disease Knowledge test (Smith, Hicks & Heywood, 1991). Responses for the former questionnaire were formatted using scale questions while the latter used closed-ended questions. A limitation to the study was identified that the CHD knowledge instrument used specific medical terminology which may be unfamiliar to laywomen and thus could have potentially limited their ability to answer the questions. Furthermore, there is also a consideration that

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participants exaggerate their answers to questionnaires perceiving such responses as more socially desirable.

Thanavaro, Moore, Anthony, Narsavage and Delicath (2006b)

Yet again the modified Coronary Heart Disease Knowledge Test (Smith et al. 1991) was used to measure CHD knowledge. A demographic form was administered to collect personal history of smoking, diabetes mellitus, hypertension and high serum lipids along with age, height and weight. Additionally to the previous research study this study provides evidence that there is a need for instrument development that will accurately measure CHD knowledge, as medical terms may not always be understood by participants. On the other hand, the study identifies that the reason this knowledge test was chosen was that the initial instrument had a high internal consistency (0.84) and that it has been the only study to be previously used to measure CHD knowledge in women.

Mochari, Ferris, Adigopula, Henry and Mosca (2007)

Standardised information on demographics, educational background, medical history, knowledge of risk factors, awareness of own risk, barriers to medication adherence and barriers to heart healthy lifestyle was collected by trained interviewers. This included asking participants open-ended questions or alternatively asking participants to answer yes or no to a selection of questions. It was however, noted that both knowledge and adherence were overestimated using the data collection instruments. But, Osterberg and Blaschke (2005) determine that in fact self-report may actually best reflect information that is provided from patient to physician in a clinical setting.

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Kayaniyil, Ardern, Winstanley, Parsons, Brister, Oh (2009)

Since no robust knowledge questionnaire validated in cardiac samples is available, items from existing knowledge questionnaires and investigator-generated questions were integrated to assess CHD knowledge relating to risk factors, symptoms and treatments. Questions were formatted as closed-ended or true or false, and consisted of a combination of investigator generated questions, or questions from previous questionnaires. Provided that the studies questionnaire used components from different sources a key limitation is that knowledge was not measured using a validated instrument. However, as the original questions were primarily obtained from previously validated questionnaires, there is some degree of confidence in the results.

Crouch and Wilson (2010)

A questionnaire was applied to collect data on rural women's perception and awareness of CHD. The origins of the components of the questionnaire were attained from previous questionnaires and included both open-ended and true or false questions. A limitation of the study however, was noted that in an attempt to maintain participant's anonymity within a small rural setting it was unknown who filled out the questionnaire as the researcher had no control over the distribution. On the other hand, hospital nurses were placed with the responsibility of distribution and had the potential to restrict who received the questionnaire.

Summary

Provided that CHD knowledge and health behaviour are better suited to a quantitative approach; given its ability to test large sample sizes, be generalised and make causal relationships, it was subsequently found that a questionnaire would be

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the most appropriate data collection tool. Yet, the use of a data collection tool largely determines on what past research has used as this anticipates any problems that may occur as a result and allows better comparisons to be made.

Following an extensive review of the methods of data collection used in similar research, it is evident that the majority prefer the use of questionnaires (12) compared to interviews (5). This may be largely down to the fact that the credibility of qualitative interviewing is difficult to assume given that the responses are discoveries and not facts. Furthermore, interviewing techniques such as telephone interviews can prove to exclude specific target groups, for example those of the lowest socioeconomically status.

The use of questionnaires is nonetheless, not without problems but it seems apparent that these can be easily managed or controlled. The questions could prove too difficult to understand by the use of medical terminology thus, limiting the ability to answer the questionnaire fully. However, ensuring that the participants have a background for the nature of the study can increase the likeliness that they will understand such information. On the other, a problem that might occur as a result of this increased awareness is that participants respond positively to the questions or exaggerate answers perceiving responses that are deemed more socially acceptable. This can also occur as a result of the structured nature of a questionnaire.

The time scale to complete the questionnaire can also affect the ability to answer the questionnaire fully but allowing respondents to have an increased time can be manageable. Additionally, questionnaires can also prove problematic in their distribution and it is typically unknown who is completing them. But, using a responsible person to manage the distribution can ensure that the questionnaire is being completed by the appropriate party. Furthermore, questionnaires can evidently

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suffer with low response rates which reduce the reliability of the studies findings. However, there are some studies which highlight that response rates can be reasonably high (69% - Byrne et al. 2005; or 66.6% - Heidrich et al. 2005).

The use of a single knowledge score can largely underestimate the overall knowledge of the individual and also may be arbitrary but nonetheless, this provides researchers with a fair estimation to use for analysis. As questionnaires largely rely on self-reports of participants it can also endure increased self-presentational and recall bias as a result. However, it is noted that in actual fact this self-reporting best reflects information. Recall bias can additionally be increased through the use of open-ended questions which subsequently are shown to underestimate the knowledge of an individual. But as questionnaires can adopt the use of other designs this can be overcome.

Finally, it is clear that the use of items from previous questionnaires to generate a new questionnaire diminishes the validity, even when the original questionnaires are shown to be validated. However, given that the original questionnaire is shown to have high construct (0.84) the generated questionnaire is seen to have some degree of the confidence in the results. To improve validity of the study it is also evident that a pilot study be completed prior to collecting data and is recommended largely on the basis that this avoids ceiling and floor effects.

Provided that measures are made to manage the characteristic problems of a questionnaire it seems obvious that this method of data collection to obtain CHD knowledge and health behaviour is the most fitting. The study will consequently, use third year student nurses who have acquired CHD knowledge through taught modules at University, provide them with a substantial amount of time to complete the questionnaire (3 months), ensure that the questionnaire is distributed by a responsible

party (University staff), and most importantly use either a full validated questionnaire or alternatively, a combination of questions from previously validated questionnaires.

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Coronary Heart Disease Knowledge and Health Behaviour Questionnaire (CHDKHBQ)

Details

1. What University do you currently attend? _____
2. What age are you? _____ years
3. Are you...?
 - a. Male
 - b. Female
4. What branch of nursing are you studying at University?
 - a. Adult Nursing
 - b. Child Nursing
 - c. Mental Health Nursing
 - d. Learning Disability Nursing
 - e. OtherPlease specify: _____

Coronary Heart Disease Knowledge

(Please answer the 16 items listed below by selecting only one option)

5. What is Coronary Heart Disease?
 - a. Chest pain
 - b. A valve problem
 - c. Reduced blood flow to the heart
 - d. Malfunction of the heart
6. A risk factor of coronary heart disease that you cannot change is:
 - a. Lack of exercise
 - b. Heredity
 - c. Obesity
 - d. Stress
 - e. Smoking
7. The single most preventable cause of death and disease in the 'western world' is:
 - a. Drug abuse
 - b. Environmental pollution
 - c. Poor nutrition
 - d. Smoking

Appendix 5

8. Which of the following blood fats is thought to lower the risk of coronary heart disease?
 - a. High-density lipoprotein
 - b. Low-density lipoprotein
 - c. Cholesterol
 - d. Triglycerides

9. Which of the following is a direct benefit of exercise?
 - a. Reduced work of heart for a given workload
 - b. Reduction of fat cells
 - c. Enlarged lungs
 - d. Increased resting heart rate

10. The best type of physical activity to maintain cardiovascular fitness is _____ exercise.
 - a. Anaerobic
 - a. Aerobic
 - b. Non-aerobic
 - c. Dynamic

11. Most people could benefit from diets
 - a. Lower in complex carbohydrates and higher in protein
 - b. Lower in complex carbohydrates and lower in fat
 - c. Higher in complex carbohydrates and higher in fat
 - d. Higher in complex carbohydrates and lower in fat

12. What is the recommended daily amount of fruit and vegetables?
 - a. 5 a day
 - b. 3 a day
 - c. 1 a day
 - d. No recommendation

13. Women who persistently drink more than _____ units of alcohol a day and men who drink more than _____ are more likely to suffer from the risk factors associated with coronary heart disease?
 - a. Two and Two
 - b. Two and Three
 - c. Three and Four
 - d. Four and Four

14. The average daily intake of salt by adults in the United Kingdom is 9g, is this?
 - a. Not enough
 - b. The correct amount
 - c. Too much

15. People who are physically active on a regular basis can cut their risk of heart disease in half?
 - a. True
 - b. False

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16. Small changes in what you eat can lower blood cholesterol?
 - a. True
 - b. False
17. A person can reduce their chances of dying from heart disease through lifestyle changes?
 - a. True
 - b. False
18. It does not help to quit smoking after many years because one's health is already damaged?
 - a. True
 - b. False
19. To get cardiac benefit from exercise, you need to get sweaty and out of breath?
 - a. True
 - b. False
20. Eating fish rich in 'Omega 3' can improve your chances of not developing coronary heart disease?
 - a. True
 - b. False

Health Behaviour

(Please answer the following 10 items)

21. Do you currently smoke?
 - a. Yes
 - b. No
22. How many times a weeks do you participate in 30minutes of exercise?
 - a. None
 - b. Once or Twice a week
 - c. Three to Five times a week
 - d. Five to Seven times a week
23. Do you add salt to foods when cooking?
 - a. Yes
 - b. No
24. Do you add salt to your food at the table?
 - a. Yes
 - b. No
25. How many portions of fruit and vegetables do you eat a day?
 - a. 1 or 2 a day
 - b. 3 or 4 a day
 - c. 5 a day
 - d. More than 5 a day

Appendix 5

26. Do you eat more than 1 portion of oily fish per week?
- Yes
 - No
27. If 1 unit is equal to one small glass of wine, half a pint of larger, a bottle of beer or cider, or a single measure of spirit, how many units of alcohol do you consume in one day?
- 1 unit
 - 2 units
 - 3 units
 - 4 units
 - More than 4 units
28. What type of spread do you usually use on your bread?
- Butter or hard margarine
 - A low fat or polyunsaturated spread
 - A cholesterol lowering spread
 - None
29. What type of fat or oil would you usually use for cooking?
- Vegetable oil
 - Sunflower oil
 - Olive oil
 - Lard or Dripping
30. What snacks do you usually have between meals? (*Tick all that apply*)
- Crisps
 - Fruit
 - Biscuits
 - Yogurt
 - Chocolate
 - Sweets
 - Cake
 - None

Justification for Question Selection

Rationale for questions taken from the modified Coronary Heart Disease Knowledge Test (Oliver-McNeil et al. 2002), the Coronary Heart Disease Awareness and Knowledge test (Kayaniyil et al. 2009) as well as justifying the investigator generated questions for both the knowledge and health behaviour sections of the CHDKHBQ.

*Key: 1 - Oliver-McNeil et al. 2002

2 - Kayaniyil et al. 2009

3 - Investigator Generated Questions

| Question Selected | Rationale | From* |
|--|--|-------|
| 5. What is Coronary Heart Disease? | Be good to initially get an understanding of whether the students are aware of what coronary heart disease is. | 2 |
| 6. A risk factor of coronary heart disease that you cannot change is: | For knowledge of modifiable risk factors it is important to determine if the students identify with which one cannot be changed. | 1 |
| 7. The single most preventable cause of death and disease in the United States is: | This question will test the hypothesis: whether, knowing the single most preventable cause is smoking correlates to a non-smoking behaviour. | 1 |
| 8. Which of the following blood fats is thought to lower the risk of coronary heart disease? | This question identifies whether the student acknowledges what type of fat intake can lower their risk of coronary heart disease. | 1 |
| 9. Which of the following is a direct benefit of exercise? | Knowing the benefits of exercise is an important tool to increase exercise participation, be important to determine if this occurs in the study. | 1 |
| 10. The best type of physical activity to maintain cardiovascular fitness is _____ exercise | This provides information on the students understanding of what type of exercise he/she should be doing | 1 |

Appendix 6

| | | |
|---|---|---|
| 11. Most people could benefit from diets | Similar to what has been proposed earlier, this question gains a good understanding whether the student knows what fat intake can benefit them in relation to coronary heart disease. | 1 |
| 12. What is the recommended daily amount of fruit and vegetables? | This question gives more detail with regard to dietary choices. | 3 |
| 13. Women who persistently drink more than _____ units of alcohol a day and men who drink more than _____ are more likely to suffer from the risk factors associated with coronary heart disease? | This question establishes knowledge of another CHD risk factor; alcohol. | 3 |
| 14. The average daily intake of salt by adults in the United Kingdom is 9g, is this? | This question establishes whether students understand the average daily intake of salt. A low salt intake is part of a healthy diet. | 3 |
| 15. People who are physically active on a regular basis can cut their risk of heart disease in half? | This question identifies whether the student understands that exercise participation on a regular basis can lower their risk. | 2 |
| 16. Small changes in what you eat can lower blood cholesterol? | This identifies that the student understands small changes can help coronary heart disease | 2 |
| 17. A person can reduce their chances of dying from heart disease through lifestyle changes? | Lifestyle changes are important to reduce coronary heart disease. This question gives an insight into whether this is known by the students | 2 |
| 18. It does not help to quit smoking after many years because one's health is already damaged? | This question determines if the student understands that modification can help coronary heart disease, this may affect behaviour | 2 |
| 19. To get cardiac benefit from exercise, you need to get sweaty and out of breath? | This identifies that the student is aware of cardiac benefit when exercising | 2 |
| 20. Eating fish rich in 'Omega 3' can improve your chances of not developing coronary heart disease? | To gain a better understanding of diet it would be beneficial to identify | 3 |
| 21. Do you currently smoke? | To establish a smoking behaviour, it is necessary to determine if the student smokes or not. | 3 |

Appendix 6

| | | |
|--|---|---|
| 22. How many times a weeks do you participate in 30 minutes of exercise? | This question enables the students current exercise behaviour to be determined and if they follow what is recommended. | 3 |
| 23. Do you add salt to foods when cooking? | To determine the students dietary habits it would be beneficial to understand if the student has a low salt intake | 3 |
| 24. Do you add salt to your food at the table? | To determine the students dietary habits it would be beneficial to understand if the student has a low salt intake | 3 |
| 25. How many portions of fruit and vegetables do you eat a day? | A diet high in fruit and vegetables is a healthy diet, so to determine the student's daily intake would be necessary. A high could be seen as the recommended 5 a day. | 3 |
| 26. Do you eat more than 1 portion of oily fish per week? | Oily fish is a healthy diet, so to determine the student's daily intake would be necessary. | 3 |
| 27. If 1 unit is equal to one small glass of wine, half a pint of larger, a bottle of beer or cider, or a single measure of spirit, how many units of alcohol do you consume in one day? | Drinking to much alcohol can contribute to CHD risk factors, for example obesity and high blood pressure. Determining the students alcohol consumption would correlate also with question 13. | 3 |
| 28. What type of spread do you usually use on your bread? | This question determines what fat intake the student is consuming. | 3 |
| 29. What type of fat or oil would you usually use for cooking? | This question determines what fat intake the student is consuming. | 3 |
| 30. What snacks do you usually have between meals? | Knowing what snacks the students usually consume between meals establishes dietary habits. | 3 |

CHDKHBQ Scoring Sheet

Knowledge

| Question | Scoring |
|--|--------------------------------------|
| 5. What is Coronary Heart Disease? | a. 0 b. 0 c. 1 d. 0 |
| 6. A risk factor of coronary heart disease that you cannot change is: | a. 0 b. 1 c. 0 d. 0 e. 0 |
| 7. The single most preventable cause of death and disease in the 'western world' is: | a. 0 b. 0 c. 0 d. 1 |
| 8. Which of the following blood fats is thought to lower the risk of coronary heart disease? | a. 1 b. 0 c. 0 d. 0 |
| 9. Which of the following is a direct benefit of exercise? | a. 1 b. 0 c. 0 d. 0 |
| 10. The best type of physical activity to maintain cardiovascular fitness is _____exercise | a. 0 b. 1 c. 0 d. 0 |
| 11. Most people could benefit from diets | a. 0 b. 0 c. 0 d. 1 |
| 12. What is the recommended daily amount of fruit and vegetables? | a. 1 b. 0 c. 0 d. 0 |

Appendix 7

| | |
|---|------------------------------|
| 13. Women who persistently drink more than _____ units of alcohol a day and men who drink more than _____ are more likely to suffer from the risk factors associated with coronary heart disease? | a. 0 b. 0 c. 1 d. 0 |
| 14. The average daily intake of salt by adults in the United Kingdom is 9g, is this? | a. 0 b. 0 c. 1 |
| 15. People who are physically active on a regular basis can cut their risk of heart disease in half? | a. 1 b. 0 |
| 16. Small changes in what you eat can lower blood cholesterol? | a. 1 b. 0 |
| 17. A person can reduce their chances of dying from heart disease through lifestyle changes? | a. 1 b. 0 |
| 18. It does not help to quit smoking after many years because one's health is already damaged? | a. 0 b. 1 |
| 19. To get cardiac benefit from exercise, you need to get sweaty and out of breath? | a. 0 b. 1 |
| 20. Eating fish rich in 'Omega 3' can improve your chances of not developing coronary heart disease? | a. 1 b. 0 |
| Total: | / 16 |

Health Behaviour

| Question | Scoring |
|-----------------------------|--------------|
| 21. Do you currently smoke? | a. 1 b. 2 |

Appendix 7

| | |
|--|--|
| 22. How many times a week do you participate n 30 minutes of exercise? | a. 1 b. 2 c. 3 d. 4 |
| 23. Do you add salt to foods when cooking? | a. 2 b. 1 |
| 24. Do you add salt to your food at the table? | a. 2 b. 1 |
| 25. How many portions of fruit and vegetables do you eat a day? | a. 1 b. 2 c. 3 d. 4 |
| 26. Do you eat more than 1 portion of oily fish per week? | a. 2 b. 1 |
| 27. If 1 unit is equal to one small glass of wine, half a pint of larger, a bottle of beer or cider, or a single measure of spirit, how many units of alcohol do you consume in one day? | a. 5 b. 4 c. 3 d. 2 e. 1 |
| 28. What type of spread do you usually use on your bread? | a. 1 b. 2 c. 2 d. 2 |
| 29. What type of fat or oil would you usually use for cooking? | a. 2 b. 2 c. 3 d. 1 |
| 30. What snacks do you usually have between meals? | a. 1 b. 3 c. 1 d. 2 e. 1 f. 1 g. 1 h. 3 |
| Total: | / 29 |

Confirmation Letter for Ethical Approval

Specimen Email to Students

Dear Student,

I am currently studying an MSc in Cardiovascular Rehabilitation at the University of Chester. As part of my dissertation I am researching coronary heart disease health knowledge and behaviour in student nurses from Universities in the north of England, and you are therefore, invited to take part.

If you would like further information on the study please see attached 'Participant Information Sheet'

Please click on the link below if you wish to participate, where you will be able to complete an online questionnaire on coronary heart disease health knowledge and behaviour. This should take no longer than 12 minutes.

Link: <http://www.surveymonkey.com/s/7JL83PC>

Kind Regards

Rosemary Murfin

MSc Student

Centre for Exercise and Nutrition Science

University of Chester

Specimen of Coronary Heart Disease Knowledge and Health Behaviour Questionnaire in ‘Survey Monkey’

The student nurses navigate through the questionnaire online using the ‘Next’ button; which is situated at the bottom of the questions. The student nurses will also be able to view their progress in the top percentage bar and will be prompted if a question is not answered with ‘This question requires an answer’.

Details

The screenshot shows a web browser window displaying a survey in preview mode. The browser's address bar shows the URL: http://www.surveymonkey.com/s.aspx?PREVIEW_MODE=DO_NOT_USE_THIS_LINK_FOR_COLLECTION&sm=vmoxJDnrc82bnD2nGlyTEdQqYDwtryk8TGzFef1f9s%3d#q1. The survey title is "Coronary Heart Disease Health Knowledge and Behaviour - Specimen Only". At the top right, there is a progress bar showing 33% completion and an "Exit this survey" link. The first question is "1. What University do you currently attend?" with a text input field containing "University of Chester". The second question is "2. What branch of nursing are you studying at University?" with radio button options: "Adult Nursing", "Child Nursing", "Mental Health Nursing", "Learning Disability Nursing", and "Other". Below these options is a text input field labeled "Please specify". A "Next" button is located at the bottom center of the survey area. The Windows taskbar at the bottom shows the Start button, several open applications, and the system clock at 17:40.

Appendix 10

Coronary Heart Disease Knowledge

[SURVEY PREVIEW MODE] Coronary Heart Disease Health Knowledge and Behaviour - Specimen Only Sur - Windows Internet Explorer

http://www.surveymonkey.com/s.aspx?PREVIEW_MODE=DO_NOT_USE_THIS_LINK_FOR_COLLECTION&sm=vmaxUDnc82bnDznGlyTEdQqYDwtrykBTGH2FeF1f9s%3d

File Edit View Favorites Tools Help

Coronary Heart Disease Health Knowledge and Behaviour - Specimen Only [Exit this survey](#)

67%

(Please answer the 16 items listed below by selecting only one option)

***3. What is Coronary Heart Disease?**

- Chest pain
- A valve problem
- Reduced blood flow to the heart
- Malfunction of the heart

***4. A risk factor of coronary heart disease that you cannot change is?**

- Lack of exercise
- Heredity
- Obesity
- Stress
- Smoking

***5. Women who persistently drink more than ___ units of alcohol a day and men who drink more than ___ are more likely to suffer from the risk factors associated with coronary heart disease?**

- Two and Two
- Two and Three
- Three and Four

Done

Internet 100%

start Appendix Create a Surv... [SURVEY PRE... 8. Coronary H... Document1 - ... 17:41

Health Behaviour

[SURVEY PREVIEW MODE] Coronary Heart Disease Health Knowledge and Behaviour - Specimen Only Sur - Windows Internet Explorer

http://www.surveymonkey.com/s.aspx?PREVIEW_MODE=DO_NOT_USE_THIS_LINK_FOR_COLLECTION&sm=vmaxUDnc82bnDznGlyTEdQqYDwtrykBTGH2FeF1f9s%3d#q3

File Edit View Favorites Tools Help

Coronary Heart Disease Health Knowledge and Behaviour - Specimen Only [Exit this survey](#)

100%

(Please answer the following 10 items by selecting only one option)

***7. Do you smoke?**

- Yes
- No

***8. How many times a week do you exercise for 30minutes?**

- None
- Once or Twice a week
- Three to Five times a week
- Five to Seven times a week

*** This question requires an answer.**

9. How many portions of fruit and vegetables do you eat a day?

- 1 or 2 a day
- 3 or 4 a day
- 5 a day
- More than 5 a day

***10. What snacks do you usually have between meals?**

Done

Internet 100%

start Appendix Create a Surv... [SURVEY PRE... 8. Coronary H... Document1 - ... 17:42



Participant Information Sheet

Short title of study: *Coronary heart disease knowledge and health behaviour in student nurses*

You have been asked to participate in a research study. But before deciding to take part, it is important for you to have full understanding why the research is being undertaken, and what it entails. Please take time to read the following information below. If anything is unclear, or if you would like more information please contact me.

What is the purpose of the study?

The aim of this study is to determine coronary heart disease knowledge and health behaviour in student nurses.

Why have you been chosen?

You have been chosen because you are at third year student nurse, attending a University in the north of England.

Do you have to take part?

Participation is voluntary. It is up to you, whether you take part or not. If you decide to take part you are free to withdraw at any time during without any explanation or consequence.

What will happen to me if I take part?

If you take part you will be given a simple questionnaire on coronary heart disease knowledge and health behaviour which will take approximately 12 minutes to complete.

What are the possible disadvantages and risks of taking part?

There are no disadvantages or risks foreseen by taking part in this study.

What if something goes wrong?

If you have concerns about the way they have been approached or treated to participate in the study, you should contact Professor Sarah Andrew, Dean of the Faculty of Applied and Health Sciences, University of Chester, Parkgate Road, Chester, CH1 4BJ, 01244 513055

Will my taking part in the study be kept confidential?

Yes. All answers given will remain confidential and anonymous. Only the researcher will have access to your responses.

What will happen to the results of the study?

The results will be written up and presented as a dissertation for the degree of MSc in Cardiovascular Rehabilitation. You will not be identified in any subsequent report or publication.

Who is organising and funding the research?

There is no funding needed to conduct the study. The researcher will fund for the production of resource, for example questionnaires.

Who may I contact for further information?

For further information, please contact the lead researcher Rosemary Murfin on or at [@chester.ac.uk](mailto:Rosemary.Murfin@chester.ac.uk)

Specimen Follow-up Email to University

Dear _____,

Further to my email 'dissertation request: emailing questionnaire to student nurses on my behalf' and the subsequent correspondence we had in April.

After discovering that none of your third year student nurses have completed the Coronary Heart Disease Knowledge and Health Behaviour Questionnaire online yet, I am emailing you to follow-up my initial request. If you haven't already done so can I please request that you send out the attached email to your third year student nurses as I am struggling to obtain a sufficient sample size. If you have already done so, I apologise for this follow-up email but if you wouldn't mind reminding your third year student nurses that there is an opportunity to take part in my study that would be much appreciated.

Many thanks in advance,

Kind Regards

Rosemary Murfin

MSc Student

Centre for Exercise and Nutrition Science

University of Chester

SPSS Output

Tests of Normality and Homogeneity of Variance

1. Test of normality for total CHD knowledge and health behaviour

| | Shapiro-Wilk | | |
|-----------------|--------------|----|------|
| | Statistic | df | Sig. |
| knowledge_total | .950 | 54 | .025 |
| behaviour_total | .976 | 54 | .359 |

CHD knowledge has not assumed a normal distribution with a p value <0.05 ($p=0.03$), whilst health behaviour has ($p=0.36$).

MUST USE THE NON-PARAMETRIC EQUIVALENT FOR A CORRELATION – SPEARMAN’S RHO

2. Test of normality and homogeneity of variance for CHD knowledge and health behaviour by age category

| | | Shapiro-Wilk | | |
|-----------------|---------------------------------|--------------|----|------|
| | | Statistic | df | Sig. |
| knowledge_total | Straight From Education (18-22) | .924 | 21 | .102 |
| | Mature Students (23+) | .960 | 33 | .260 |

CHD knowledge has assumed a normal distribution in both age categories with p values >0.05 ; straight from education ($p=0.10$) and mature students ($p=0.26$).

| Levene's Test | |
|-----------------|------|
| | Sig. |
| knowledge_total | .239 |

Appendix 13

CHD knowledge has also assumed a normal variance using the Levene's test with a p value >0.05 ($p=0.24$).

CORRECT TO USE THE PARAMETRIC TEST FOR AN INDEPENDENT GROUPS RESEARCH DESIGN – INDEPEDANT T-TEST

| | | Shapiro-Wilk | | |
|-----------------|---------------------------------|--------------|----|------|
| | | Statistic | df | Sig. |
| behaviour_total | Straight From Education (18-22) | .945 | 21 | .278 |
| | Mature Students (23+) | .925 | 33 | .026 |

Health behaviour has assumed a normal distribution for the age category 'straight from education' with a p value >0.05 ($p=0.28$) but not for the age category 'mature students' ($p=0.03$).

| Levene's Test | |
|-----------------|------|
| | Sig. |
| behaviour_total | .763 |

Health behaviour has however, assumed a normal variance using the Levene's test with a p value >0.05 ($p=0.76$).

MUST USE THE NON-PARAMETRIC EQUIVALENT FOR AN INDEPENDENT GROUPS RESEARCH DESIGN – MANN WHITNEY U TEST

3. Test of normality and homogeneity of variance for CHD knowledge and health behaviour by gender

| | | Shapiro-Wilk | | |
|-----------------|--------|--------------|----|------|
| | | Statistic | df | Sig. |
| knowledge_total | Male | .845 | 7 | .110 |
| | Female | .954 | 47 | .061 |

Appendix 13

CHD knowledge has assumed a normal distribution in both males and females with p values >0.05 ($p=0.11$ and $p=0.06$, respectively).

| Levene's Test | |
|-----------------|------|
| | Sig. |
| knowledge_total | .489 |

CHD knowledge has also assumed a normal variance using the Levene's test with a p value >0.05 ($p=0.45$).

CORRECT TO USE THE PARAMETRIC TEST FOR AN INDEPENDENT GROUPS RESEARCH DESIGN – INDEPEDANT T-TEST

| | | Shapiro-Wilk | | |
|-----------------|--------|--------------|----|------|
| | | Statistic | df | Sig. |
| behaviour_total | Male | .854 | 7 | .133 |
| | Female | .963 | 47 | .137 |

Health behaviour has assumed a normal distribution in both males and females with p values >0.05 ($p=0.13$)

| Levene's Test | |
|-----------------|------|
| | Sig. |
| behaviour_total | .281 |

Health behaviour has also assumed a normal variance using the Levene's test with a p value >0.05 ($p=0.28$).

CORRECT TO USE THE PARAMETRIC TEST FOR AN INDEPENDENT GROUPS RESEARCH DESIGN – INDEPEDANT T-TEST