KNOWLEDGE, BEHAVIOURS, PERCEIVED BARRIERS AND FACILITATORS IN UNIVERSITY WOMEN REGARDING HEART HEALTH

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by

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ABSTRACT

Cardiovascular disease (CVD) is the number one cause of mortality in Canada. A number of risk factors for CVD have been identified. Some of these risk factors are modifiable, such as smoking and use of oral contraceptives; others are unmodifiable, such as family history. Often the modifiable risk factors are acquired early in life. Females have unique risk factors and shared risk factors act differently in men and women.

The objectives of this study were to determine: (1) level of heart health knowledge in university females 17-25 years, (2) level of awareness of how daily behaviours may impact on the etiology of CVD, (3) level of concern regarding CVD, (4) presence of risk factors, (5) practices with respect to heart health behaviour and (6) factors viewed as barriers/facilitators to the practice of heart health.

A cross-sectional descriptive study using a self-completed questionnaire was applied to females attending Memorial University of Newfoundland. A randomized one-stage cluster sample was employed. The study sample consisted of 463 university females ages 17-25.

Eighty-seven percent of respondents believe present behaviours may impact future health; 85% believe CVD can be prevented; and 68% stated they were concerned about CVD and

its risk factors.

Knowledge, incidence of risk factors and present health practices were compared with the Newfoundland Heart Health Study (1990). In general, the overall knowledge level and present health practices were higher in this study population than in the NHHS subjects, while the prevalence of risk factors was lower in this study population compared to the NHHS subjects.

Recommendations for the development of appropriate and relevant health promotion programming for the target population were developed.

DEDICATION

For my parents
Julia and Chaker
who taught me the
importance of both
education and perseverance;
and for
my husband
Edward
for his tremendous support, encouragement
and belief in my abilities.

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CHAPTER 1

INTRODUCTION

CARDIOVASCULAR DISEASE- AN OVERVIEW

Despite a decline in mortality rates, cardiovascular disease (CVD) remains the number one cause of death in Canada. Newfoundland has the highest rate of mortality from CVD of all provinces (Heart and Stroke Foundation of Canada, 1995), (see Figures 1 and 2, page 2).

CVD is an umbrella term for all diseases of the circulatory system. These include cerebrovascular accident, ischaemic heart disease, peripheral vascular disease, hypertensive disease, arrhythmia, acute myocardial infarction, diseases of the pulmonary circulation and valvular disease (ICD-9 390-459).

Diseases of the circulatory system are multifactorial in etiology. Determinants or risk factors are classified as modifiable or nonmodifiable. Modifiable risk factors may be altered by changes in behaviour, and include smoking, hypertension, hypercholesterolemia and sedentary lifestyle. Nonmodifiable risk factors, on the other hand, cannot be altered through behavioural modification, and include male gender and age (Castelli, 1984).

Certain risk factors, such as hormonal status and use of oral contraceptives or other exogenous hormones in women,

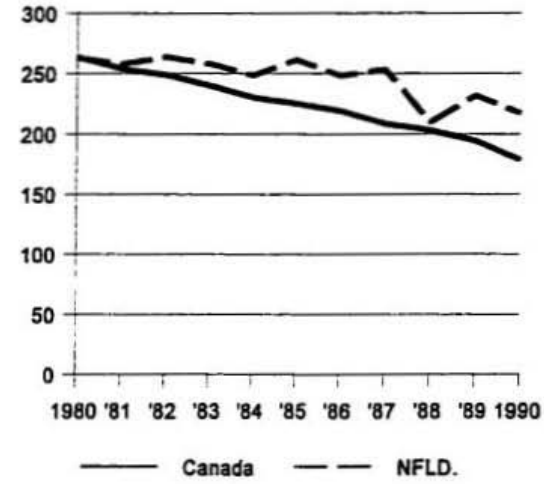

Figure 1: Standardized CVD Mortality Rates per 100,000 (Males)[1]

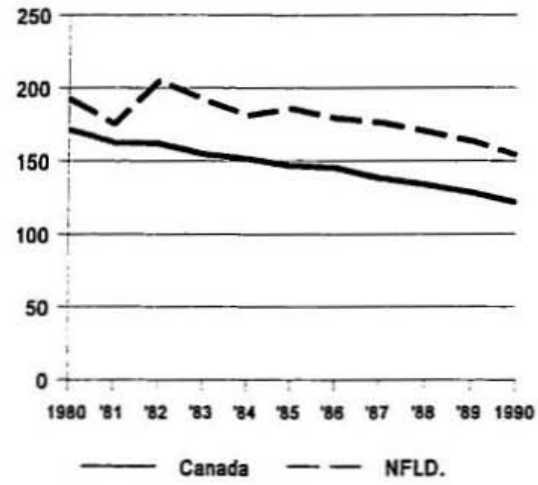

Figure 2: Standardized CVD Mortality Rates per 100,000 (Females)[2]

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[1]Source: Newfoundland Health for the Year 2000 Project: A Report of Newfoundland Health Status

[2]*Ibid.*

are gender specific. CVD itself affects men and women differently (Johansen, Nargundkar, Nair, Neutel and Wielgosz, 1991). Many people believe that CVD is solely a man's disease (Derman, 1990). Being male, however, is only a risk factor for the early onset of CVD (Expert Panel on Detection, Evaluation and Treatment of High Blood Cholesterol in Adults, 1993). Women have low prevalence rates of CVD prior to menopause and then rates climb, approaching rates of men (Heart and Stroke Foundation of Canada, 1995). The numbers of men and women who die secondary to CVD are approximately equal (Johansen et al., 1991). However, despite the statistics, women have lower perceived susceptibility for heart disease and stroke than other diseases including uterine and breast cancer (Khan and Marriott, 1996).

Despite the quiescent nature of CVD in pre-menopausal women, the pathophysiology of CVD has been demonstrated to begin prior to the second decade of life (Holman, Mcgill, Strong, and Geer, 1958; Newman et al., 1986). Fatty streaks, the precursor of fatty plaques, a component of atherosclerosis, form in the endothelium of blood vessels (Ross, 1986). Atherosclerosis is the primary physiologic mechanism in the majority of CVD cases (Kannel and Sytkowski, 1987). Clearly, an important component in

combatting this chronic disease is the education of the young, prior to development of risky behaviours and pathophysiologic changes in the circulatory system (WHO, 1990; Eaker et al., 1993).

RATIONALE

Determination of heart health knowledge, behaviours, facilitators and barriers in this group will result in the creation of a data base from which (a) perceived needs may be identified, (b) recommendations for programming developed and (c) comparisons with future studies can be made. A cross-sectional descriptive study of this nature has not been performed in university aged females.

Intervention in the second decade of life is warranted as many women, particularly young women, may not be practicing heart healthy behaviours because of low perceived susceptibility towards CVD. University women may not feel susceptible because of the common belief that CVD primarily affects men. They may not know that the pathophysiology of CVD begins at a very young age and therefore, may not realize CVD risk factors and prevention should be a priority. Furthermore, many young women may take oral contraceptives and smoke, practices when combined elevate the risk factor of CVD in certain sub-groups of females

(Hannaford and Webb, 1996).

Frost (1992) proposes that health awareness might be enhanced during college years when students make integral decisions concerning career, financial planning and time management. In addition, a college/university setting is ideal for incorporating standardized educational programming according to the needs and interests of the student population. Efforts should be directed towards increasing healthy behaviours and awareness of CVD risk factors while these women are young. Additionally, many of these women represent the mothers of today and tomorrow; educating them may enable prevention of CVD risk factors in a new generation.

OBJECTIVES

The objectives of the study were as follows:

1. To determine the level of knowledge regarding heart health in university females 25 years of age or younger.
2. To determine the level of awareness of how daily behaviour may impact on the etiology of CVD.
3. To ascertain whether or not the study group is concerned about CVD.
4. To determine the prior exposure of the study group

to concepts of healthy living.

5. To determine the prevalence of cardiovascular risk factors in this population.
6. To determine if this group practices heart healthy behaviours.
7. To ascertain which educational and programming modes, in the opinion of the study group, would be most beneficial in educating about heart health.
8. To determine which factors, if any, this group views as barriers and/or facilitators to practicing heart healthy behaviours.
9. To aggregate survey data to establish recommendations for appropriate and relevant programming for the target group.

CHAPTER II

LITERATURE REVIEW

A review of the relevant literature concerning (a) the epidemiology of CVD, (b) the role of risk factors, (c) related research which has been undertaken and (d) the conceptual framework which guided the study is presented below.

EPIDEMIOLOGY OF CARDIOVASCULAR DISEASE

As the rate of infectious diseases began to decline early in the twentieth century in developed countries, overall mortality rates began to decline and life expectancy began to increase. However, this shift led to an epidemiologic transition where chronic diseases, such as CVD and cancer moved to the forefront (Omran, 1971).

CVD mortality rates climbed from the turn of the century to the 1960's. Since the 1960's, mortality rates of CVD have fallen steadily at approximately two percent per year (Heart and Stroke Foundation of Canada, 1995). Studies have subsequently been conducted to determine the probable cause or causes of the noted reduction in CVD. Sytkowski, Kannel and D'Agostino (1990) reviewed data from three different samples (1950, 1960 and 1970) in the Framingham Heart Study to examine the effect of the secular trends in

incidence, prevalence and mortality of CVD. Using life table survival analysis, a 43% reduction in mortality secondary to CVD was noted from 1950 to 1970. Mantel-Haenszel and linear model analysis revealed significant differences between the 1950 and 1970 samples with respect to risk factors. Mean serum cholesterol, percentage of smokers and percentage of individuals with hypertension were all lower in the 1970 sample. Interestingly, there were no significant changes in incidence and case-fatality rates between the two samples. Some improvements in risk factors, such as lowered hypertension, may have been secondary to the advent of anti-hypertensive medications in the 1960's.

According to Goldman and Cook (1984), who used meta-analysis to examine declines in mortality rates, 40% of the reduction in CVD mortality rates was secondary to medication and 54% was related to behavioural and lifestyle changes.

In the early 1990's age standardized mortality rates secondary to CVD were highest in Romania and lowest in Japan. Canada ranked in the lowest quartile with approximately 240 male deaths and 125 female deaths per 100,000 in 1989 compared to 490 male deaths and 400 female deaths per 100,000 in 1988 in Romania. In Canada, CVD mortality rates increase from west to east, with British Columbia having the lowest rates and Newfoundland the

highest (Heart and Stroke Foundation of Canada, 1995).

The burden of CVD in Canada is immense. In 1993, CVD accounted for the highest direct costs of all illnesses. Direct costs include: hospital costs, medications, research, health care, pensions and benefits. Ten percent of all visits to physicians in 1994 were attributable to CVD, second only to physician visits for respiratory illness. Between 1991-1992, CVD accounted for more than nineteen percent of hospital stays. One-fifth of all disability payments in Canada are a direct result of CVD, second only to disability payments for musculoskeletal injuries. Potential years of life lost from CVD was third in Canada in 1992, following injuries and cancer. Injuries and cancer generally demonstrate higher potential years of life lost as both are more prevalent in younger ages (Heart and Stroke Foundation of Canada, 1995).

Men and women are both significantly affected by CVD. However, a common misperception, explained in part by the ten year differential in onset of CVD between men and women, is that women are not affected. Females are believed to be protected from the effects of CVD prior to the onset of menopause because of the estrogen protection factor and certainly rates of CVD reflect this (Kannel, 1987). However, post-menopausal rates of CVD in women increase

dramatically (Heart and Stroke Foundation of Canada, 1995). Overall, the number of deaths attributable to CVD is approximately equal in both genders. (Johansen et al., 1991). This may be explained by the longer life expectancy in women which may become an even greater issue in the future as the population continues to grow and the number of older women in turn increases.

ROLE OF RISK FACTORS

The etiology of CVD is tied to both nonmodifiable and modifiable risk factors. Nonmodifiable risk factors include male gender, age and family history of CVD prior to the age of 60. Major modifiable risk factors include smoking, hypercholesterolemia, and hypertension. Minor modifiable risk factors include: obesity, physical inactivity, diabetes and psychosocial factors. These factors were established as risk factors for CVD through the Framingham study, a prospective longitudinal cohort study that was initiated in 1948 to follow individuals to various CVD disease endpoints (Castelli, 1984).

It is important to note that risk factors affect each gender differently. For example, diabetes, low levels of HDL cholesterol and high levels of triglycerides are greater risk factors for CVD in women than men (Kannel, 1987;

Murabito, 1995). Additionally, females have unique risk factors for CVD such as the use of oral contraceptives (in certain women), other exogenous hormones and menopause (Johansen et al., 1991; Hannaford and Webb, 1996).

Factors related to the etiology of CVD are important to consider because several may be altered through changes in behaviour. Many behavioural risk factors such as smoking and physical activity are established early in life.

Furthermore, the beginnings of the atherosclerotic process have been demonstrated on autopsy in young children (Holman et al., 1958). Both early onset of modifiable risk factors and pathophysiologic changes in blood vessels point to the necessity of early prevention through education and health promotion methods (WHO, 1990).

The presence of each additional risk factor for CVD has a synergistic effect on overall CVD risk (Wilhelmsen, 1990). For example, "when one risk factor is present the addition of one additional risk factor doubles the potential for CVD, and when two other risk factors are added, the risk doubles again" (Health Canada, 1995). Prevention of CVD should therefore, address multiple risk factors to be most effective.

This section will briefly describe the following risk factors for CVD: (1) family history, (2) hypertension,

(3) hypercholesterolemia, (4) smoking, (5) diabetes, (6) sedentary lifestyle, (7) obesity, (8) stress and (9) factors unique to women (ie. oral contraceptives). The significance of each risk factor for women will be described.

Family History: CVD and risk factors related to atherosclerosis tend to cluster in families (Hamby, 1981). The CARDIA study (Coronary Artery Risk Development in Young Adults) examined the relationship of risk factor levels in young adult children (ages 18-30) to their parents' history of heart related diseases and risk factors. It was determined that a parental history of disease which included diabetes, myocardial infarction, cerebrovascular accident, or obesity, was associated with an altered risk factor profile in their young adult children (Burke et al., 1991). For example, a history of parental myocardial infarction was associated with higher plasma cholesterol, higher blood pressure and lower levels of HDL cholesterol in their children; and a parental history of hypertension was associated with higher systolic and diastolic blood pressure levels in their children.

Families promote health related behaviours through their physical and social environments (Potvin and Eisner,

1995). In certain families CVD risk factors may be enhanced through risk promoting behaviours, such as eating a high fat diet and leading a sedentary lifestyle (Kannel and Sytkowski, 1987). This combined with a family predisposition towards CVD escalates CVD risk in children, and emphasizes the necessity of the identification of children/ young adults in high risk families and subsequent promotion of heart health through preventive advice regarding risk factors and examinations, as appropriate.

Hypertension: Hypertension is one of the most important risk factors for CVD. Data from the Framingham study after 36 years of follow-up indicates there is an average increase of 20 mmHg in systolic blood pressure and a 10 mmHg increase in diastolic blood pressure between the ages of 30-65. In addition, hypertension is associated with other CVD risk factors including obesity and elevations in cholesterol (Kannel, 1996).

The Canadian Task Force on the Periodic Health Examination (1994) recommends blood pressure case-finding, using the sphygmomanometer in all individuals aged 21-64. For those individuals with elevated blood pressure (ie. $\geq$ 140/90) treatment consists of non-pharmacologic management and drug therapy. Drug therapy is not usually introduced to

individuals without concomitant CVD risk factors, rather the emphasis is on non-pharmacologic management (The Canadian Task Force on the Periodic Examination, 1994). The non-pharmacologic approach might consist of the following: limiting alcohol intake, weight loss, reduction of salt intake, increasing potassium intake, quitting smoking and engaging in physical activity (Perloff et al., 1993; Canadian Coalition for High Blood Pressure Prevention and Control, 1994).

According to the Newfoundland Heart Health Survey (1990), three percent of Newfoundland females aged 18-24 had hypertensive diastolic levels while two percent had hypertensive systolic levels. These numbers greatly increase as women age. In the age group 65-74, 48% had hypertensive diastolic levels while 68% had hypertensive systolic levels.

The summary report of the ten Provincial Heart Health Surveys performed between 1986-1992, illustrates that knowledge concerning hypertension as a risk factor for CVD was low in all provinces (Health Canada, 1995). Almost one in three Newfoundlanders was aware that high blood pressure was a risk factor for CVD while only 18% of Canadians were aware that this was a cause.

Enhancing the knowledge of young women of the

importance of prevention of hypertension would be beneficial in light of the poor level of present knowledge and the evidence that points to increased levels with aging.

Cholesterol: Elevated levels of total serum cholesterol represent a major risk factor for coronary heart disease. Cholesterol levels affect men and women differently. High levels of LDL cholesterol are a risk factor for coronary heart disease in both men and women. A high level of triglycerides and a low level of HDL cholesterol is a greater risk factor in women than men (Kannel, 1987).

Cholesterol is comprised of the following: low density lipoproteins which contain cholesterol, very low density lipoproteins which contain triglycerides and high density lipoproteins which are responsible for transportation of cholesterol molecules to the liver for excretion (Schafer and Levy, 1985).

According to the lipid hypothesis, there is both 'good' and 'bad' cholesterol. The two low density lipoproteins are considered 'bad' because they accumulate in the circulatory system, while the high density lipoprotein is considered protective against CVD because it removes cholesterol from the circulatory system (Castelli et al., 1986).

The Canadian Consensus Conference on Cholesterol (1988)

defines desirable levels of cholesterol as < 5.2 mmol/L; between 5.2 mmol/L- 6.2 mmol/L as a moderate level of risk for coronary heart disease and > 6.2 mmol/L as a high level of risk for coronary heart disease. Recommendations for cholesterol measurement include case-finding in adults greater than 18 years of age with CVD risk factors, family history of hypercholesterolemia or onset of coronary heart disease prior to the age of 60, or symptomatology of CVD. With respect to treatment of hypercholesterolemia, the first line of treatment is dietary alteration. Drug therapy is introduced after six months of a modified diet if a sufficient decrease in cholesterol levels has not occurred.

Elevated cholesterol levels (≥ 5.2 mmol/L) are present in 23% of Canadians ages 18-34 (Health Canada, 1995). Cholesterol levels increase with age. After menopause, the cholesterol level increase seen in women parallels the increase in rates of CVD in women (Lobo, 1988). Approximately three percent of females aged 18-34 have very high levels of total cholesterol (≥ 6.2 mmol/L) compared with 28% of females ages 65-74 (Newfoundland Heart Health Survey, 1990).

Awareness of blood cholesterol as a risk factor for CVD is low in Canada. Only 29% of Canadians ages 18-34 cited elevated blood cholesterol as a determinant (Health Canada,

1995). Knowledge of the possible ways to lower cholesterol was also low. Sixty-four percent of respondents in the Newfoundland Heart Health Survey indicated eating foods lower in fat, 56% noted lowering cholesterol intake, 29% identified exercise, 12% identified losing weight and four percent cited taking medications.

Smoking: Smoking is one of the major modifiable risk factors for CVD in both men and women (Kannel, 1981). In a summary report of the ten Provincial Heart Health Surveys, smoking was the number one cited cause of heart disease by both men and women(Health Canada, 1995). Despite this, 27% of Canadians between the ages of 18-74 years continue to smoke. Smoking rates vary across the country, but generally follow a west to east gradient, with the highest rates in Newfoundland (Health Canada, 1995).

Smoking rates have declined over the last 30 years. However, the rate of decline in women has been slower. If this trend continues, more women than men will be smoking in the future (Rafuse, 1993). High numbers of females in this age group also take oral contraceptives and this behaviour combined with smoking represents an increased risk for CVD in some women (Hannaford and Webb, 1996).

Smoking exerts both acute and chronic adverse effects

on the body. These effects include: elevated heart rate; reduction in estrogen levels, which may result in early onset of menopause (Hansen, Anderson and Von Eyben, 1993); elevation of total cholesterol levels (Wilett et al., 1987; Stachenko et al., 1992) and increased platelet aggregation and fibrinogen levels (Willett et al., 1987).

Risk of myocardial infarction specifically is increased with the number of cigarettes smoked per day (Kannel, 1981). Willett et al.,(1987), in a prospective study of more than 100,000 nurses, determined that women who smoked 25 or more cigarettes per day had a relative risk of 5.5 for fatal coronary heart disease compared to non-smokers. However, the potential benefits of cessation were also demonstrated in this study as the risk of coronary heart disease and myocardial infarction in women who had quit was only slightly higher than in women who never smoked.

The demonstrated benefits of cessation, the slower reduction of smoking rates in women versus men and the use of oral contraceptives in women point to the continued need for smoking prevention and cessation programs. Of course, programming needs to be tailored to suit women because men and women smoke for different reasons and hence, barriers to quitting will be different. Women, for example, perceive

weight gain as a much greater barrier to quitting smoking than men (Pirie, Murray and Luepken, 1991).

Diabetes: Diabetes is an independent risk factor for CVD (Kannel, 1985). Furthermore, diabetes is a greater risk factor for coronary heart disease for women than for men. This disease negates the protective effects of estrogen, thereby eliminating the 10 year differential in onset of CVD between men and women (Murabito, 1995).

Other CVD risk factors are more common in diabetics than in non-diabetics (Russo, Pryor, Brown and Kinney, (1990). These include: obesity, sedentary lifestyle and altered lipid profile (decreased levels of HDL cholesterol and increased LDL cholesterol), (Kannel, 1985).

Oral Contraceptives: Oral contraceptives and estrogen replacement therapy are very controversial areas of health research (Johansen et al., 1991). Many past studies have documented an increased risk of CVD associated with oral contraceptives alone and markedly increased risk with the combination of oral contraceptive use and smoking (Stadel, 1981).

Both the effectiveness and dangers of oral contraceptives are dose dependent. Oral contraceptives used

today contain much lower amounts of estrogen than those previously used (Snider, 1990; CPS, 1996). Since the dosage used in oral contraceptives is now lower (50 micrograms versus 150 micrograms per pill), the risk of CVD is lower. Eaker et al.,(1993) in a review of the literature noted that low dose oral contraceptives certainly lower the risk of CVD and that certain preparations might provide protection against CVD. The authors also pointed out that the present effects of oral contraceptives combined with smoking are not clear. However, Hannaford and Webb (1996) in a consensus statement on prescription of oral contraceptives state that the absolute risk of myocardial infarction is greatest when a women takes oral contraceptives and both smokes and is older than 35 years of age.

Data collected from the Heart Health Surveys (between 1986-1992) do cause concern as oral contraceptive use was higher in 18-24 year old smokers than non-smokers (Stachenko et al., 1992). These women may not be in a high risk group at present but the potential for CVD events exists if these women continue to smoke and take oral contraceptives. Certainly screening procedures prior to the prescription of oral contraceptives should include: a personal and family history, with particular emphasis on CVD risk factors and a blood pressure measurement (Hannaford and Webb, 1996).

Exercise: A sedentary lifestyle is an important risk factor for CVD. Exercise has beneficial effects on other CVD risk factors including lipid profile, blood pressure, weight, diabetes mellitus, stress and smoking (Fletcher et al., 1992; Chandrashekhar and Anand, 1991).

Gibbons (1983) examined the association between physical fitness and risk factors in women ages 18-65. Physical fitness was objectively measured using the maximal treadmill test. Multiple regression analysis was used to control for confounders and to look specifically at fitness - risk factor relationships. A positive association was noted between higher fitness levels and lower rates of smoking. A limitation of this study, however, was the use of only a highly educated, motivated and health conscious study population.

Unfortunately, despite the obvious benefits of exercise only 41% of females in Canada's Heart Health Surveys, reported lack of exercise as a possible risk factor for heart disease (Macdonald et al., 1992). Furthermore, 37% of females in Newfoundland between 18-24 reported having a sedentary lifestyle (defined as exercising less than once per week). The percent of sedentary women generally increases in older age (Newfoundland Heart Health Survey,

1990). This general trend of decreasing exercise in older age groups is very noteworthy. Exercise is only protective if it is maintained as is evidenced by Paffenberger et al., (1978). Paffenberger et al., studied a cohort of 19,936 Harvard male alumni. A questionnaire examining physical activity was mailed to alumni who had attended the university between 1916 and 1950. Accepted subjects were followed to various end points. Paffenberger et al.,(1978) noted that previous strenuous activity such as participation in varsity sports did not translate into low risk status for heart attack unless the activity was maintained. Physical activity and the importance of continued lifelong maintenance must be emphasized to young individuals.

Exercise recommendations for optimal heart health benefits are continually being revised and tailored to specific populations. Previously, the prescription for heart health benefits involved exercise sessions lasting between 20 to 60 minutes at 60 to 90% of maximal heart rate preformed a minimum of three or more times per week (Francis, 1996). In 1995, an expert panel organized by the Centres for Disease Control and the American College of Sports Medicine released a consensus statement designed to complement previous recommendations for optimal health benefits. The new guidelines were developed, in part,

because of present low rates of exercise in the general population thought to be a result of the perception that exercise has to be intensive to be beneficial. The present recommendation, which complements former guidelines, is for adults to preform at least 30 minutes of exercise on most, preferably all, days of the week. The chosen activities should be moderate intensity and can be accumulated throughout the day (Pate et al., 1995).

Obesity: Obesity exerts an adverse effect on the CVD risk factor profile through a number of mechanisms including the promotion of hypertension and altered lipid profile (Barrett-Connor, 1985; Pi-Sunyer, 1993). A body mass index (BMI) defined as weight in kg/[height in metres]^2 of < 20 is considered underweight, $\geq 20 - \leq 25$ within normal, $> 25 - < 27$ is slightly overweight and ≥ 27 is considered obese (Health and Welfare Canada, 1988). Data from Canada's Health Promotion Survey (1990) indicated that five percent of females between the ages of 20-24 had a BMI > 27.

However, the findings from the Nurses' Cohort Study after controlling for age, smoking, menopausal status, postmenopausal hormone use and family history of coronary heart disease indicate that a BMI from 21 to 22.1 compared to a BMI of < 21 resulted in a relative risk for coronary

heart disease of 1.19; while a BMI of 25-28.9 compared to < 21 resulted in a relative risk for coronary heart disease of 3.56. Furthermore, body weights within the high range of normal, in addition to minor weight gain after 18 years of age resulted in an increased risk of coronary heart disease in middle-aged women. These findings suggest that current guidelines for healthy weights may be falsely reassuring (Willett et al., 1995).

Psychosocial Factors: Psychosocial factors including personality, social support and emotions can impact on physical health (Shumaker and Smith, 1996). These factors combined with socioeconomic factors(including income, education, occupation or a combination) play an important role in the etiology of CVD (Kaplan and Keil, 1993). However, it has been difficult to establish if psychosocial status is an independent risk factor for CVD because of the confounding of other CVD risk factors (Kaplan and Keil, 1993). Despite the uncertainty, studies do suggest a link between psychosocial factors and CVD.

Haynes, Feinleib and Kannel (1980) as part of the Framingham Study administered a psychosocial questionnaire to a cohort which was subsequently followed for an eight year period. Those women who scored significantly higher on

the Framingham Type A Behaviour, Suppressed Hostility, Tension and Anxiety Symptoms Scales were twice as likely to develop coronary heart disease as those classified as having Type B behaviour. However, Kannel and Sytkowski (1987) point out that the association between Type A behaviour and increased risk of CVD is only substantial in the presence of other risk factors. Of course, psychosocial factors may increase the risk of CVD through various behavioural influences such as eating and smoking.

Stress may result when one takes on too many responsibilities, as seen with increasing numbers of women juggling childcare and work responsibilities. However, a review of the literature by La Rosa (1988) indicates employment, as such, is not a risk factor for coronary heart disease and may even be protective. It is lack of perceived control over a situation, job or home that may escalate stress levels and adversely affect health. As more females move into the work force, in addition to their domestic responsibilities, the potential to be exposed to stressful situations is naturally increased.

RELATED RESEARCH

A review of the literature reveals a number of studies which have examined CVD risk factors in populations and sub-populations. These include: Canada's Health Promotion Survey, 1990 and the ten Provincial Heart Health Surveys (a component of the Canadian Heart Health Initiative, 1986-1992).

However, a MEDLINE search only revealed one article which examined health practices in university students, one article which examined women and their perceived health needs and two articles which specifically examined CVD risk factor knowledge and behaviours in university students.

Walters (1992) using a stratified random sample studied perceptions of women aged 21-65 years concerning their main health problems. A questionnaire was employed to determine information on demographics, concerns and experiences with respect to health. When asked about life-threatening diseases, 38% were concerned about heart disease, second only to concerns about traffic accidents. Stress, an indirect risk factor for heart disease, was most often reported as the main health problem in this group. A limitation of this study is that younger females (21-34 years) were under-represented; so conclusions from this study may be more applicable to an older age group.

Svenson and Campbell (1992) examined perceived health status and desired health information needs of university students via a questionnaire. The study specifically examined: (1) areas of needed health improvement, (2) barriers to health practices and (3) areas where more information was needed. The study population consisted of 457 undergraduate students, male and female enrolled in introductory psychology.

Females were significantly more likely than males to identify eating habits and losing weight as areas which needed to be altered. Mature females, those older than 22 years, were likely to report a need to reduce tobacco use while younger females indicated needing more exercise.

Thirty-two percent of young females and 36% of mature females felt there were no barriers to improving physical health. However, lack of discipline and time were identified by approximately a third of females respectively as reasons for not improving health.

The study revealed that the information most often requested by young females concerned STDs. Interestingly, smoking and alcohol were the two least desired areas for obtaining information.

Kashari et al., (1993) performed an evaluation of a program designed to integrate preventive cardiology concepts

into the medical school curriculum. Diet, preventive cardiology knowledge, preventive cardiology attitudes, exercise behaviour and BMI were compared at entrance to medical school and in the graduating year. A questionnaire and physical assessment were used initially and on follow up a cardiovascular risk factor assessment only was carried out.

Results indicated females demonstrated significant positive changes in attitude towards CVD prevention and both males and females significantly improved their knowledge of CVD prevention. A limitation of this study is the small sample size.

Frost (1992) examined knowledge, attitudes and behaviour regarding CVD risks in college/university students using a questionnaire. Students demonstrated a satisfactory level of knowledge but this was often not translated into behaviour. Ninety-seven percent had blood pressure readings in the past but only one third could report the reading. Less than 20% knew their cholesterol values. Ninety percent reported that reducing cigarette smoking would have a large effect on preventing CVD, yet more than one third had smoked in the past or were currently smoking. Although 72% reported exercise was important in the prevention of CVD, only one third exercised three or more times a week.

With respect to where previous exposure to learning about CVD risk factors was ascertained, approximately one half stated teachers and family had discussed CVD with them, while only 23% had discussed CVD issues with their doctor. Students indicated that the desired modes to learn more about preventing CVD were doctor or nurse followed by books, computer programs, course for credit, parents, community programs, other family members and friends.

These data provide useful information about this population. The author does point out, however, that a potential limitation was selection bias, with only interested and knowledgeable students participating.

No studies were found specific to females twenty-five years of age or younger concerning knowledge, behaviours, perceived barriers and facilitators to heart health.

CONCEPTUAL FRAMEWORK

The review of related literature certainly does suggest many students are aware of risk factors but often this does not translate into heart healthy behaviours. This may be explained by various health theories which attempt to explain how human behaviour relates to health.

Before designing a health promotion program, perceptions, knowledge, behaviours, perceived barriers and

facilitators must be determined to enable development of a tailored program for the target audience.

In a review of the Health Belief Model, Rosenstock, Strecher and Becker (1988) explain that health behaviours occur when the following conditions are simultaneously present:

1. sufficient motivation to alter a change in behaviour,
2. perceived susceptibility or vulnerability to an illness,
3. effecting behaviour change will outweigh the costs or barriers.

This theory does have limitations, particularly with respect to its application to chronic illnesses. According to Rosenstock et al., (1988) behavioural modification can only ensue if the three conditions listed above are present, and if the person about to initiate the behaviour change feels self-efficacious to do so. Self-efficacy refers to a person's confidence in him/herself that he/she possesses the necessary competence to formulate behavioural intentions and enact the intended behaviour (Bandura, 1991). Therefore, the authors believe that inclusion of self-efficacy into the Health Belief Model enhances its applicability, particularly

in situations involving modifications in lifestyle such as quitting smoking, altering diet and exercise habits.

Other limitations of the Health Belief Model outlined by Schwarzer (1992) include: (1) lack of accountability for behaviour intention and (2) the assumption that the existence of perceived susceptibility leads directly to an individual preforming a health preventive behaviour.

In spite of the outlined limitations of the Health Belief Model, this theory in combination with the concept of self-efficacy may be applied to young university females and heart health to explain low participation in heart health behaviours. Many young women may not feel they are susceptible to CVD because they are young, healthy and perceive that CVD affects the old. Those women with strong family histories of CVD, however, may have a higher level of perceived vulnerability.

Young women with university demands may feel that the barriers, such as lack of time, outweigh the facilitators, such as improved CVD risk profile, because of lack of perceived susceptibility. Additionally, young women may feel they do not have the necessary knowledge/skills (low self-efficacy) to carry out behaviour changes such as quitting smoking or beginning an exercise program.

Lack of knowledge regarding CVD, its early

pathophysiology and synergistic risk factors may also account for a lack of perceived susceptibility. It is important to enhance awareness regarding risk factors without alarming individuals. Therefore, focussing on changing behaviour to improve general health while considering the factors which affect health behaviour, may be more relevant for this population.

It is important to determine the level of knowledge, behaviour, barriers, facilitators and priority the target group places on certain issues related to heart health, in order to develop relevant and appropriate programming.

CHAPTER III

METHODS

RESEARCH DESIGN

The investigator conducted a cross-sectional descriptive study. Professors of randomly selected classrooms at Memorial University of Newfoundland in St. John's, Newfoundland were contacted concerning participation of females in their class in the study. The investigator requested twenty minutes of classroom time. If permission was granted by the professor, he/she was asked to read a form prepared by the investigator which requested permission of the class for their time. If consent was given by the class, the investigator attended the classroom at a pre-arranged time. The purpose of the investigation was explained to the students in the class and the questionnaire was distributed. The questionnaires were completed in class by females who agreed to participate, and then returned to the investigator.

SETTING

The study was conducted at Memorial University of Newfoundland in randomly selected classrooms in each of four chosen academic groups. All questionnaires were administered from 18/09/96 to 03/10/96.

SAMPLE

The study population consisted of female students ages 17-25 years attending Memorial University of Newfoundland. Four academic groups were chosen to facilitate cross-group comparisons. Memorial University offers both undergraduate and professional degree programs, these four groups reflect the diversity of programs which are offered at the university. These included:

1. Undergraduate Arts
2. Undergraduate Science
3. Professional degree programs-health related
4. Professional degree programs-non-health related

Sample size was determined in consultation with Dr. V. Gadag, biostatistician. The study contains 21 variables (see Table 1, page 35) all of equal importance. Since no primary variable could be determined, the rule given by Norman and Streiner (1994) was applied, "five to ten subjects are required for each study variable." Four strata were employed, therefore the sample size was: 21 (variables)x 5 (subjects) x 4 (strata) = 440. A sample of 517 was collected, however, only 463 satisfied established inclusion criteria.

Table 1

List of Variables

Variable	Variable
1. CVD Knowledge	12. Sex
2. Blood Pressure- Knowledge and Measure	13. Area of Residence during School
3. Diabetes- Knowledge and Prevalence	14. Area of Residence otherwise
4. Cholesterol- Knowledge and Measure	15. Education of the Father
5. Eating Habits- Knowledge and Practice	16. Education of the Mother
6. Weight Knowledge	17. Year of Birth
7. Smoking- Knowledge and Practice	18. Height
8. Exercise- Knowledge and Practice	19. Weight
9. Stress- Knowledge and Practice	20. Program of Study
10. Use of Oral Contraceptives	21. Family History
11. Exposure to Heart Health	

A randomized one stage cluster sample was utilized and classes in each of the four academic groups were considered clusters. Mr. Mervin Goodyear, a computer programmer in the Registrar's office at Memorial University of Newfoundland, employed the following steps to facilitate randomization of the target group:

1. The Banner program, a student administration computer program, was utilized by Mr. Goodyear to generate identifiers (course reference numbers) for courses in each of the four academic groups (undergraduate arts, undergraduate science, professional schools-health related and professional schools-non-health related). Listings of classes containing 25 or more students were generated (to ensure sufficient numbers of subjects in each class).
2. This data was provided to the investigator in the ASCII format. The investigator then employed the SPSS, version 7.5 statistical package to randomly select course reference numbers in each of the four academic groups.
3. Following randomization, Mr. Goodyear provided the investigator with the Memorial University calendar course numbers which corresponded with the course reference numbers.
4. Appropriate faculties were then contacted to determine which professor was instructing each of the selected classes.

Following the above steps, the professors were contacted, the study was explained and consent for class time was requested. If the professor declined to participate, the next professor on the list was contacted. If permission was granted, a letter addressed to each professor explaining the study (see Appendix A, page 141) and a letter addressed to students of selected classrooms requesting participation were faxed to the professor (see Appendix A, page 141). The letter addressed to the students was read by the professor to the students and if the majority agreed to participate then the study was undertaken in that classroom. A brief verbal explanation regarding the study was provided. All females in the classroom were requested to complete the questionnaire. Participants were informed that all questionnaires were to be completed at the time of distribution. The consent form on the first page of the study contained no personal identifiers, hence consent was assumed by completion of the questionnaire. Males were provided with heart health facts during the time of survey administration. Only questionnaires of subjects who met the following criteria were included in the analysis:

1. Females only, born between 1971-1978.
2. Part-time or full-time students at Memorial

University of Newfoundland.

3. Undergraduate or graduate student.

4. The degree of study or intended degree was indicated by the subject on the questionnaire.

A synopsis of results and a heart health fact sheet were distributed to the professors of the participating classes for the subjects as a debriefing method following the completion of data collection.

ETHICAL REVIEW

This study was reviewed and approval was granted by the Memorial University of Newfoundland Faculty of Medicine Human Investigation Committee prior to initiating sampling (See HIC approval, Appendix B, page 144). The questionnaire contained no personal identifiers and anonymity of subjects was assured and maintained at all times.

THE INSTRUMENT

A questionnaire was developed for the study. Most questions were generated by the investigator. Other questions were taken from Canada's Health Promotion Survey (1990) and the Newfoundland Heart Health Survey (1990).

The questionnaire examined knowledge, behaviours, perceived barriers and facilitators concerning heart health

of females ages 17-25 attending Memorial University of Newfoundland in St. John's, Newfoundland. The instrument was divided into twelve sections. These included: heart disease, blood pressure, diabetes, cholesterol, eating habits, weight, smoking, exercise, stress, oral contraceptives, exposure to heart health and demographic information. Questions were primarily close-ended, but space was provided for the subject to indicate 'other' responses and to elaborate if necessary (see questionnaire, Appendix D, page 148).

Validity: Some questions were taken from the Newfoundland Heart Health Study (NHHS),(1990) and Canada's Health Promotion Study (1990). Permission was sought and granted for use of the Newfoundland Heart Health questions from Dr. Catherine Donovan, Principal Investigator (See Letter of Approval, Appendix C, page 146). The questions contained in Canada's Health Promotion Survey (1990) were available for public use and therefore permission for their use was not necessary. All questions from these two surveys were previously validated and both were undertaken in all ten provinces.

The investigator also developed several questions independently which were thought to be both relevant and

appropriate to this population. Five experts were asked to assess content validity (Aday, 1989). These experts included: a researcher with a masters degree in Community Medicine; a professor with a doctorate degree in Health Care Policy and Delivery; two physicians with masters degrees in Public Health; and a Biostatistician with a doctorate degree. In addition, the Human Investigation Committee reviewed the questionnaire. Revisions were made as required. Each individual was asked to determine if: (1) all variables such as knowledge, behaviours, perceived barriers and facilitators were being tested in this questionnaire and (2) if the questions were appropriate for this particular group.

Pretest: A pretest involving five females (who satisfied inclusion criteria) was conducted. After each subject involved in the pre-test completed the questionnaire, she was then asked to complete an accompanying questionnaire to obtain feedback regarding the study instrument. Questions asked included: clarity of content, language and length of time to complete the study questionnaire (see Appendix D, page 148).

Responses to the two questionnaires were examined and necessary changes to the instrument were made prior to

administering the questionnaires to the study sample.

Uniformity of Administration: All instructions regarding completion of the questionnaire were provided by the investigator (see Consent Form, Appendix D, page 148). The investigator was available at all times during administration of the questionnaire to answer any questions. Subjects were assured of anonymity of responses.

DATA ANALYSIS

Upon completion of data collection, all questionnaires were coded and data were entered into the EPI-INFO computer program version 6.0. EPI-INFO was used to determine frequencies. The data were then exported to SPSS statistical package, version 7.5, using DBMS/COPY version 5.0 for further data analysis. Descriptive statistics including frequencies, median and mode were utilized. Despite the large sample size, non-parametric tests were used because the data were nominal and interval in nature. The Chi Square statistic was used to determine the presence of associations. The Kruskal-Wallis One-Way ANOVA statistic was employed to determine if there was a significant difference among geographic and academic groups with respect to their mean. The level of significance used was $p \leq 0.01$.

The purpose of data analysis included the following:

1. To describe basic demographics of the sample.
2. To describe prevalence of various risk factors in this population.
3. To describe frequency of women who practice various heart health behaviours.
4. To describe agreement between knowledge and behaviour.
5. To describe relationship between family history and behaviour.
6. To describe agreement between family history and perceived susceptibility.
7. To describe frequency of females interested in learning more about heart health.
8. To describe facilitators for improving heart health as identified by the subjects.
9. To describe relationship between use of oral contraceptives and knowledge and behaviour.
10. To compare knowledge and behaviours between different geographic regions.

The data were utilized to determine the present level of knowledge, behaviours, perceived barriers to and

facilitators for the practice of heart health in young university females. Based on the data, recommendations were made regarding the development of appropriate and relevant health promotion programming for the target population.

CHAPTER IV

RESULTS

This section details study findings. Findings are presented in terms of the study objectives.

Certain questions in the questionnaire were not answered by the entire sample. If a question did not require responses from the entire sample, frequencies are presented based upon two denominators: (1) n=number eligible for responses to that question and (2) N=463, the entire study sample. It is important to present data in light of the entire study sample, in addition to sub-groups, as one of the study objectives pertained to the establishment of heart health programming for university women. If data were only presented in terms of sub-groups, then mis-information about programming needs for the entire study sample might be communicated. Furthermore, presentation of information using two denominators, where appropriate, provides more complete information about the study sample and its sub-groups.

In addition, in the questionnaire (See Appendix D, page 148) the results of any question to which the entire sample is not required to respond will be presented in terms of two percentages, as discussed above.

In the questionnaire, CVD was referred to as heart

disease because of the diverse and primarily non-health background of the study sample. In the presentation of data in this section and the discussion of data in the following section, 'CVD' will be used instead of 'heart disease'.

All extreme values were re-checked to ensure there were no coding errors.

CHARACTERISTICS OF THE SAMPLE

Seventeen professors were contacted. Four declined to participate, three professors who taught in non-health professional schools and one who taught in undergraduate arts. The response rate of professors agreeing to participate in the study was 76%. The response rate of classes (once professors had given consent) was 100%.

The overall student response rate was determined by dividing the number of female respondents eligible to be included in the survey (463) by the total number of female respondents in selected classrooms (495). This resulted in an overall response rate of 93.5%.

The sample was divided into four academic sections: undergraduate arts, undergraduate science, professional schools- health related and professional schools- non-health related. The investigator attempted to sample a minimum of 110 subjects in each group. Following completion of data

collection, it was noted that the health group was over-sampled, while the non-health and science groups were under-sampled (see Table 2, page 47).

Students attending health related professional schools comprised the largest group, while those in non-health related professional schools comprised the smallest group.

The year of study ranged from 1-8, with a median of 2 and a mode of 1. The year of birth of the subjects ranged from 1971 to 1978 with a median of 1977 (Q96).

Table 2 details place of residence, three percent (3.2%) indicated 'other' living arrangements, these included: 'living in a boarding house' and 'living with a boyfriend'. When not attending Memorial University of Newfoundland, almost half of the subjects reside in St. John's.

Thirty-one percent (31.1%) indicated they were employed in addition to studying (Q100). The range of hours of employment per week was 3-45, with a median of 13 (Q101).

Students were asked to indicate present height and weight and BMI was then calculated (Q91, 92). The BMI ranged from 15 to 42. The median BMI was 22.

Respondents were asked to indicate the highest educational level obtained by their parents (Q97). More

than one third of parents had completed post-secondary education while approximately 20% of parents did not complete high school, (Q97).

Table 2

Demographic Characteristics of the Sample N=463

Characteristic	Number (n)	Percentage (%)
Area of study		
Profess.-Health	156	33.7
Undergrad. Arts	110	23.8
Undergrad. Science	102	22.0
Profess. - Non-Health	95	20.5
Year of Study		
1	190	41.0
2-4	140	30.2
5-8	107	23.1
Missing	26	5.6
Year of Birth		
1978	178	38.4
1975-1977	148	32.0
1971-1974	137	29.6

Characteristic	Number (n)	Percentage (%)
Type of Residence (at MUN)		
With Parents	185	40.0
Sharing house/apt.	132	28.5
Living Alone	73	15.8
In Residence	57	12.3
Other	15	3.2
Missing	1	0.2
Place of Residence (When not at MUN)		
St. John's	196	42.3
Avalon Peninsula(AP)	99	21.4
West of Gander(G)	62	13.4
Between AP and G	50	10.8
Northern Peninsula/Labrador	24	5.2
Outside of Province	22	4.8
Missing	10	2.2
Employed Presently		
No	317	68.5
Yes	144	31.1
Missing	2	0.4

Characteristic	Number (n)	Percentage (%)
Hours Worked/week		
1-9	63	13.6
10-19	60	13.0
20-29	15	3.2
30-39	5	1.1
40-49	1	0.2
Not Applicable/Missing	319	68.9
BMI ***(Weight/[Height]^2)***		
< 20	70	15.1
≤ 20- ≤ 25	287	62.0
> 25-< 27	39	8.4
≥ 27	64	13.8
Missing	3	0.6
Educational Level **(Parents-F/M)**	***F/M***	
< High School (HS)	104/ 90	22.5/19.4
Completed HS	70/ 94	15.1/20.3
Some Post-Sec.	86/ 92	18.6/19.9
Completed Post-Sec.	178/172	38.4/37.1
Not Sure	20/ 12	4.3/ 2.6
Missing	5/ 3	1.1/ 0.9

HEART HEALTH KNOWLEDGE AND AWARENESS OF HOW BEHAVIOUR MAY IMPACT ON CARDIOVASCULAR DISEASE

Respondents were asked to indicate the effect that each of the following has on the development of CVD: diet high in fat, high cholesterol in the blood, excess salt in the diet, high density lipoproteins in the blood, high blood pressure, excess stress, smoking, obesity and family history. The results are included in Table 3, page 51.

The majority of respondents indicated that the presence of these risk factors, including HDL cholesterol, may increase potential development of CVD. Only 8.0% indicated HDL acts to decrease the risk of CVD.

Subjects were asked to indicate how CVD affected men and women (Q8). Only 20.3% correctly identified that the effects of CVD are age dependent.

Subjects were asked to indicate, from a list provided, what someone can do to control his/her blood pressure (Q17). The majority of respondents were aware of the possible avenues for controlling hypertension. Greater than 85% indicated the following: lower salt intake (91.8%), decrease stress (90.1%), increase exercise (88.6%) and eat less fat (87.9%). Approximately half (48.4%) noted medications could be effective. Less than two percent (1.5%) indicated 'other' responses, which included: 'I do not smoke', 'I eat

healthily', 'I want to lose weight' and 'I lead a healthy lifestyle'.

Table 3

Effect of Risk Factors

Number (%)

	Decrease risk 1	No effect 2	Slight increase in risk 3	Moderate increase in risk 4	Major increase in risk 5	Missing
Diet high in fat	2 (0.4)	0	14 (3.0)	95 (20.5)	347 (74.9)	5 (1.1)
High cholesterol in the blood	0	1 (0.2)	17 (3.7)	94 (20.3)	346 (74.7)	5 (1.1)
Excess salt in diet	0	5 (1.1)	70 (15.1)	188 (40.6)	190 (41.0)	10 (2.2)
High density lipoprotein in the blood	37 (8.0)	27 (5.8)	99 (21.4)	152 (32.8)	101 (21.8)	47(10.2)
High blood pressure	0	1 (0.2)	26 (5.6)	147 (31.7)	277 (59.8)	12 (2.6)
Excess stress	0	4 (0.9)	62 (13.4)	180 (38.9)	211 (45.6)	6 (1.3)
Smoking	2 (0.4)	6 (1.3)	31 (6.7)	128 (27.6)	288 (62.2)	8 (1.7)
Overweight	0	6 (1.3))	19 (4.1)	131 (28.3)	297 (64.1)	10 (2.2)
Family history	1 (0.2)	1 (0.2)	46 (9.9)	154 (33.3)	255 (55.1)	6 (1.3)

The next knowledge related question involved diabetes (Q19). Twenty-two percent (21.6%) of respondents indicated diabetes posed a greater risk for CVD in women than men. Slightly more than two-thirds (67.4%) indicated both sexes are affected equally and 9.3% felt women are less affected than men.

The study group was asked which blood component, including HDL cholesterol, LDL cholesterol and triglycerides in increased amounts would cause the most concern (Q23). Slightly more than two-thirds indicated they were uncertain of which should cause concern. Elevated triglycerides, elevated HDL cholesterol and elevated LDL cholesterol were a concern for 19.4%, 12.7% and 18.8% of subjects, respectively.

A list of potential interventions was given for lowering cholesterol and subjects were asked to indicate what they would do (Q31). Most respondents were aware of the possibilities. Greater than 90% indicated altering the diet to reduce fat (93.7%), exercising more (90.1%) and 84.4% indicated discussion with a health professional.

Subjects were asked which types of health problems are related to consumption of too much fat in the diet (Q41). Knowledge level for this question was very high. Greater than 85% indicated: obesity (94.6%), hypercholesterolemia

(94.4%), CVD (93.1%) and atherosclerosis (87.3%). Only 2.4% were unsure. 'Other' responses were noted by 1.3% of subjects and included: cancer, stroke and acne.

A question was asked regarding the most effective way to lose and maintain weight (Q46). Almost all respondents (90.9%) indicated a combination of diet and exercise, 7.6% stated exercise only, 0.9% noted diet only and 0.6% indicated 'other' reasons. These included: 'I have hobbies to preoccupy me when I want to eat' and 'I eat moderate portions'.

A list of health problems was provided and subjects were asked to check which were associated with smoking (Q56). Almost all respondents noted respiratory problems (98.1%), very high numbers indicated CVD (87.7%), approximately one-half indicated hypertension (53.3%), 27.4% noted hardening of the arteries, 11.0% checked high cholesterol and 4.8% noted obesity.

Health problems caused by smoking can often be reversed after quitting was indicated by 43.2% of respondents (Q57). One-fifth (20.1%) felt health problems could not be altered and approximately 35.9% stated they were uncertain.

Subjects were asked how often one should exercise per week to promote heart health (Q61). The majority of respondents (58.3%) felt exercise 3-5 times per week was

optimal for heart health, approximately one-third (32.4%) felt daily exercise was important, while the remaining nine percent (9%) stated 1-2 times per week or less or were uncertain.

Two-thirds (66.1%) were aware that it is important to elevate the heart rate during exercise for maximal heart health benefits, while the remainder of respondents either were unsure(27.9%) or did not know (6.0%), (Q63).

Subjects were provided with a list of times and asked how long one should exercise for optimal heart health benefits (Q65). Approximately four-fifths indicated either 31-60 minutes (40.2%) or 15-30 minutes (39.3%).

Benefits of exercise were provided in a list and subjects were asked to check all that applied (Q69). Greater than 85% were aware of the following: 95.9% indicated enhancement of general well-being, lowered stress levels (89.6%), elevated self-esteem (89.6%), decreased risk of heart attack (86.8%) and increased productivity in other areas of life (86.4%). 'Other' benefits were noted by 5.8% of subjects. These included: 'it provides a healthy feeling inside', 'it is refreshing' and 'it increases energy levels'.

Four-fifths noted stress negatively impacted health, while 6.7% felt it did not and 12.5% were uncertain (Q71).

A question was asked to determine if the study sample was aware of the effect present behaviours may have on future health (Q6). Most participants (86.8%) indicated present health behaviours may affect future health, 5.6% felt they did not and 7.1% were uncertain.

LEVEL OF CONCERN ABOUT CARDIOVASCULAR DISEASE

Questions were asked to determine if the study sample was concerned at about CVD. Slightly more than two-thirds (67.6%) indicated they were concerned (Q5).

Subjects were provided with a list of diseases and asked how likely it would be for a person of their age to develop one of the listed diseases (Q7). Choices provided included: not likely, somewhat likely and likely. Most respondents indicated high susceptibility towards: the common cold (96.5%), STDs (86.2%), AIDS (78.6%), followed by depression (65.0%), diabetes (31.1%) and breast cancer (14.3%). Overall, respondents felt least susceptible towards CVD (13.0%).

Almost all respondents (98.1%) indicated they would take steps to lower cholesterol, if necessary (Q30).

Almost all subjects (95.5%) noted they were concerned about the potential health problems associated with smoking (Q55).

PRIOR EXPOSURE TO CONCEPTS OF HEALTHY LIVING

Subjects were asked to indicate which healthy living choices their high schools offered (Q83). Almost all (90.9%) indicated gym class, approximately half noted health class (45.1%), 3.7% were unsure of what was offered and 4.1% noted 'other' choices. The 'other' choices offered included: aerobics classes, extra-curricular sports, nutrition classes and guidance counselling.

Thirty percent (30.2%) of the study group indicated that their community offered programs to facilitate heart health awareness (Q84). The most frequently offered programs reported included: exercise classes (24.8%), weight loss clinics (24.8%) and blood pressure checks (22.2%). The least commonly offered program reported by subjects was smoking cessation (10.8%). Approximately seventy percent were either uncertain of what programs were available (43.2%) or indicated nothing was offered (26.2%).

PRESENCE OF CARDIOVASCULAR DISEASE RISK FACTORS

This questionnaire examined the presence of CVD risk factors in the study group. Risk factors included: family history, blood pressure, diabetes, cholesterol, eating habits, smoking, stress, oral contraceptives and physical inactivity. Results regarding each risk factor are

presented in Table 4, page 60.

Family History: Approximately one-third (33.9%) noted that a family member had CVD (Q3). The most commonly affected relatives were grandfathers (19.0%) and grandmothers (16.0%). Approximately eleven percent (10.8%) indicated their uncles had CVD while 6.0% indicated their aunts had CVD. Less than ten percent of fathers (8.0%) and 2.0% of mothers had CVD. Less than one percent (0.6%) noted their sisters were affected. Interestingly, no one indicated a brother was affected by CVD.

Blood Pressure: Approximately four percent (3.7%) of respondents had been told previously they had high blood pressure (Q13). Twenty-four percent (23.5%) of the study sample indicated their actual blood pressure readings (Q12). Approximately four percent (3.7%) of these respondents (0.9% of the study sample) reported hypertensive systolic readings while 4.6% (1.1% of the study sample) reported hypertensive diastolic readings.

Diabetes: Almost two percent of all respondents reported diabetes (1.7%), (Q20). The reported range of age of onset was two to seventeen years (Q21).

Cholesterol: Of those respondents who had a previous cholesterol reading, 12.2% (2.4% of the study sample) had been told their cholesterol level was elevated (Q27, 29).

Eating Habits: Almost ten percent (9.9%) of all respondents noted they never considered ingredients prior to eating something (Q33). Sixteen percent (16%) always added salt to their food (Q34). Ten percent (10.2%) ate food high in fat daily (Q35).

Weight: Twelve percent of the study sample reported weight and height consistent with a BMI of $\geq$ 27. Approximately fifteen percent (15.1%) of the study sample reported weight and height consistent with a BMI of < 20. The range of BMIs was from 15 to 42.

Smoking: Almost one-half of respondents (48.2%) had smoked cigarettes previously (Q48). Almost forty percent (38.6%) of these respondents (18.6% of the study sample)currently smoked regularly (Q49). These respondents smoked a range of one to thirty-five cigarettes per day (with one outlier of 101 cigarettes per day),(Q50). The range in age of initiation of smoking cigarettes was 4-21 years of age, with a mean of 14.9 years (Q51). Approximately seven percent

(7.2%) of current smokers (3.4% of the entire sample) indicated they did not want to quit smoking (Q53).

Physical Inactivity: Approximately thirty percent either exercised occasionally (27.2%) or never (3.5%), (Q60). Approximately thirty percent (29.2%) noted that less than half their exercise sessions were strenuous enough to cause sweating or breathing heavy (Q62). Approximately seven percent (7.3%) exercised less than 15 minutes in one session (Q64).

Stress: Approximately eighty percent (80.3%)of all respondents indicated stress negatively impacted on their life (Q71). Almost twenty percent noted they felt very stressed most of the time (18.6%); 22.5% noted they did not take time daily to relax (Q72, 74).

Oral Contraceptives: Slightly more than sixty percent of subjects (62.6%) had, at some point, been prescribed oral contraceptives (Q78). Of these subjects 78% (49.0% of the study sample) were taking oral contraceptives at the time of the survey (Q79). Ten percent (10.2%) of the study sample were both smoking and taking oral contraceptives at the time of the survey.

Table 4

Risk Factors

Risk Factor	Number (n)	Percentage (%)
Family History		
Yes	157	33.9
No	242	52.3
Not sure	59	12.7
Missing	5	1.1
Hypertension		
Yes	17	3.7
No	394	85.1
Not sure	6	1.3
N/A	46	8.6
Missing	46	1.3
Diabetes		
Yes	8	1.7
No	450	97.2
Missing	5	1.1
Hypercholesterolemia		
Yes	11	2.4
No	79	17.1
N/A	373	80.6

Risk Factor	Number (n)	Percentage (%)
Eating-Salt		
Often	74	16.0
Sometimes	123	26.6
Occasionally	183	39.5
Never	83	17.9
Eating- Fat		
Daily	47	10.2
3-5 times per week	144	31.1
1-2 times per week	208	44.9
Almost never/Never	63	13.6
Missing	1	0.2
Smoking, Regular		
Yes	86	18.6
No	137	29.6
N/A	240	51.8
Exercise (frequency)		
Daily	66	14.3
3-5 times per week	138	29.8
1-2 times per week	117	25.3
Occasionally	126	27.2
Never	16	3.5

Risk Factor	Number (n)	Percentage (%)
Exercise (% of exercise that is strenuous)		
76-100%	88	19.0
50-75%	218	47.1
< 50%	135	29.2
None of it	9	1.9
Missing	13	2.8
Length of Exercise Session		
> 60 minutes	78	16.8
31-60 minutes	207	44.7
15-30 minutes	120	25.9
<15 minutes	34	7.3
Not Sure	47	4.8
Missing	1	0.4
Stress (negative impact on health)		
Yes	372	80.3
No	31	6.7
Sometimes	58	12.5
Missing	2	0.4

Risk Factor	Number (n)	Percentage (%)
Oral Contraceptives (at present)		
Yes	227	49.0
No	64	13.8
N/A	172	37.1

CURRENT HEALTH PRACTICES

Blood Pressure: More than ninety percent (91.4%) of the study sample have had their blood pressure measured (Q9). Of these individuals, 65.9% (60.3% of the study sample) have had a blood pressure reading in the last six months (Q10). Twenty-six percent (26%),(23.7% of the study sample) knew the reading in numbers (Q11). Approximately two-thirds (66.3%) of all subjects intended to have a blood pressure check in the next 12 months (Q18).

Cholesterol: Almost twenty percent (19.4%) of the study sample have had their cholesterol measured (Q27), and of these respondents, 67.8% (13.2% of the study sample) were informed of their reading (Q28). Slightly less than twenty percent (18.4%) of all subjects planned to have their cholesterol measured in the next 12 months (Q32).

Eating Habits: Twenty-nine percent (28.7%) always considered ingredients prior to eating something (Q33). As illustrated in Table 4, 39.5% added salt to their food occasionally and 17.9% never added salt to their food(Q34). More than half (58.5%) of the respondents noted they would eat high fat foods 1-2 times per week or less. Foods most likely chosen for a snack included fruit, chips and a muffin while donuts were least likely to be selected. Approximately one percent (0.9%) indicated they did not snack (Q36).

Almost fifty percent (46.4%) noted they intended to alter their diet in the next 12 months (Q40).

Weight: Eighty-one percent (81.2%) had previously tried to lose weight (Q42). Fifty-six percent (56.6%) were trying to lose weight at the time of the survey (Q43). Eighty-six percent of individuals with a BMI $\geq$ 27 were trying to lose weight (12% of the study sample).

Individuals who were attempting to lose weight were asked to indicate their weight loss method. Eighty-seven percent (87.4%) specified exercise (49.5% of the study sample), 55.0% noted dieting (31.1% of the study sample), 14.5% indicated skipping meals (4.5% of the study sample), 8.4% noted weight control programs (4.8% of the study sample) and 0.8% indicated taking diet pills (0.4% of the

study sample). 'Other' methods provided by 23.3% of these respondents (13.2% of the study sample) included: 'I have altered my snacking habits', 'I have lowered my fat intake', 'I eat less' and 'I have eliminated meat' (Q45).

Those subjects who were not planning to lose or gain weight were asked how they maintained their weight. Almost half (46.4%) of these respondents (19.4% of the study sample) noted they both watch what they eat and exercise, 32.5%, (13.6% of the study sample) did nothing, 10.3% (4.3% of the study sample) watch what they eat, 7.2% (3.2% of study sample) exercise and 3.1% (1.3% of the study sample) cited 'other' reasons. These included: 'I try not to overeat', 'I have hobbies to preoccupy me' and 'I rely on having a small frame' (Q47).

Smoking: Slightly more than fifty percent (51.8%) of respondents had never smoked (Q48). Slightly more than sixty percent (61.4%) of these subjects (29.6% of the study sample) did not smoke regularly (Q49). Thirty-six percent of those who smoked (17.5% of the study sample) wanted to quit smoking (Q53). Approximately one percent (0.6%) of all subjects indicated they planned to take up smoking in the next year (Q58).

Exercise: As shown in Table 4, approximately seventy percent (69.4%) of the sample exercised between one to seven days per week during the month prior to the survey (Q60). Furthermore, approximately two thirds (66.1%) noted that at least half of their exercise sessions were strenuous enough to cause sweating or heavy breathing (Q62). Approximately ninety percent (87.4%) of respondents noted that their exercise sessions lasted a minimum of 15 minutes (Q64). Exercises in which subjects participated were walking (88.6%), aerobics (46.9%), swimming (34.6%), dancing (28.7%), weights (27.9%), running (25.9%), team sports (21.2%), cycling (18.1%), racquet sports (5.4%) and martial arts (1.7%). 'Other' types of exercises cited by 5.4% included: tennis, figure skating, rowing, rollerblading, sit-ups/push-ups and hiking (Q67). Almost half the subjects (49.5%) intended to alter their exercise habits in the next 12 months (Q68).

Stress: Almost all respondents (99.6%) noted the importance of regular relaxation (Q73). Seventy-seven percent (76.9%) indicated they take time daily to relax (Q74). These respondents indicated they relaxed in the following ways: 80.3% talked to friends (61.8% of the study sample), 78.6% watched TV (60.5% of the study sample), 73.0% listened to

music (56.2% of the study sample), 64.6% noted bathing (49.7% of the study sample), 43.2% exercised (33.3% of the study sample), 31.7% indicated they ate (24.4% of the study sample), 13.2% noted smoking (10.2% of the sample), 12.6% indicated drinking alcohol (12.6% of the study sample) and 6.5% noted 'other' (5.0% of the study sample). 'Other' ways given included: 'I drive my car', 'I go to malls', 'I read', 'I nap' and 'I take time for myself' (Q75).

Oral Contraceptives: Of those subjects who had ever been prescribed oral contraceptives, 77.9% noted that the doctor took their blood pressure (48.8% of the study sample) when oral contraceptives were provided and 83.1% (52.1% of the study sample) indicated the doctor discussed possible associated risks when oral contraceptives were prescribed(Q81, 82).

PROGRAMMING OPTIONS

Questions were asked to determine possible programming options for dissemination of heart health information to this population. The results are illustrated in Table 5, page 69.

Subjects were asked to indicate from a list of healthy living topics, which one/s they would like to learn more

about. The topic cited by most respondents was stress management (78.4%), while the topic cited least by respondents was smoking cessation (15.8%). 'Other' programs suggested by 0.9% of respondents included: 'mental well-being' and 'steps to become a vegetarian'. Approximately four percent (3.5%) of subjects indicated they were not interested in learning more about heart health (Q86).

Subjects were asked to indicate which sessions , if offered at MUN, they would attend. As shown in Table 5, most subjects cited stress management (70.6%), while the topic cited by the fewest subjects was smoking cessation (14.5%), (Q87).

The most convenient days for subjects to attend programs were Tuesday (36.6%), Thursday (38.4%) and Sunday (35.6%), while Friday (19.7%) was the least convenient (Q88). Afternoon was the most convenient time of day for programs, as indicated by 37.4% of subjects (Q89).

Table 5

Programming Preferences

Preference	Number (n)	Percentage (%)
Topic		
Stress Management	363	78.4
Healthy eating	358	78.3
Physical fitness	328	70.8
Weight control	323	69.8
Blood Pressure control	154	33.3
Cholesterol control	151	33.0
Diabetes control	113	24.4
Smoking cessation	72	15.8
Not interested	16	3.5
Other	4	0.9
Missing	6	1.3
Sessions at MUN		
Stress Management	327	70.6
Healthy Eating	318	68.7
Session on Heart Health	148	32.0
Cholesterol Screening	135	29.2
Blood Pressure Screening	116	25.1
Cholesterol Education	107	23.1
Diabetes Screening	103	22.2
Blood Pressure Control	93	20.1
Diabetes Education	70	15.1
Smoking Cessation	67	14.5

Preference	Number (n)	Percentage (%)
Convenient Days		
Thursday	178	38.4
Tuesday	171	36.9
Sunday	165	35.6
Saturday	133	28.7
Wednesday	119	25.7
Monday	114	24.6
Friday	91	19.7
Missing	28	6.0
Convenient Times		
Afternoon	173	37.4
Evening	140	30.2
Morning	114	24.6
Variable	112	24.2
Missing	28	6.0

BARRIERS AND FACILITATORS

Questions were asked concerning barriers and facilitators to heart health. Eighty-five percent (84.7%) felt that based upon what they heard or read, a large proportion of CVD could be prevented, approximately 15% were either unsure (11.4%) or did not feel (3.2%) that CVD could be prevented (Q1). Eighty-seven percent (86.8%) of all

respondents felt that present health behaviours could affect future health, while slightly more than five percent (5.6%) did not feel that present behaviours would affect their future health, and 7.1% were uncertain (Q6).

Approximately ninety-one percent (90.5%) of all subjects felt regular blood pressure checks were important (Q14). The reasons indicated by these respondents included: belief that regular check-ups were important (75.2%), (68.2% of the study sample), regular checks may facilitate any necessary action (55.6%),(50.3% of the study sample), oral contraceptive use (47.7%), (43.2% of study sample), a family history of hypertension (36.6%),(33.0% of the study sample) and 4.1% (3.7% of study sample) specified 'other' reasons (Q15). These included: 'I have a heart condition', 'pregnancy', ' I gave blood, and that is part of the process', 'I have diabetes', 'I am overweight and under stress' and 'I have low blood pressure'.

Almost ten percent (9.5%) of all subjects felt it was unnecessary to have regular blood pressure checks (Q14). The reasons provided included: this measure is not important (68.2%),(6.5% of the study sample), this measure is presently unnecessary because of young age (31.8%), (3.0% of the study sample), 22.7% noted they were not sick (2.2% of the study sample) and 15.9% (1.5% of the study sample)

specified 'other' reasons. These reasons included: 'no family history', 'no history of hypertension', 'no risk factors' and 'not caring about oneself' (Q16).

Seventy-six percent (75.8%) of all subjects felt it was important to be aware of cholesterol levels at the present time (Q24). Reasons noted by these respondents included: belief in preventive health measures (83.0%), (62.9% of the study sample), regular check-ups enabled necessary action (79.8%), (60.5% of the study sample), family history of hypercholesterolemia (26.8%), (20.3% of the study sample) and 'other' reasons (2.3%), (1.7% of the study sample). These included: 'I have general health concerns', 'it seems important' and 'it is good to be informed' (Q25).

Almost one quarter (23.8%)of the study sample did not feel it was important to be aware of their cholesterol levels at the present time (Q24). Reasons indicated by these respondents included: never thought about it before (72.7%), (17.3% of the study sample), not important at my age (27.3%), (6.5% of the study sample), no family history (24.5%),(5.8% of the study sample) and 10.9% (2.6% of the study sample) noted 'other'. These reasons included: 'eating healthy hence , no need', 'I don't care about myself', 'I am a vegetarian, and eat a diet with low amounts of cholesterol' and 'I am thin'.

Of the subjects who would like to eat more healthy foods, 75.4% (69.5% of the study sample) indicated increased energy levels, 75.2% (69.3% of the study sample) noted to lose weight, 73.5% (67.8% of the study sample) felt this would enable them to look better, 30.0% (27.6% of the study sample) wanted to lower cholesterol, 23.2% (21.4% of the study sample)indicated to lower blood pressure and 12.9% (11.9% of the study sample) specified 'other' reasons. These included: 'to feel healthier' and 'I have a previous history of hypertension/hypercholesterolemia' (Q38).

Eight percent (7.6%) of all subjects noted they were either not interested or were unsure of wanting to improve their eating habits (Q37). Reasons provided by these respondents included: present diet is healthy (87.0%),(5.8% of the study sample), too busy (26.1%),(1.1% of the study sample), not cooking for self and hence no control over what is served (21.7%), (1.1% of the study sample), lack of interest (17.4%), (0.9% of the study sample),healthy food is expensive (13.0%), (0.6% of the study sample), lack of knowledge (8.7%), (0.4% of the study sample) and 17.4%(0.9% of the study sample) noted other reasons. These included:'I am too lazy to cook' and 'I dislike healthy food' (Q39).

Subjects who smoked or intended to start were asked to specify why (Q59). The responses noted by the largest

percentage of the total sample included: enjoyment (13.2%), inability to quit (10.4%), lowered stress levels (7.1%),and 2.6% specified 'other' reasons.' These included: 'I get bored but I know I can quit', 'I like to smoke while driving', ' it is a social thing', 'peer pressure', and 'it is a habit, and it is comforting'.

More than three-quarters (76.9%) of subjects take time daily to relax, while twenty-three percent (22.5%) noted they do not (Q74). Those who did not relax daily indicated the following reasons: 76.9% (17.3% of the study sample) indicated 'lack of time', 1.9% (0.4% of the study sample) felt they did not need to relax and 12.5% (2.8% of the study sample) specified 'other' reasons. These included: 'I can not relax', 'I feel pressure to finish my work', 'I am too stressed to relax' and 'there are too many people around' (Q76).

Subjects were asked to specify why they exercised regularly (Q66). Most respondents cited: enjoyment of exercise (56.8%), followed by losing weight (46.2%) and lowering stress levels (45.6%).

Subjects were asked what prevented them from exercising more (Q68). Almost half (48.6%) of the respondents cited lack of time (48.6%), while 5.4% noted lack of interest. Approximately four percent (4.1%) noted 'other' reasons.

These included: 'history of asthma', 'bad weather', 'lack of energy', 'laziness' and 'I am a single mom'.

Subjects were asked to indicate which healthy living choices were offered by their high school (Q83); programs offered are detailed in the section entitled: 'Prior Exposure to Concepts of Healthy Living'. Almost five percent (4.5%) indicated nothing and 3.7% were unsure. 'When asked if their community offered any programs to increase awareness of heart health, 26.3% noted nothing was offered and 43.4% indicated they were uncertain of what was offered.

Questions were asked to determine programming requests of students. These are detailed in section entitled 'Programming Options'. Respondents who indicated they were not interested in attending any heart health sessions at MUN were asked why (Q90). The reason cited by most respondents was 'too busy with school' (13.8%) and 1.3% noted 'I am young and this does not affect me'. One percent (0.9%) gave 'other' responses, which included: 'sufficient level of knowledge already' and 'able to research necessary information on my own'.

AGREEMENT BETWEEN KNOWLEDGE AND BEHAVIOUR

Using the Chi Square statistic, associations between knowledge and behaviour were explored in the following

variables: blood pressure, cholesterol, eating, smoking, stress and exercise. A p value of ≤ 0.01 was considered significant. Tables illustrating the associations and appropriate p values were constructed for each risk factor.

When using the Chi Square statistic, if the expected value of a cell (or cells) was less than five, the question(s) involved was/were collapsed to generate expected cell values greater than or equal to five. For example, question 9, "Have you ever had your blood pressure measured?" had three possible responses: yes, no and not sure. No and not sure would be collapsed together to make one category, if necessary.

Questions which included several related responses were sometimes summed to generate one number (or score), for the applicable question. For example, Question 41 was a knowledge question which asked subjects: 'What types of health problems are related to consumption of too much fat in the diet? Check all that apply'. Question 41, included six different choices. To generate one knowledge score, all variables which correctly answered the question were summed. This gave a range of knowledge scores. See Appendix E, page 191, for the list of all questions that were collapsed and for details regarding how they were collapsed.

Blood Pressure: No significant relationship was determined between knowledge and behaviour with respect to blood pressure. That is, level of knowledge with respect to awareness of blood pressure as a risk factor for CVD was not associated with (a) having had a previous blood pressure measurement or (b) intention to have a blood pressure measurement done in the next 12 months. Furthermore, actions one may take to control hypertension were not associated with (a) having had a previous blood pressure measurement or (b) intention to have a blood pressure measurement done in the next 12 months (see Table F1, Appendix F, page 195).

Cholesterol: No significant association was determined between knowledge and behaviour with respect to cholesterol. Knowledge regarding the effect that cholesterol has on the potential development of CVD (high cholesterol levels in the blood and HDL cholesterol) was not associated with (a) having had cholesterol levels done in the past or (b) the intention to have a cholesterol measure done in the future. Furthermore, awareness of what one may do to lower cholesterol was not associated with either (a) having had cholesterol levels done in the past or (b) the intention to have a cholesterol level done in the future (see Table F2,

Page 196).

Eating: A significant association was found between knowledge and behaviour with respect to knowledge that use of excess salt resulted in a major increased risk for CVD and the behaviour of infrequently adding salt to food ($p=0.01$).

No significant relationship was found between the following: knowledge of the potential problems associated with high fat consumption and (a) how often one considers ingredients, such as fat, prior to eating or (b) intentions to alter diet in the next 12 months. Furthermore, knowledge of the effect a diet high in fat has on the etiology of CVD was not associated with how often food that is high in fat is eaten during the week (see Table F3, Appendix F, page 197).

Smoking: There was no significant association between being a smoker and knowledge of: (a) smoking as a major risk factor for CVD, (b) problems caused by smoking may be reversed by quitting and (c) health problems associated with smoking (see Table F4 Appendix F, page 198).

Exercise: A significant relationship was present between

exercise knowledge and behaviour questions in the following: (a) knowledge of how often one should exercise for heart health benefits and number of times one actually exercised per week (p=0.00) and (b) knowledge of how long one should exercise per session for heart health and amount of time actually spent exercising (p=0.00).

There was no significant relationship found with respect to the following: (a) knowing that it is important to exercise strenuously for heart health benefits and actually exercising strenuously during exercise sessions and (b) level of knowledge regarding the benefits of exercise and amount of time spent exercising per session (see Table F5, Appendix F, page 198).

Stress: There was no significant relationship found between knowledge and behaviour with respect to stress. Knowledge that: (a) stress may negatively impact health or (b) the presence of stress may increase the risk of the development of CVD was not associated with taking time to relax daily (see Table F6, Appendix F, page 199).

RELATIONSHIP BETWEEN FAMILY HISTORY AND BEHAVIOUR

Relationships between family history and behaviour (blood pressure, cholesterol, eating, exercise and stress)

were explored. Significant relationships were determined between the following: having a family history of CVD and (a) having had cholesterol levels done in the past ($p=0.01$), (b) intending to have cholesterol levels done in the next 12 months ($p=0.00$) and (c) exercising at a strenuous level ($p=0.00$).

No significant associations were found between: having a family history and (a) having had a blood pressure measurement done in the past, (b) how often ingredients are considered prior to eating, (c) how often salt is added to food, (d) how often foods high in fat are eaten in a week, (e) how long exercise sessions last and (f) taking time to relax daily (See Table F7a, Appendix F, page 200).

No significant association was found between the number of family members with CVD and any behaviour measures (see Table F7b, Appendix F, page 201).

KNOWLEDGE AND BEHAVIOUR AMONG DIFFERENT GEOGRAPHIC GROUPS

The Kruskal-Wallis test was preformed to determine if there were significant differences among geographic groups with respect to knowledge and behaviour. There were six geographic groups, these included: St. John's, Avalon Peninsula, West of Avalon Peninsula to Gander, West of Gander, Northern Peninsula/Labrador and Outside of the

province. No significant differences at the p=0.01 significance level were observed (see Table F8a, page 202 and Table F8b Appendix F, page 203).

KNOWLEDGE AND BEHAVIOUR AMONG DIFFERENT ACADEMIC GROUPS

The Kruskal-Wallis test was preformed to determine if there were differences among academic groups with respect to knowledge and behaviour. The academic groups were: undergraduate arts, undergraduate science, professional schools-health related and professional schools-non- health related.

Differences were found among groups with respect to knowledge of the health problems hypertension may cause. The 'health' group had the highest mean rank (260.8) and the 'science' group had the lowest mean rank (204.9), (p=0.002). A significant difference was also determined among groups with respect to the effect HDL cholesterol has on the development of CVD. The 'health' group had the highest mean rank (227.3), while the 'arts' group had the lowest mean rank (180.0), (p=0.01), (see Table F9a, Appendix F, page 204).

There was a significant difference among academic groups with respect to one behaviour, the number of times per week subjects ate food high in fat. The group with the

highest mean rank was 'non-health' (254.6) and the group with the lowest was 'arts' (200.8), (p=0.01). This may be interpreted as the group with the highest mean rank ate fat fewer times per week than the other groups and there was a significant difference among the groups (see Table F9b, Appendix F, page 205).

ORAL CONTRACEPTIVES-USE AND BEHAVIOUR

One significant relationship was found with respect to oral contraceptives. There was a relationship between the physician discussing risks associated with oral contraceptives and the physician taking a blood pressure reading when prescribing oral contraceptives (p=0.00).

No significant relationship was found between the following: taking oral contraceptives and (a) smoking, (b) exercise, (c) the physician discussing possible risks associated with the pill and smoking practices of subjects (see Table F10, Appendix F, page 205).

FAMILY HISTORY AND PERCEIVED SUSCEPTIBILITY

A significant relationship was found between: family history and (a) the belief that present behaviours would affect future health (p=0.01), (b) being concerned about CVD (p=0.00) and (c) the belief that a person of this age might

develop CVD ($p=0.01$).

There was no significant association between having a family history of CVD and the belief that CVD can be prevented.

No significant association was determined between the number of family members with CVD and (a) being concerned about CVD and its risk factors, (b) belief that present health behaviours will affect future health and (c) likelihood of a person of the same age developing one of several listed diseases. That is, the number of family members with CVD was not associated with perceived susceptibility (see Table F11, Appendix F, page 206).

CHAPTER 5

DISCUSSION

The discussion of findings will include, wherever possible, references to other similar studies and/or the theoretical concepts utilized in the study, namely the Health Belief Model and the concept of self-efficacy. The primary study used for comparison is the Newfoundland Heart Health Survey (NHHS),(1990). The purpose of the NHHS, which was conducted between 1988 and 1989, was to establish the prevalence of CVD risk factors, knowledge and behaviours within the Newfoundland population, including ages 18-74, inclusive. Permission to use data from the NHHS was granted by Dr. Catherine Donovan (see Letter of Approval, Appendix c page 146). Ms. Alison Edwards (analyst for the NHHS) generated frequency data for females in the age group 18-25, inclusive, to facilitate comparison across similar questions related to risk factors, knowledge and behaviour with this survey.

The response rate (students) was very high in this survey, 93.5%. This is likely related to the manner in which the instrument was administered. Questionnaires were distributed, completed and collected within a 15-20 minute period during classroom time. The manner in which this survey was conducted afforded the least inconvenience for

the study group as possible. The response rate in the NHHS, home interview portion, was 75% and for completion of both the interview and clinic components was 65%. The differences in the response rate between the two surveys may be explained, in part, by the difference in survey methods and degree of inconvenience for the subjects.

CHARACTERISTICS OF THE SAMPLE

The sampling frame for this study was females less than 25 years of age attending Memorial University of Newfoundland. The most commonly cited 'year of study' was first year, while the most commonly cited year of birth was 1978 (ages 17-18). Since the study was conducted in the fall semester, many of the perceptions of students might be related to what they learned in high school.

Health related behaviours are promoted through the physical and social environments provided by the family (Potvin and Eisner, 1995). Educational level is associated with (1) health knowledge (Canada's Health Promotion Survey, 1990) and (2) socioeconomic status (Kaplan and Keil, 1993). It is noteworthy that approximately 40% of parents in this sample had achieved some form of post-secondary education and that 40% of the sample still reside with their parents.

Four groups were studied, these included: undergraduate

arts, undergraduate science, professional schools-health related and professional schools-non-health related. The largest group of students was enrolled in 'health'. It would be expected that high levels of heart health knowledge would exist in this group because of the nature of their university studies.

Most of the students in this survey were not employed outside of school. This suggests that some students might not need to work as a result of high parental income or that there is a scarcity of student employment available. Of those who did work, the hours of employment per week ranged from 3-45 and the mean hours of employment was 14.

LEVEL OF HEART HEALTH KNOWLEDGE AND AWARENESS OF IMPACT OF DAILY BEHAVIOUR

CVD has many risk factors, which include: hypercholesterolemia, hypertension, smoking, obesity, high salt/fat diet, excess stress and family history. The majority of respondents in this survey noted that the presence of these factors had a moderate to major increase in the risk for CVD. Awareness of risk factors related to CVD was much higher overall in this group than the awareness of risk factors for CVD in the NHHS. The largest discrepancies between the two groups related to 'diet high in fat' and 'altered lipid profile'. The differences in the

results between the two surveys may be explained by three factors: (1) differences in survey administration ie. in the NHHS, the respondents were not prompted in any fashion, while in this survey, the subjects were asked to complete a table where all the risk factors were presented (2) the subjects in this survey were all university students, while 35.7% of the subjects in the NHHS had completed some secondary education or less. Level of education, as stated previously, is correlated with knowledge of CVD (Health Canada, 1995) and (3) the NHHS was conducted in 1988-1989 while this survey was conducted in 1996. Knowledge regarding risk factors might be higher at the present time as a result of the public education activities of the Newfoundland Heart Health program, which has included a program directed towards women and CVD.

Although, the university study group did demonstrate a higher level of knowledge related to CVD risk factors, deficiencies in knowledge were present. Between 50-60% were aware that hypertension, smoking, obesity and family history constituted major increases in risk for CVD. Less than 50% noted excess salt and stress contributed to the etiology of CVD in a major fashion and less than 10% noted HDL cholesterol decreased the risk of CVD. Education around risk factors is clearly needed in this group, particularly

with respect to overtly present factors such as smoking and obesity.

CVD is the leading cause of death in both Newfoundland and Canada (Heart and Stroke Foundation of Canada, 1995). However, because of the age differential between men and women regarding CVD onset, the common misperception is that men were/are more greatly affected than women. Being male is a risk factor for coronary heart diseases at an early age only (Expert Panel on Detection, Evaluation and Treatment of High Blood Cholesterol in Adults, 1993). The mistaken perception of female immunity from CVD is obviously still present, as more than one-third of the sample felt that CVD affected men more than women. Only, one-fifth of respondents correctly knew it depended upon the age group being considered.

Respondents were asked what one might do to control blood pressure. Most of the approaches indicated involved lifestyle change, such as eating less fat and lowering salt intake. The option of taking medications was noted by less than one-half. This response is consistent with guidelines of the Canadian Task force on the Periodic Health Examination (1994) which recommend the non-pharmacologic approach as the first line of treatment of hypertension, with drug therapy being reserved for patients with other CVD

risk factors. Interestingly, Joffres et al., (1992) found that of those subjects who were treated for hypertension, in a summary report of the ten Heart Health Surveys, the most commonly used treatment was pharmacological therapy alone (19%), followed by a combination of drugs and lifestyle modification (14%) and lastly non-pharmacologic intervention (8%). Of course, the age range of the subjects in the Heart Health Surveys was wider and may have included more individuals with hypertension that was resistant to non-pharmacologic management.

Diabetes is a major risk factor for CVD, and a greater risk factor for CVD in women than men (Semenciw et al., 1988). Most respondents felt it affected both sexes equally. Of concern, seven of the eight people who noted they had diabetes felt the disease was an equal risk factor for CVD in men and women, while only one indicated the correct response. This illustrates a need for increased education of women in general and particularly those women with diabetes regarding risk factors for CVD.

Respondents were asked which, if present in large amounts, would cause concern: HDL cholesterol, LDL cholesterol and triglycerides. This question was incorrectly answered by a majority of respondents indicating the study sample did not know the different components involved in a

lipid profile. The poor level of response to this question might be expected as the Canadian Consensus Conference for Cholesterol (1988) recommends case-finding only in females in this age group with: (1) family history of CVD (2) known risk factors for CVD or (3) clinical signs of CVD.

However, once women do begin screening, it is important for them to be aware of the different components in a lipid profile, particularly since alterations in different components are gender specific. For example, increased levels of triglycerides and low levels of HDL cholesterol are more important risk factors for coronary heart disease in women than men (Kannel, 1987).

With respect to controlling high cholesterol, most subjects were aware of pro-active measures such as diet and exercise alterations. These measures are generally the first line of treatment initiated for high cholesterol (Canadian Consensus Conference on Cholesterol, 1988; Heart and Stroke Foundation of Saskatchewan, 1995). Less than one-quarter noted quitting smoking; smoking affects the lipid profile by decreasing levels of HDL cholesterol (Stachencko et al., 1992).

Knowledge was much higher in this study sample than in the NHHS with respect to health problems associated with consumption of too much fat in the diet. More than 85% of

the respondents in this survey were aware that obesity, high blood cholesterol, CVD, and atherosclerosis might be related to a high fat diet compared with the following results in the NHHS survey: obesity (34.4%), heart disease (43.1%), high blood cholesterol (34.1%) and atherosclerosis (20.3%).

The most effective way to lose weight is through a combination of diet and exercise (Levy and Heaton, 1993). This question was not asked in the NHHS and hence data can not be compared. The correct response was noted by almost all the subjects in this survey.

Knowledge with respect to: (1) health problems associated with smoking and (2) reversal of health problems associated with smoking after quitting was not tested in the NHHS. In this survey, knowledge was quite high (defined as greater than 85%) regarding the relationship of cardiovascular and respiratory disease to smoking. However, knowledge of the association with other health problems was deficient (defined as less than 60%). These included: high blood pressure, hardening of the arteries and high cholesterol . Approximately five percent incorrectly thought smoking was associated with obesity. Health problems associated with smoking may be reversed by quitting (Willett et al., 1987). Slightly less than one half of subjects in this survey were aware of this.

In this survey, knowledge regarding the frequency and length of time one should exercise for heart health benefits was quite good. More than 85% were aware (1) that exercise should be done at least three times per week (2) that exercise sessions should last at least 15 minutes and (3) of the benefits of exercise. A number of responses, with respect to frequency and time of exercise, were considered correct because new exercise guidelines have been proposed. The new guidelines complement older guidelines. Former guidelines recommended continuous aerobic exercise for 20-60 minutes, a minimum of three times per week at 50- 60% maximal heart rate (American College of Sports Medicine, 1990). Newer guidelines recommend an accumulation of 30 minutes of activity daily at moderate intensity (Pate et al., 1995). However, only two-thirds of respondents were aware that it is important to elevate the heart rate when exercising. Even with the newer guidelines, elevation of heart rate during exercise is still important for heart health, but these guidelines recommend minimal exertion at a moderate level rather than at an intense level. The numerous guidelines available may serve to confuse some subjects, which may lower self-efficacy and negatively affect exercise participation (Bandura, 1977).

CVD has both modifiable and unmodifiable risk factors.

Many of the modifiable risk factors, including smoking and eating high fat food, are rooted in daily behaviours and modern lifestyle. Most subjects were aware that present behaviours may impact on future health.

LEVEL OF CONCERN ABOUT CARDIOVASCULAR DISEASE

According to the Health Belief Model, perceived susceptibility is one factor that must be present for a health related behaviour to ensue (Rosenstock, 1974; Becker, 1974). Perceived susceptibility to breast cancer, CVD, AIDS, other STDs, depression, flus/colds and diabetes was examined in this study and subjects were asked about the likelihood of developing these diseases at their present age. Subjects were most concerned about colds/flus, STDs (excluding AIDS) and AIDS. Walters (1992) who studied perceptions of women regarding health problems found that women were most concerned about traffic accidents, followed by heart disease. The range of the ages and mean ages of subjects in the Walters study were higher than the ages of the subjects in this study, which might explain differences in perceived susceptibility. Khan and Marriott (1996), on the other hand, report that overall, women feel more susceptible towards breast and uterine cancer than heart disease and stroke. The authors also pointed out that this

lower level of concern for heart disease and stroke means women are not motivated to address risk factors for heart disease. However, in this study, the sample did not feel susceptible to breast cancer, which might be explained by their young age. Subjects felt least susceptible to developing CVD at this time, but 70% indicated they were concerned about CVD and its risk factors, while the remainder were either unsure or were unconcerned. Not being aware that both modifiable and unmodifiable risk factors begin at an early age, low perceived susceptibility as a result of (a) poor knowledge, (b) good health and/or (c) no family history of CVD, might explain why 30% of subjects had no concern.

Almost all subjects noted that if their cholesterol was ever high, they would take appropriate steps to lower it. This suggests that if a risk factor was known to be present, action might be taken. Positive health behaviour may result because of increased motivation through perceived increased susceptibility (Becker, 1974; Rosenstock, 1974). However, since CVD is a longitudinal process where many risk factors such as hyperlipidemia may be present in asymptomatic individuals, there is a need to educate about the presence of silent risk factors and lifelong prevention.

Almost all subjects were concerned about potential

health problems associated with smoking. The high level of concern may have been related to the extent of public health campaigns such as the AY (Allied Youth) program to deter smoking. However, in spite of the high number expressing concern, almost 20% of the study group smoked. This fact confirms that alternate approaches must be utilized to facilitate cessation of smoking addressing those issues most important to women (Pirie, Murray and Luepker, 1991).

PRIOR EXPOSURE TO CONCEPTS OF HEALTHY LIVING

Being exposed to various concepts of healthy living may enhance heart health knowledge, thereby increasing self-efficacy, which may, in turn, increase the likelihood of a health related behaviour (Rosenstock et al., 1988). Furthermore, since risk factors for CVD begin early in life, early exposure within the community may positively affect both knowledge and behaviour. While in high school, gym classes were offered to almost all the subjects, low fat food was offered to only ten percent. The most frequently offered programs by communities reported included: diabetes education and smoking cessation. However, approximately 70% of respondents either did not know or were uncertain of what their community offered to increase awareness of heart health. This illustrates the need for greater promotion

within the community of heart health services targeted towards youth.

PRESENCE OF CARDIOVASCULAR DISEASE RISK FACTORS

CVD risk factors will now be discussed. Comparisons will be made between the data obtained in this survey and data obtained in the NHHS, where applicable. Data from this survey were entirely self-reported, while data obtained from the NHHS were both self-reported and clinical. However, all data from the NHHS used for comparison were self-reported (with the exception of BMI).

The frequency of risk factors, with the exception of oral contraceptive use and presence of high cholesterol, was higher in the NHHS. These risk factors included: smoking, hypertension, frequency of adding salt, inactivity and BMI. Table 6, page 98 details comparative frequencies regarding risk factors between the two surveys.

Self-reported smoking rates in the NHHS were more than double those of the university females. Prevalence of smoking is inversely related to educational and income level (Canada's Health Promotion Survey, 1990) and as previously mentioned the level of education in the survey was higher than in the NHHS.

The percentage who reported having been told previously

they had high cholesterol was slightly greater in university females. This may be related to a higher prevalence but may also be related to increased screening in recent years in individuals with a family history. The knowledge of the medical community regarding cholesterol has increased since the Canadian Task Force on Periodic Health Examination concluded in 1979, that there was " insufficient evidence to include or exclude screening for hyperlipidemia as part of the Periodic Health Examination". In addition, the public is becoming better educated regarding health issues and may be more likely to request cholesterol screening than in the past.

The prevalence of self-reported hypertension in the NHHS was ten percent greater than the university females survey. According to Canada's Health Promotion Survey (1990) individuals with a lower educational level report higher blood pressure readings. This may explain, in part, the differences.

The frequency of subjects with a BMI of $\geq$ 27 was far greater in the NHHS than in this survey. The differences obtained may be explained, in part, by the fact that this study relied on self-report of both weight and height, while the measures in the NHHS were clinical. Roberts (1995) found that population surveys based on self-reported height

and weight under-estimated the true prevalence of obesity, particularly in women. On average, the female subjects in the Robert's study under-reported their weight by 1.1 kg and over-reported their height by 0.7 cm. Hence, the true prevalence of obesity might be higher in this survey.

Table 6

Comparison of CVD Risk Factors between University Females and NHHS Females (Ages 18-25)

Risk Factor	University Females (%)	NHHS Self Report (%)	NHHS Clinical (%)
Smoking Regularly	18.6	46.8	
High cholesterol	2.4	1.3	
Hypertension	4.1	14.3	
Diabetes	1.7	1.0	
Frequent salt	16.0	29.9	
Oral Contraceptives	49.0	43.9	
Exercise < 1 time/wk	30.5	39.5	
Strenuous exercise < 50% of session	31.1	36.7	
BMI $\geq$ 27	13.0		23.2
Exercise < 15 minutes per session	7.3	3.6	

CURRENT HEALTH PRACTICES

When discussing current health practice measures, comparisons will be made to measures utilized by the subjects in the NHHS study (See Table 7, page 102). Again, it would be expected that preventive health measures might be more frequently practiced by the university females for a number of reasons previously discussed in the knowledge section. Future health practices will be discussed following past and present health practices. This portion will focus on this study population only, as questions around future intentions were not asked in the NHHS.

Equal numbers of subjects in both groups have had their blood pressure checked in the past. University females were more likely than the subjects in the NHHS to have had their blood pressure measured between 6-12 months ago.

Very small numbers of subjects noted they had diabetes. Diet was the most frequently utilized treatment in both groups.

More university females have tried to lose weight in the past and are presently doing so than in the subjects in the NHHS. Levy and Heaton (1993) who conducted a telephone survey to determine weight control practices of adults trying to lose weight, found that compared to the general population, those individuals more likely to attempt weight

loss were those who were better educated.

In this survey, 86% of women with a BMI $\geq$ 27 were trying to lose weight. Losing weight promotes heart health, but Willett et al., (1995) found through a prospective study that even higher levels of body weight within 'normal',BMI of 21-27, were associated with an increased risk of coronary heart disease in middle-aged women.

Reduction of salt intake is one of the approaches to primary prevention of hypertension recommended by Perloff et al., (1993) and the Canadian Coalition for High Blood Pressure Prevention and Control (1994). Hence, adding excess salt to food promotes hypertension. Overall, NHHS females added salt to food less frequently overall than the females in this survey.

More university females had a previous cholesterol measure in the past. In this survey practice of this preventive health measure was associated with a family history of CVD. The higher number in this survey might be reflective of both a family history of CVD and increased screening (as discussed).

More subjects in the NHHS have tried smoking previously. More than twice as many females in the NHHS smoked regularly than university females. The higher rates in the NHHS might be explained by two reasons: (1) smoking

rates have been declining over the last 30 years and the NHHS was conducted in 1988 and (2) smoking rates and educational level have an inverse relationship (Rafuse, 1993).

University females demonstrated higher levels of preventive health practices with respect to exercise on all measures, namely frequency, duration and intensity. Again, this might also be a result of higher education in the university females.

Questions were asked to determine if the university subjects intended to preform or initiate preventive health measures in the next 12 months. These measures included: blood pressure, cholesterol, exercise and eating. Almost two-thirds intended to have their blood pressure measured. This intention was not associated with use of oral contraceptives.

As expected, a small number intended to have their cholesterol levels measured. As previously discussed, screening guidelines only recommend testing in a sub-group of women in this age group.

In the next 12 months, approximately half intend to alter: (1) their diet and (2) their exercise habits. This may be a result of attempting to positively alter physical appearance rather than attempting to affect a change in the

heart disease risk factor profile per se. Certainly, subjects who indicated they wanted to eat more healthy foods specified reasons associated with improved physical appearance more so than reasons related to reducing risk of CVD. Regardless of the motivation, however, positive changes in both exercise and diet will improve CVD risk profile.

Table 7

Comparison of Current Health Practices between University Females and NHHS Females (ages 18-25)

Preventive Health Measure	**University Females (%)**	**NHHS (%)**
Ever had blood pressure checked?		
Yes	91.4	91.4
Time since last blood pressure check?		
< 6 months	60.3	46.3
6-12 months	13.4	19.0
> 1 year	9.7	25.8
Cannot remember/ Do not know	6.0	0.3
N/A/Missing	10.5	8.6

Preventive Health Measure	University Females (%)	NHHS (%)
Diabetes Treatment		
N/A/Missing	98.7	99.0
Diet	0.5	1.1
Insulin	0.4	0.5
Pills to control	0.2	0.0
Ever tried to lose weight?		
yes	81.2	66.4
Are you presently trying...		
Lose weight	56.6	42.8
Gain weight	1.5	5.9
Neither	41.9	51.3
Method of trying to lose weight?		
Dieting	31.1	36.1
Taking diet pills	0.4	0.5
Exercising	49.5	27.6
Skipping meals	8.2	8.2
Weight control clinic	4.8	5.3
Other	13.2	1.7
N/A	43.6	57.2

Preventive Health Measure	University Females (%)	NHHS (%)
How often is salt added to food?		
Often	16.0	29.9
Sometimes	26.6	12.3
Occasionally	39.5	14.5
Never/Almost never	17.9	43.3
Ever had cholesterol measured?		
Yes	19.4	5.1
No	72.1	80.8
Not sure	8.4	5.1
N/A	0.0	9.0
Ever smoked cigarettes?		
Yes	48.2	69.0
No	51.8	31.0
At present, do you smoke regularly?		
Yes	18.6	46.8
No	29.6	5.1
N/A	51.8	48.1

Preventive Health Measure	University Females (%)	NHHS (%)
Exercise 1+ times/wk		
Yes	69.4	60.5
No	30.6	39.5
How much of exercise is strenuous?		
Most of it	66.1	23.7
Some of it	29.2	30.8
None of it	1.9	5.9
Missing/N/A	2.8	39.5
How long do you exercise?		
> 60 minutes	16.8	15.2
31 to 60 minutes	44.7	18.2
15 to 30 minutes	23.1	25.9
< 15 minutes	7.3	3.6
Not sure/N/A	5.2	39.5

PROGRAMMING OPTIONS

An important goal of this study was to identify heart health programming needs and requests of the study population, as this would facilitate the establishment of suitable and relevant learning options. Questions were asked to determine: (1) topics about which the subjects

wanted to enhance their knowledge, (2) programs students would attend if offered at MUN and (3) the preferred times and days of programming.

Of the students who wanted to learn more about heart health, the topics requested by the most respondents were stress management and healthy eating. The topics requested are consistent with the study findings as four-fifths noted stress negatively impacted on their health and more than 90% noted they would like to improve their eating habits. Only about one-third of respondents wanted to attend sessions related to general heart health. This is unfortunate, as the data related to knowledge did illustrate deficiencies.

BARRIERS

According to the Health Belief Model (Becker, 1974; Rosenstock, 1974), a change in health behaviour will not result if the costs or barriers to executing a particular action are greater than the perceived benefits. In addition, a perception of lack of self-efficacy concerning the execution of a particular behaviour might also pose as a barrier (Bandura, 1977; Rosenstock et al., 1988).

Approximately 15% felt CVD could not be prevented. Those respondents may not feel they possess the necessary skills or self-efficacy to facilitate prevention or may feel

the onset of CVD is inevitable as a result of family history.

Approximately 30% noted that they were either unsure or were not concerned about CVD and its risk factors. This may be a result of lack of perceived susceptibility because of: (1) no family history of CVD (these two factors were associated), (2) young age and (3) good health.

Questions were asked to determine if individuals felt preventive health measures should be undertaken. These measures included: blood pressure checks, cholesterol checks, eating healthier, exercising and coping with stress. Those individuals who noted they did not presently or did not intend to perform the above measures in the future were asked to indicate the reason(s) from a list provided.

If a person indicated that it was not important to have a regular blood pressure check, the reasons cited by most respondents were 'never thought it was important' and 'I'm not sick'. These responses suggest that these individuals did not feel susceptible to CVD as blood pressure was given a low priority. It is important to point out however, that most subjects do feel blood pressure checks are important.

Of those who felt it was unimportant to be aware of cholesterol at the present time, the reason cited by most respondents was 'never thought about it before'. Others

indicated that 'it is not important at my age' and 'no family history of CVD'. This is consistent with consensus guidelines, as previously discussed. Although answering 'no' to a preventive health measure would normally be construed as a barrier, in this case, it is consistent with present screening guidelines.

With respect to smoking cessation, a number of barriers were noted. Some smokers noted they did not want to quit. According to the Health Belief Model, without motivation, the health related behaviour, in this case smoking cessation, would not be feasible. Another barrier to smoking cessation was the lack of concern about smoking associated health problems, as expressed by a small percentage of the sample.

The most often cited reasons for smoking were related to stress and socializing. Interestingly, hunger was the least cited reason. Pirie, Murray and Luepker (1991) examined barriers to quitting in a sample of both men and women. The statement regarding 'barriers to quitting' most often agreed to by subjects was related to 'increased stress' followed by 'weight gain' and then 'difficulties with socializing'.

Stress is a risk factor for CVD and is more prevalent with higher educational levels (Canada's Health Promotion

Survey, 1990). In this survey, 80% indicated that stress negatively impacted their health, more than 20% indicated they did not take time to relax and 19% noted they were stressed most of the time. This illustrates the need for education regarding stress and possibly time management. Stress management was the programming need noted by most respondents.

'Lack of time' was also the most often cited barrier to exercising more frequently. Approximately equal numbers noted other barriers including: 'too expensive', 'lack of knowledge', 'intimidation' and 'lack of interest'. The 'other' barriers noted point to low self-efficacy and lack of motivation regarding exercise in the target group. This certainly may impact on present health beliefs, knowledge and behaviour. Many modifiable risk factors begin at a young age and healthy living programs might facilitate primary prevention of unhealthy behaviours. Furthermore, learning about healthy concepts increases knowledge level and therefore self-efficacy, thus enhancing confidence to pursue healthy behaviours.

Those subjects who indicated they were uninterested in attending any heart health sessions at Memorial University were asked to indicate their reasons. The reason cited by most respondents was 'lack of time'. Other responses such

as 'I am young and these problems do not affect me' and 'I have sufficient knowledge already' pointed to a lack of perceived susceptibility because of the mistaken impression of low risk.

FACILITATORS

Questions were asked to determine why individuals participate in preventive health measures which include: blood pressure readings, cholesterol screening, altering eating habits, losing weight and exercising.

The reason cited by most respondents for regular blood pressure readings was: 'belief in regular check-ups'. The mean age in this study group was 21 and the Canadian Task Force on the Periodic Health Examination (1994) specifies that case finding should be considered in all persons 21 to 64 years of age using the sphygmomanometer. These subjects also noted that knowledge of their blood pressure reading would facilitate any necessary alterations in health behaviour. The other reasons cited by respondents for having regular blood pressure readings related to 'family history of hypertension' and 'use of oral contraceptives', both of which would be consistent with regular screening guidelines.

Approximately three-quarters felt it was necessary to be aware of cholesterol levels at present. The reasons

cited by most respondents were similar to those reasons for regular blood pressure readings.

The reasons cited by most respondents for wanting to eat healthier foods were related to appearance and increased energy levels, while the reasons cited by the least number of respondents were to effect change in the CVD risk profile, through lowering cholesterol and blood pressure. This would be expected in this group, as there is increased emphasis on thinness and appearance in general in women. Furthermore, as these risk factors have a low prevalence in this population, perceived susceptibility to these risk factors is probably low.

Subjects who noted they wanted to lose weight were more likely to indicate that their motivation was related to wanting to 'improve both general health' and 'attractiveness' rather than wanting to decrease the risk of CVD. Again this suggests low perceived susceptibility in this group to CVD.

Enjoyment was the reason cited by most subjects for exercising regularly. Other reasons included: reducing stress and losing/maintaining weight. The fact that friends exercise or that exercise lowers CVD risk were not reported as strong motivators.

AGREEMENT BETWEEN KNOWLEDGE AND BEHAVIOUR

Agreement between knowledge and behaviour was examined in the following: eating habits, exercise habits, cholesterol measurements, blood pressure readings, stress and smoking. No association was determined between knowledge and behaviour with two exceptions: (1) exercise and (2) eating.

Knowledge was not associated with behaviour in respect to blood pressure and cholesterol. This is consistent with a study by Frost (1992) which employed a questionnaire in college students. Frost determined that sufficient knowledge regarding CVD risk factors, such as blood pressure and cholesterol did not translate into healthy heart behaviours.

Furthermore, there was no association between use of oral contraceptives and having had a blood pressure measure in the past. This is contrary to what might be expected because blood pressure measurements are a component of screening when prescribing oral contraceptives and subjects should have been informed that taking oral contraceptives might contribute to increased susceptibility with respect to CVD (Hannaford and Webb, 1996).

Knowledge regarding stress was not associated with the behaviour of taking time to relax. One of the most

requested topics and sessions regarding heart health was stress management suggesting students may not know how to relax.

Indicating that the use of excess salt was a major increased risk for CVD was associated with the behaviour of infrequently adding salt to food. However, high levels of knowledge, with respect to increased risks of CVD as a result of eating excess fat, were not associated with consumption of decreased amounts. Perhaps limiting salt intake is seen as less intrusive to overall lifestyle than lowering fat intake, which may explain the apparent contradiction.

AGREEMENT BETWEEN FAMILY HISTORY AND BEHAVIOUR

Family history was associated with two behavioural measures: (1) having had cholesterol measures done in the past and the intention to have screening done in the future and (2) exercising at a strenuous level.

A relationship between cholesterol screening and family history is, of course, consistent with guidelines for screening.

It is interesting that family history was associated with exercising strenuously and not associated with frequency of exercise and duration of exercise sessions.

KNOWLEDGE AND BEHAVIOUR AMONG DIFFERENT GEOGRAPHIC GROUPS

The geographic groups studied included: St. John's, Avalon Peninsula, West of Avalon Peninsula to Gander, West of Gander, Northern Peninsula/Labrador and outside of Province.

One might have expected differences between the urban and rural areas with respect to both knowledge and behaviour because access to resources/services for preventive practices is lower in rural areas than in urban centers; but this was not the case. However, no significant differences were determined among groups with respect to knowledge and behaviour.

KNOWLEDGE AND BEHAVIOUR AMONG DIFFERENT ACADEMIC GROUPS

Four academic groups were studied in this survey. These included: undergraduate science, undergraduate arts, professional schools- health and professional schools- non-health. With respect to knowledge, the 'health' group might be expected to have the highest level of knowledge regarding heart health because of the nature of their curriculum. In the two measures of knowledge, where significant differences were determined among groups, the 'health' group had the highest mean rank. These two measures were: (1) 'problems hypertension might cause' and (2) 'the effect HDL has on the

development of heart disease'. The 'science' group had the lowest measure on number one above. On one level it was surprising that the science group had the lowest mean rank because one might think that the science curriculum in areas such as biology, would educate students on these principles. However, science encompasses many disciplines, some of which would have no emphasis on health related issues. Of course, it is also important to note that almost 40% of the sample were first year students in the fall semester and knowledge with respect to heart health would have been acquired within the family, community and high school.

There was one significant difference with respect to behaviour, 'frequency of eating fat in one week'. It might be expected that the 'health' group would have the highest mean rank (eat high fat food infrequently) because of their level of knowledge, but this was not the case in this study as the 'non-health' group had the highest score. Frost (1992) in a study of college students reported that knowledge did not necessarily translate into behaviour.

ORAL CONTRACEPTIVES-USE AND BEHAVIOUR

When a physician prescribes oral contraceptives, part of the screening process is to take a blood pressure reading

and discuss risks associated with the pill (Hannaford and Webb, 1996). In this study, when a physician prescribed oral contraceptives and performed one screening practice it was likely that she/he preformed the other practice.

Oral contraceptives in isolation are no longer considered a risk factor for CVD for most women because the dose of estrogen is low, generally < 50 micrograms per pill (CPS, 1996). However, there is risk of CVD in some women if use of oral contraceptives and smoking are combined (Hannaford and Webb, 1996). Discussion of the risks of smoking in combination with oral contraceptives is also part of the screening exam by physicians (Hannaford and Webb, 1996; CPS, 1996). In spite of this, there was no reported relationship between taking oral contraceptives and not smoking. In fact, ten percent of the sample both smoked and took oral contraceptives, which points to the need for continued education in this population regarding the dangers of this combination.

FAMILY HISTORY AND PERCEIVED SUSCEPTIBILITY

In this study, having a family history did impact on perceived susceptibility to CVD. Perceived susceptibility was associated with having concern about CVD and its risk factors. This would be expected because a family history

might bring with it a sense of vulnerability for CVD particularly if an individual has witnessed the suffering of a family member.

The findings also demonstrated that a family history of CVD was also associated with (1) the belief that present behaviours impact on future health, (2) concern about CVD and (3) development of CVD at present age. Although results demonstrate that persons with a family history may feel vulnerable towards CVD there was no relationship between family history and belief that CVD could/could not be prevented.

It was interesting that the number of relatives with CVD affected did not impact on perceived susceptibility of subjects in this study.

LIMITATIONS

The limitations of the survey will be described. Limitations related to: (1) lack of inclusion of smaller classes, (2) lack of generalizability of study, (3) manner of knowledge measurement, (4) inaccuracies of self-reported data and (5) questionnaire design.

Only classes with 25 or more students were included in the random sample. This may have resulted in some degree programs being excluded altogether because of their small

numbers.

This survey employed random sampling within university aged females. As a result, generalizability to all females of this age group could not be established since the educational level of the university females and hence the socioeconomic status (Kaplan and Keil, 1993) was higher than the general populus. Furthermore, since 40% of the sample were first year students in the fall semester, the knowledge, behaviours, barriers and facilitators may not accurately reflect those of the more senior students. In addition, the inclusion of more senior students may have been reduced because of the upper age limit established for inclusion criteria and the inclusion of only undergraduate arts and science students.

The survey may not reflect actual individual subject knowledge/behaviour because responses in this survey were prompted through the use of close-ended questions and this may not be a true reflection of knowledge.

This survey did not employ clinical measurements but rather relied on self-report. Self-report of measures such as weight, height, hypertension, hypercholesterolemia and diabetes may not have been accurate. For example, women tend to over-report their height and under-report their weight (Roberts, 1995). In this survey, inaccuracies in

reporting these two measures (height and weight) would have skewed calculated BMI's.

In the questionnaire, regular exercise was not defined, which may have led to confusion with respect to questions 66 (If you exercise regularly, why?) and 68 (If you do not exercise regularly, why?). As a result, the entire study sample had to be utilized for frequency calculations for these two questions.

CHAPTER VI

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

The study examined the knowledge, behaviours, perceived barriers and facilitators of university females in Newfoundland regarding heart health.

Generally, a high level of knowledge exists within this group with respect to CVD. This may be explained, in part, by the educational level of the sample. However, there were recognized deficiencies in knowledge that suggest there is a need to educate university females about:

(1) the long asymptomatic phase of the natural history of CVD;

(2) risk factors for CVD, particularly those considered to be major contributors;

(3) the different manner in which CVD affects women as opposed to men including the difference in the age of onset, the difference in risk factors and the different manner that shared risk factors act;

(4) expanded exercise parameters for heart health and the importance of exercising at the minimum of a moderate level of intensity;

(5) risk for CVD in some women when smoking and use of oral contraceptives are combined.

Knowledge does not necessarily translate into behaviour on measures of heart health. This may be explained by a lack of perceived susceptibility because of young age, good health, no family history and lack of time. Those areas where knowledge was reflected in behaviour change, such as exercise, were a result of the subjects attempting to improve appearance and boost energy levels rather than decrease risk of CVD.

Most university females believe that present behaviours affect future health and are concerned about CVD and its risk factors, but few subjects feel susceptible towards developing CVD at the present time. However, having a family history of CVD was associated with both concern about CVD and its risk factors and feeling susceptible towards developing CVD at the present time. Furthermore, a family history was associated with behaviour on two measures: (a) cholesterol screening (past and present) and (b) exercising at a strenuous level. These associations point to awareness of the importance of preventive health measures at a young age in this sub-group. Most subjects were exposed to some type of health promotion program in their high schools prior to attending university. Almost all subjects noted gym classes were offered in their high schools. Slightly less than one-third noted their

communities offered programs to promote heart health awareness. Lack of previous exposure to heart health may negatively affect feelings of self-efficacy, which may in turn negatively affect the practice of heart health.

There were a number of identified CVD risk factors in the sample. Approximately one-third noted they had a family history of CVD; approximately one-third exercised less than once per week. Almost one-fifth were regular smokers; one-fifth felt stressed most of the time. Sixteen percent added excess salt to their food frequently. Slightly more than ten percent had a BMI of $\geq$ 27. Approximately ten percent ate high fat food daily and ten percent smoked regularly and took oral contraceptives. Approximately two percent noted they had been told they had hypercholesterolemia and two percent had diabetes. Of the risk factors that were compared with the NHHS females, frequencies of risk factors in this sample were all lower with the exception of hypercholesterolemia.

With respect to current health practices, the following applies to the sample: slightly less than ninety percent of those with a BMI of $\geq$ 27 were attempting to lose weight; three-quarters relaxed regularly and three-quarters had a blood pressure measurement performed in the last year. Almost half of the sample exercised at least three times per

week. Almost three-fifths ate high fat less than three times per week and almost three-fifths added excess salt to their food infrequently. Approximately one-half never smoked. Almost one-fifth have had a previous lipid profile. In general, all health practices of the university females were higher than the NHHS females.

Among geographic groups, no differences with respect to knowledge and behaviour were determined. Among academic groups, significant differences were determined on two knowledge measures: (1) health problems that hypertension may cause and (2) effect HDL cholesterol has on development of CVD. The health group had the highest level of knowledge on both measures, while the science group had the lowest level of knowledge on the first measure and the arts group had the lowest level of knowledge on the second measure. In terms of behaviour there was a significant difference with respect to one measure: frequency of eating high fat food. The professional schools-non-health group ate high fat food the least number of times of all groups, while the arts group ate high fat food the most number of times per week.

The barrier to practicing heart health measures cited by most respondents was related to lack of time, while the facilitator to practicing heart health measures cited by most subjects related to a belief in preventive health

measures.

The topics about which most students wanted to increase their knowledge were stress management, healthy eating, physical fitness and weight control. Programs which most of the students wanted to see offered at MUN were stress management and healthy eating (>70%); almost one-third wanted sessions related to enhancing general heart health knowledge. Most students noted they would like to attend sessions on Tuesday and Thursday, with afternoon being the time chosen by the most subjects.

RECOMMENDATIONS

Recommendations arising will be organized using the concept of self-efficacy and the Health Belief Model. According to the Health Belief Model, the following must be present for a health behaviour to ensue: sufficient motivation, benefits of the behaviour must outweigh costs, and the individual must feel susceptible to a certain disease (Rosenstock, 1974).

A large percentage of the study sample indicated their motivation to either continue with or initiate heart health measures, noting their concern about CVD and its risk factors, belief in the importance of health preventive measures and interest in further learning about heart

health. In order to capitalize on this, it would be important to offer programming that the study sample specifically indicated they were interested in attending, such as healthy eating and stress management. Furthermore, in order to ensure participation, it would be important to offer programming on Tuesday and Thursday afternoons, as these times were the times indicated by the most subjects.

There were a number of barriers to the practice of heart health which must be addressed to maximize the benefits to the study sample. There was a lack of perceived susceptibility towards development of CVD at the present time. However, the majority of the sample believed that present behaviours could affect future health. This illustrates that programming should be presented to students as a way to enhance their general health rather than specifically related to the promotion of heart health. University females may be better able to relate to issues around general health, which the study sample feel affect them presently. A general program addressing a number of topics, including those identified by the sample may be most beneficial. Sessions could explore different topics such as: stress/time management, healthy eating, physical fitness and general preventive health measures (such as cholesterol screening, blood pressure readings). Students could choose

to attend those sessions related to their perceived needs and interests. Of course, areas where CVD knowledge deficiencies are present, could be addressed in the appropriate sessions but the overall message would be to enhance general health rather than heart health specifically.

Lack of time was the barrier cited by the most subjects. If programming emphasized that heart health measures could be incorporated into daily life with minimal time, this may enhance behaviour. For example, highlighting that exercise does not necessarily mean going to the gym, but rather can be an accumulation of various activities, throughout the day may increase participation. Furthermore, programming related to time and stress management would address the frequently identified barrier to performing health related behaviour 'lack of time'. Programming which promotes efficiency of time management may help to reduce stress levels regarding time constraints and thus free time for healthy pursuits, such as physical activity. Also, sessions at the beginning of the semester may attract the most students, prior to course demands intensifying. The beginning of the year would be an opportune time to educate students, particularly new students, about tips for stress management, healthy eating and time management. Hopefully

this may prevent development of poor habits.

Sessions which combine an educational and behavioural component may enhance knowledge, behaviour and facilitate the translation of knowledge to behaviour. Furthermore, combined sessions, particularly those which include post-course support would enhance self-efficacy. For example, an exercise class that incorporates an educational component concerning different ways individuals may exercise independently to improve heart health may enhance feelings of self-efficacy regarding exercise. Furthermore, if an exercise instructor is available after class this may afford individuals the opportunity to have questions answered and in turn further enhance self-efficacy. Also, if persons are aware of resource persons with whom they can discuss heart health and general health issues with confidence around health behaviours will increase and may contribute to behavioural maintenance.

Finally, the use of electronic and paper means could be used to convey heart health/general health promotion messages. For example, student packages are generally distributed to new and returning students at the time of orientation. This provides an excellent opportunity to distribute literature to students concerning heart health risk factors, promotion of general health and healthful

interventions. This package may also be used to inform students of any healthy living workshops that are being offered during the semester. Electronic media such as e mail and a web page could provide health related messages and advise students of upcoming programming.

In order to ensure that programming is successful it would also be important to implement an evaluation phase to determine if programming is enhancing knowledge and behaviour and to ensure that the programming is continuing to meet the needs of the students.

Of course, heart health may also be enhanced through university policy consistent with healthy living. For example, campus cafeterias should provide students with the opportunities to avail of heart healthy foods. Also, students should, as part of tuition, be entitled to utilize the campus physical fitness facilities to promote general health while attending university. Furthermore, students should be aware that the university has, on staff, professionals trained in stress management who are available for students.

Although CVD symptomatology is very infrequent at this age, the pathophysiology of atherosclerosis and risk factors are present. The university setting affords a wonderful opportunity to enhance heart health through promotion of

general health, which may result in a healthier future for these women and their families.

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APPENDICES

APPENDIX A

September 26, 1996

Name of Professor
Faculty of Business Administration
Memorial University of Newfoundland

Dear:

I am a Masters student in Community Medicine. As part of the thesis requirements for my degree, I am conducting a cross-sectional descriptive study, using a questionnaire to obtain data. The information collected will provide a data base of the knowledge, behaviours, perceived barriers and facilitators regarding heart health for females in college. This data base may be used in the future to design programs to promote heart health. The study is entitled *"Knowledge, Behaviours, Perceived Barriers and Facilitators of College Females Regarding Heart Health."*

This study has been designed to be carried out during class time to facilitate an increased response rate. The time required to distribute the survey, provide an explanation and enable completion will be approximately 20 minutes.

Your class has been chosen through random selection. With your permission, I will employ your class in the survey. A time will be arranged, at your convenience, to visit your class to administer the survey. The surveys will be administered to all females in the class. Participaction is voluntary and confidentiality will be assured. The males will be provided with pamphlets addressing Heart Health, which they may read while the females complete the questionnaire. Following distribution of the survey, I will remain outside the classroom, while the survey is completed. One class prior to administration of the questionnaire I will ask you to ask the class for their consent regarding participaction in the study.

At a later time during the semester I will provide heart health facts for you to distribute to your class. This will serve as a debriefing tool for the class.

I will contact you regarding participaction in the study. If you have any questions, please feel free to contact me at any of the following numbers: 737-7101/6693 (W).

Your participaction will be greatly appreciated.

Sincerely Yours,

Christine Hobeika Bsc PT

September 17,1996

To: Selected Classes

From: Christine Hobeika, Masters student

Re: Participaction in study

During the next class, Christine Hobeika, a Masters student in Community Medicine would like to visit the class to distribute a questionnaire. This questionnaire is part of a Masters thesis study. The study is entitled "*Knowledge, Behaviours, Perceived Barriers, and Facilitators regarding Heart Health in College Females.*"

The questionnaire will be distributed to all females in the classroom. Participaction is completely voluntary and confidential. The questionnaire will take approximately 15 minutes to complete. It will be completed during class time. The investigator will distribute the questionnaires and then remain outside the class during completion of the questionnaire.

Males will receive a pamphlet detailing heart disease risk factors.

The investigator requests your consent for the use of class time to distribute the survey.

Sincerely yours,

Christine Hobeika BSc PT

APPENDIX B

Memorial
University of Newfoundland

Office of Research and Graduate Studies (Medicine)
Faculty of Medicine
The Health Sciences Centre

20 August 1996

TO: Ms. Christine Hobeika

FROM: Dr. Verna M. Skanes, Assistant Dean
Research & Graduate Studies (Medicine)

SUBJECT: Application to the Human Investigation Committee - #96.111

The Human Investigation Committee of the Faculty of Medicine has reviewed your proposal for the study entitled **"Knowledge, Behaviours, Perceived Barriers and Facilitators of College Females Regarding Heart Health"**.

Full approval has been granted for one year, from point of view of ethics as defined in the terms of reference of this Faculty Committee.

For a hospital-based study, it is **your responsibility to seek necessary approval from the Health Care Corporation of St. John's**.

Notwithstanding the approval of the HIC, the primary responsibility for the ethical conduct of the investigation remains with you.

Verna M. Skanes, Ph.D.
Assistant Dean

cc Dr. K.M.W. Keough, Vice-President (Research)
Dr. D. Neville, Supervisor

St. John's, NF. Canada A1B 3V6 • Tel.: (709) 737-6762 • Fax: (709) 737-5033 • email: rgs@morgan.ucs.mun.ca

APPENDIX C

COMMUNITY HEALTH
EASTERN REGION

Eastern Newfoundland Regional Community Health

P.O. Box 70
Holyrood, NF
A0A 2R0

Fax: 709-229-4005

March 24, 1997

Administration

C.E.O.'s Office
709-229-4855
Business Office/ Purchasing
709-229-4124
Human Resources
709-229-3973

Community Health Client Services

Public Health Nursing
Home Care
Home Support
Rehabilitation
709-229-4812
708-229-3352

Health Promotion/ Protection

Communicable Disease Control
Environmental Health
Nutrition
Health Education
Child Health
709-229-3367

Mental Health & Addictions Services
709-229-3353

Ms. Christine Hobeika
Division of Community Medicine
Faculty of Medicine
Memorial University of Nfld.
The Health Sciences Centre
St. John's, NF
AIB 3V6

Dear Christine,

Please feel free to use any pertinent questions from the Newfoundland Heart Health Survey in your study of college females. I also approve of the use of the relevant data for a comparison between your subjects and appropriate subjects in the Newfoundland Heart Health Database. I look forward to seeing this analysis. I am requesting that should you plan to publish data related to the comparison that I have the opportunity to review and approve the relevant sections prior to submission for publication.

Yours truly,

Catherine Donovan, M.D., M.H.Sc.
Regional Medical Health Officer

CD/sd

APPENDIX D

PRE-TEST QUESTIONNAIRE

FEEDBACK

The following questions concern the content of the questionnaire which you have just completed. Your answers are very important. Please answer each question and briefly explain your response.

Your time and input are greatly appreciated.

1. (a) Did you feel any of the question/s was/were ambiguous?

__Yes __No

(b) If yes, which one/s and why?

_____

_____

2. (a) Did you think the length of the questionnaire was:

__Too short __Just right __Too long

(b) How long did it take you to complete the questionnaire?

__minutes

3. (a) Was/were any of the word/s used in the questionnaire difficult to understand?

__Yes __No

(b) If yes, which word/s?

_____

_____

4. (a) Were you offended by any of the question/s asked?

__Yes __No

(b) If yes, which one/s, please explain.

_____

_____

5. Please write any additional comments in the space provided.

_____

_____

_____

_____

ID:

QUESTIONNAIRE CONSENT FORM

DIVISION OF COMMUNITY MEDICINE

FACULTY OF MEDICINE

MEMORIAL UNIVERSITY OF NEWFOUNDLAND

ST. JOHN'S, NF

TITLE: Knowledge, Behaviours, Perceived Barriers and Facilitators of College Females Regarding Heart Health

INVESTIGATOR: Christine Hobeika BSc PT

You have been asked to participate in a research study, by completing this questionnaire. This questionnaire is the basis of a Masters thesis.

Participation in this study is entirely voluntary. Subjects are not obligated to complete the questionnaire. Each questionnaire will be assigned a code number and will contain no personal identifiers;it will not be possible to be identified by your questionnaire. Your responses are confidential. All completed questionnaires will be kept in a locked drawer with only the investigator having access to a key.

Questions will be asked about knowledge, behaviours and perceived barriers and facilitators concerning heart health. In addition, demographic information including family history will be collected.

Information collected via the questionnaire will be used to create a data base regarding the status of college females and perceived barriers and facilitators. This data will be used to identify health needs and then appropriate measures may be undertaken to improve health status.

At a later time, during the semester, you will be receiving general heart health facts. I will provide the heart health information to each participating class.

This survey takes approximately 15 minutes to complete. Your time and input are greatly appreciated. Numbers found throughout questionnaire are for coding purposes and may be ignored.

SURVEY QUESTIONNAIRE

Following is the questionnaire used in the survey. Where possible, frequencies are presented followed by the appropriate percentage (#(%)). 'Missing' and 'not applicable' frequencies are also detailed. In some questions, the frequencies are not presented within the questionnaire, but rather in frequency tables; the reader is referred to the relevant tables as appropriate.

Certain questions did not require the entire study cohort to respond. In these questions, the number of actual respondents is listed first followed by (1) frequency based upon N=463 and (2) frequency based upon n=number of eligible respondents for that question. For example, question 11 does not require responses from the entire cohort but indicates 112 responses to that question, with 23.7%(N=463) and 26.0%(n=423).

11. Do you know the reading in numbers? (N=463), (n=423)

Yes	☐ 1	112 (23.7), (26.0)

SECTION 1 HEART DISEASE

1. Based upon what you have heard/read, do you believe a large proportion of heart disease be prevented?

Yes	☐ 1	392 (84.7)
No	☐ 2	15 (3.2)
Not sure	☐ 8	53 (11.4)
Missing	☐ 9	3 (0.6)

2. Indicate what effect each of the following has on the development of heart disease?

	Decrease risk 1	No effect 2	Slight increase in risk 3	Moderate increase in risk 4	Major increase in risk 5	Missing
Diet high in fat	2 (0.4)	0	14 (3.0)	95 (20.5)	347 (74.9)	5 (1.1)
High cholesterol in the blood	0	1 (0.2)	17 (3.7)	94 (20.3)	346 (74.7)	5 (1.1)
Excess salt in diet	0	5 (1.1)	70 (15.1)	188 (40.6)	190 (41.0)	10 (2.2)
High density lipoproteins in the blood	37 (8.0)	27 (5.8)	99 (21.4)	152 (32.8)	101 (21.8)	47 (10.2)
High blood pressure	0	1 (0.2)	26 (5.6)	147 (31.7)	277 (59.8)	12 (2.6)
Excess stress	0	4 (0.9)	62 (13.4)	180 (38.9)	211 (45.6)	6 (1.3)
Smoking	2 (0.4)	6 (1.3)	31 (6.7)	128 (27.6)	288 (62.2)	8 (1.7)
Overweight	0	6 (1.3))	19 (4.1)	131(28.3)	297 (64.1)	10 (2.2)
Family history	1 (0.2)	1(0.2)	46 (9.9)	154(33.3)	255 (55.1)	6 (1.3)

3. Does anyone in your family have heart disease?

Yes	☐ 1	157 (33.9)	
No	☐ 2	242 (52.3)	**(Go to question 5)**
Not sure	☐ 8	59 (12.7)	**(Go to question 5)**
Missing	☐ 9	5 (1.1)	

4. Which members of your family have heart disease? *Check all that apply*. If more than one, indicate the number. For example, if two of your uncles have heart disease, place a 2 after the word uncle in parenthesis. (N= 463), (n=157)

Mother ( )	☐ 1	13 (2.8), (8.3)	Grandmother ( )	☐ 5	74 (16.0), (47.1)
Father ( )	☐ 2	37 (8.0),(23.6)	Grandfather ( )	☐ 6	88 (19.0), (56.0)
Sister ( )	☐ 3	3 (0.6),(1.9)	Aunt ( )	☐ 7	28 (6.0), (17.8)
Brother( )	☐ 4	0	Uncle ( )	☐ 8	50 (10.8), (31.8)
N/A	☐ 99	305 (65.9)	Missing	☐ 9	5 (1.1)

5. Are you concerned about heart disease and its risk factors?

Yes	☐ 1	313 (67.6)	Not sure	☐ 8	60 (13.0)
No	☐ 2	84 (18.1)	Missing	☐ 9	6 (1.3)

6. Do you believe your present health behaviours will affect your future health?

Yes	☐ 1	402 (86.8)
No	☐ 2	26 (5.6)
Not sure	☐ 8	33 (7.1)
Missing	☐ 9	2 (0.4)

7. In your opinion, indicate how likely it is that a person your age might develop each of the following diseases?

Disease	Not likely 1	Somewhat likely 2	Likely 3	Missing
Breast cancer	129 (27.9)	265 (57.2)	66 (14.3)	3 (0.6)
AIDS	10 (2.2)	85 (18.4)	364 (78.6)	4 (0.9)
Heart disease	167 (36.1)	233 (50.3)	60 (13.0)	3 (0.6)
Common cold/flu	2 (0.4)	11(2.4)	447 (96.5)	3 (0.6)
Depression	13 (2.8)	145 (31.3)	301 (65.0)	4 (0.9)
Sexually transmitted diseases	8 (1.7)	51(11.0)	399 (86.2)	5 (1.1)
Diabetes	61 (13.2)	253 (54.6)	144 (31.1)	5 (1.1)

8. Does heart disease affect men and women.....*(Choose one answer only)*

Equally	☐ 1	74 (16.0)
Women more than men	☐ 2	29 (6.3)
Men more than women	☐ 3	165 (35.6)
Depends upon which age group is being considered	☐ 4	94 (20.3)
Not sure	☐ 8	98 (21.2)
Missing	☐ 9	3 (0.6)

SECTION 2 BLOOD PRESSURE

9. Have you ever had your blood pressure measured?

Yes	☐ 1	423 (91.4)	Not sure	☐ 8	10 (2.2)	**(Go to question 14)**
No	☐ 2	30 (6.5)	**(Go to question 14)**			

10. How long ago? (N=463), (n=423)

In the last 6 months	☐ 1	279 (60.3), (65.9)	1- 2 years ago	☐ 3	45 (9.7), (10.6)
6-12 months ago	☐ 2	62 (13.4) , (14.6)	Not Sure	☐ 8	28 (6.0), (6.6)
N/A	☐ 99	40 (8.6)	Missing	☐ 9	9 (1.9), (2.1)

11. Do you know the reading in numbers? (N=463), (n=423)

Yes	☐ 1	112 (23.7), (26.0)	
No	☐ 2	305 (65.9), (72.1)	**(Go to question 13)**
N/A	☐ 99	40 (8.6), (9.4)	
Missing	☐ 9	8 (1.7), (1.9)	

12. What was the reading? __/__ (Table D1, page 185), (N=463), (n=109)

13. Have you ever been told that you have high blood pressure? (N=463), (n=423)

Yes	☐ 1	17 (3.7), (4.0)
No	☐ 2	394 (85.1), (93.1)
Not sure	☐ 8	6 (1.3), (1.4)
N/A	☐ 99	46 (9.9)
Missing	☐ 9	46 (9.9)

14. Do you think it is important to have your blood pressure checked regularly?

Yes	☐ 1	419 (90.5)	**(Go to question 15)**
No	☐ 2	44 (9.5)	**(Go to question 16)**

15. If yes to above question, why? *Check all that apply.* (N=463), (n=419)

I have a family history of high blood pressure	☐	153 (33.0), (36.6)
I can then take action to lower blood pressure	☐	233 (50.3), (55.6)
I believe regular check-ups are important	☐	315 (68.0), (75.2)
I take oral contraceptives	☐	200 (43.2), (47.7)
Other, specify:_____	☐	17 (3.7), (4.1)
N/A	☐	45 (9.7)

16. If no to question 14, why? *Check all that apply.* (N=463), (n=44)

I think it is a waste of time	☐	2 (0.4), (4.5)
I am young, so it is not necessary	☐	14 (3.0), (31.8)
I am not sick	☐	10 (2.2), (22.7)
I never thought it was important	☐	30 (6.5), (68.2)
Other, specify:_____	☐	7 (1.5), (15.9)
N/A	☐	419 (90.5)

17. From the list provided indicate what someone can do to control his/her blood pressure. *Check all that apply.*

Increase exercise	☐ 410 (88.6)	Decrease stress	☐ 417 (90.1)
Take medications	☐ 224 (48.4)	Eat less fat	☐ 407 (87.9)
Lower salt intake	☐ 425 (91.8)	Speak to Health Professional	☐ 352 (76.0)
Nothing	☐ 3 (0.6)		
Other, specify:_____	☐ 7 (1.5)		

18. Do you plan to have your blood pressure checked in the next 12 months?

Yes	☐ 1	307 (66.3)
No	☐ 2	53 (11.4)
Not sure	☐ 8	102 (22.0)
Missing	☐ 9	1 (0.2)

SECTION 3 DIABETES

19. Diabetes is a risk factor for heart disease. Does it affect men and women in the same manner or differently?

Women less than men	☐ 1	43 (9.3)
Women more than men	☐ 2	100 (21.6)
Both sexes equally	☐ 3	312 (67.4)
Missing	☐ 9	8 (1.7)

20. Have you ever been told you have diabetes?

Yes	☐ 1	8 (1.7)	
No	☐ 2	450 (97.2)	**(Go to question 23)**
Missing	☐ 9	5 (1.1)	

21. If yes, how old were you when you were first diagnosed?

Years old___ (Table D2, page 186), (N=463), (n=8)

22. Are you now on any treatment for your diabetes? Check all that apply. (N=463), (n=8)

Diet	☐ 1	5 (1.1), (62.5)	Pills	☐ 2	1 (0.2), (12.5)
Insulin	☐ 3	2 (0.4), (25.0)	N/A	☐ 99	455 (98.3)
Missing	☐ 9	2 (0.4)			

SECTION 4 CHOLESTEROL

23. Indicate which of the following would cause you concern? *Check all that apply.* (N=463), (n=156)

Elevated triglycerides	☐ 1	90 (19.4), (57.7)
Elevated high density lipoproteins (HDL)	☐ 2	59 (12.7), (37.8)
Elevated low density lipoproteins (LDL)	☐ 3	87 (18.8), (55.8)
Not sure	☐ 8	317 (68.4)

24. In your opinion, is it important to be aware of your cholesterol level at the present time?

Yes	☐ 1	351 (75.8)	**(Go to question 25)**
No	☐ 2	110 (23.8)	**(Go to question 26)**
Missing	☐ 9	2 (0.4)	

25. If yes to question 24, why? *Check all that apply.* (N=463), (n=351)

I believe in preventive health measures	☐	291 (62.9), (83.0)
I have a strong family history of high cholesterol	☐	94 (20.3), (26.8)
I can take action to lower it, if necessary	☐	280 (60.5), (79.8)
Other, specify:_____	☐	8 (1.7), (2.3)
N/A	☐	111 (24.0)
Missing	☐	2 (0.4)

26. If no to question 24, why? *Check all that apply.* (N=463), (n=110)

This is not important at my age	☐	30 (6.5), (27.3)
No family history of high cholesterol	☐	27 (5.8), (24.5)
Never thought about it before	☐	80 (17.3), (72.7)
Other, specify:_____	☐	12 (2.6), (10.9)
N/A	☐	352 (76.0)
Missing	☐	1 (0.2)

27. Have you ever had your cholesterol measured?

Yes	☐ 1	90 (19.4)	
No	☐ 2	334 (72.1)	**(Go to question 30)**
Not sure	☐ 8	39 (8.4)	**(Go to question 30)**

28. Were you told the cholesterol reading? (N=463), (n=90)

Yes	☐ 1	61 (13.2), (67.8)
No	☐ 2	29 (6.3), (32.2)
N/A	☐ 99	373 (80.6)

29. Were you ever told that your cholesterol was high? (N=463), (n=90)

Yes	☐ 1	11 (2.4), (12.2)
No	☐ 2	79 (17.1), (87.8)
Not sure	☐ 8	0
N/A	☐ 99	373 (80.6)

30. If your cholesterol is/will be high in the future, would you take the steps to lower it?

Yes	☐ 1	454 (98.1)	Missing	☐ 9	2 (0.4)
No	☐ 2	1 (0.2)			
Not sure	☐ 8	6 (1.3)			

31. What, if anything, would you do? *Check all that apply.*

Stop smoking	☐ 108 (23.3)	Exercise more	☐ 417 (90.1)
Eat less fatty foods	☐ 434 (93.7)	Consult a Health Professional	☐ 391 (84.4)
Exercise less	☐ 14 (3.0)	Not sure	☐ 6 (1.3)
Other, specify:_____			☐ 9 (1.9)
Missing			☐ 2 (0.4)

32. Do you plan to have your cholesterol measured in the next 12 months?

Yes	☐ 1	85 (18.4)	Not sure	☐ 8	206 (44.5)
No	☐ 2	171 (36.9)	Missing	☐ 9	1 (0.2)

SECTION 5 EATING HABITS

33. Before you eat something, do you consider the ingredients (such as fat content)?

Yes, always	☐ 1	133 (28.7)	Sometimes	☐ 3	192 (41.5)
Often	☐ 2	92 (19.9)	Never	☐ 4	46 (9.9)

34. How often do you add salt to your food?

Often	☐ 1	74 (16.0)	Occasionally	☐ 3	183 (39.5)
Sometimes	☐ 2	123 (26.6)	Never	☐ 4	83 (17.9)

35. How often in one week do you eat food that is high in fat (such as french fries)?

Daily	☐ 1	47 (10.2)	Almost never	☐ 4	58 (12.5)
3-5 times per week	☐ 2	144 (31.1)	Never	☐ 5	5 (1.1)
1-2 times per week	☐ 3	208 (44.9)	Missing	☐ 9	1 (0.2)

36. When you have a snack, which of the following foods are you most likely to choose? *Check all that apply.*

Chips	☐	237 (51.2)	Muffin	☐	223 (48.2)
Fruit	☐	300 (64.8)	Donut	☐	81 (17.5)
Soft drink	☐	187 (40.4)	Health bar	☐	139 (30.0)
Bar	☐	154 (33.3)	I do not snack	☐	4 (0.9)
Other, specify:_____				☐	57 (12.3)
Missing				☐	1 (0.2)

37. Would you like to eat more healthy foods?

Yes	☐ 1	427 (92.2)	No	☐ 2	23 (5.0)	**(Go to question 39)**
Not sure	☐ 8	12 (2.6)	**(Go to question 39)**			
Missing	☐ 9	1 (0.2)				

38. If yes to question 37, why? *Check all that apply.* (N=463), (n=427)

To lose weight	☐	321 (69.3), (75.2)
To lower cholesterol	☐	128 (27.6), (30.0)
To lower blood pressure	☐	99 (21.4), (23.2)
To increase energy levels	☐	322 (69.5), (75.4)
To look better	☐	314 (67.8), (73.5)
Other, specify:_____	☐	55 (11.9), (12.9)
N/A	☐	36 (7.8)
Missing	☐	1 (0.2)

39. If no to question 37, why? *Check all that apply.* (N=463), (n=23)

I am not interested	☐	4 (0.9), (17.4)
I feel my diet is healthy at the present time	☐	27 (5.8), (87.0)
Healthy food is expensive	☐	3 (0.6), (13.0)
I do not know how to improve my diet	☐	2 (0.4), (8.7)
I am too busy to think about altering my diet	☐	6 (1.1), (26.1)
I do not cook for myself, must eat what is provided	☐	5 (1.1), (21.7)
Other, specify:_____	☐	4 (0.9), (17.4)
N/A	☐	427 (92.2)
Missing	☐	1 (0.2)

40. In the next 12 months, do you plan to alter your diet?

Yes	☐ 1	215 (46.4)
No	☐ 2	126 (27.4)
Not sure	☐ 8	119 (25.7)
Missing	☐ 9	3 (0.6)

41. What types of health problems are related to consumption of too much fat in the diet? *Check all that apply.*

Obesity	☐	438 (94.6)
High blood cholesterol	☐	437 (94.4)
Heart disease	☐	431 (93.1)
Atherosclerosis/hardening of the arteries	☐	404 (87.3)
Not sure	☐	11 (2.4)
Other, specify:_____	☐	6 (1.3)

SECTION 6 WEIGHT

42. Have you ever tried to lose weight?

Yes	☐ 1	376 (81.2)
No	☐ 2	86 (18.6)
Missing	☐ 9	1(0.22)

43. Are you presently trying to...

Lose weight	☐ 1	262 (56.6)	**(Go to question 44-46)**
Gain weight	☐ 2	7 (1.5)	**(Go to question 46)**
Neither	☐ 3	194 (41.9)	**(Go to question 46)**

44. If you are trying to lose weight, why? *Check all that apply*. (N=463), (n=262)

To become more attractive	☐	209 (45.1), (79.8)
To improve general health	☐	232 (50.1), (88.5)
To decrease risk of heart attack	☐	70 (15.1), (26.7)
To maintain/lower blood pressure	☐	53 (11.4), (20.2)
To decrease risk of diabetes	☐	52 (11.2), (19.8)
Other, specify_____	☐	17 (3.7), (6.5)
N/A	☐	201 (43.4)

45. What are you doing to try to lose weight ? *Check all that apply*.(N=463), (n=262)

Dieting	☐	144 (31.1), (55.0)	Skipping meals	☐	38 (8.2), (4.5)
Diet pills	☐	2 (0.4), (0.8)	Weight loss program	☐	22 (4.8), (8.4)
Exercising	☐	229 (49.5), (87.4)			
Other, specify_____				☐	61 (13.2), (23.3)
N/A				☐	202(43.6)

46. Which of the following is the most effective way to lose and maintain weight?

Diet	☐ 1	4 (0.9)
Exercise	☐ 2	35 (7.6)
Combination of diet and exercise	☐ 3	421 (90.9)
Other, specify_____	☐ 4	3(0.6)

47. If you are not planning to lose or gain weight, what do you do to maintain your weight? (N=463), (n=194)

I watch what I eat	☐	20 (4.3), (10.3)
I exercise	☐	15 (3.2), (7.7)
I watch what I eat and exercise	☐	90 (19.4), (46.4)
I do nothing	☐	63 (13.6), (32.5)
Other, specify:_____	☐	6 (1.3), (3.1))
N/A	☐	269 (58.1)

SECTION 7 SMOKING

48. Have you ever smoked cigarettes?

Yes	☐ 1	223 (48.2)	
No	☐ 2	240 (51.8)	**(Go to question 54)**

49. At present, do you smoke cigarettes regularly (one or more per day)?(N=463), (n=223)

Yes	☐ 1	86 (18.6), (38.6)
No	☐ 2	137 (29.6), (61.4) **(Go to question 54)**
N/A	☐ 99	240 (51.8)

50. If yes, how many cigarettes per day do you smoke? (N=463), (n=81)

___# of cigarettes (Table D3, page 186)

51. At what age did you begin to smoke? (N=463), (n=94)

___years (Table D4, page 187)

___I do not remember

52. When and where are you most likely to smoke? *Check all that apply.* (N=463),(n=223)

While studying	☐	44 (9.5), (19.7)
When under stress	☐	72 (15.6), (32.2)
When hungry	☐	16 (3.5), (7.2)
Anytime I have a craving	☐	52 (11.2), (23.3)
In bars	☐	81 (17.5), (36.3)
Other, specify:_____	☐	21 (4.5), (9.4)
N/A, Missing	☐	361 (78.0)

53. Would you like to quit smoking? (N=463), (n=223)

Yes	☐ 1	81 (17.5), (36.3)
No	☐ 2	16 (3.4), (7.2)
N/A, Missing	☐ 9	366 (79.0)

54. Are you in favour of smoking bans in public places?

Yes	☐ 1	397 (85.7)
No	☐ 2	62 (13.4)
Missing	☐ 9	4 (0.9)

55. Are you concerned about potential health problems associated with smoking?

Yes	☐ 1	442 (95.5)
No	☐ 2	18 (3.9)
Missing	☐ 9	3 (0.6)

56. What types of health problems are associated with smoking? *Check all that apply.*

Heart disease	☐ 406(87.7)	High blood pressure	☐	247(53.3)
Obesity	☐ 22(4.8)	High cholesterol	☐	51(11.0)
Hardening of the arteries	☐ 127(27.4)	Respiratory problems	☐	454(98.1)
Missing	☐ 2 (0.4)			

57. Can health problems caused by smoking be reversed by quitting?

Yes	☐ 1	200 (43.2)
No	☐ 2	93 (20.1)
Not sure	☐ 8	166 (35.9)
Missing	☐ 9	4 (0.9)

58. If you do not smoke at present, do you plan to take up the habit in the next 12 months?

Yes	☐ 1	3 (0.6)
No	☐ 2	362 (78.2)
Not sure	☐ 8	3 (0.6)
N/A, Missing	☐ 99	95 (20.5)

59. If you presently smoke or are planning to start, why? *Check all that apply.*

Lose weight	☐	13(2.8)	Enjoy it	☐	61(13.2)
My friends smoke	☐	21(4.5)	Unable to quit	☐	48(10.4)
Decrease stress	☐	33(7.1)			
Other, specify:_____				☐	12(2.6)
N/A				☐	364 (78.6)

SECTION 8 EXERCISE

60. How often have you engaged in physical exercise in your leisure time in the last month?

Daily	☐ 1	66 (14.3)
3-5 times per week	☐ 2	138 (29.8)
1-2 times per week	☐ 3	117 (25.3)
Occasionally	☐ 4	126 (27.2)
Never	☐ 5	16 (3.5)

61. How many times per week do you think you should exercise to promote heart health?

Daily	☐ 1	150 (32.4)
3-5 times per week	☐ 2	270 (58.3)
1-2 times per week	☐ 3	28 (6.0)
Occasionally	☐ 4	6 (1.3)
Never	☐ 5	0
Exercise does not promote heart health	☐ 6	1 (0.2)
Not sure	☐ 8	7 (1.5)
Missing	☐ 9	1 (0.2)

62. When you exercise, how much is strenuous enough to cause sweating or breathing heavy?

76-100 %	☐ 1	88 (19.0)	< 50 %	☐ 3	135 (29.2)
50-75 %	☐ 2	218 (47.1)	None of it	☐ 4	9 (1.9)
Missing	☐ 9	13 (2.8)			

63. Is it important to elevate your heart rate when exercising for heart health benefits?

Yes	☐ 1	306 (66.1)	Not sure	☐ 3	129 (27.9)
No	☐ 2	28 (6.0)			

64. If/when you exercise, how long do you exercise?

> 60 minutes	☐ 1	78 (16.8)
31-60 minutes	☐ 2	207 (44.7)
15-30 minutes	☐ 3	120 (25.9)
< 15 minutes	☐ 4	34 (7.3)
Not sure	☐ 8	22 (4.8)
Missing	☐ 9	2 (0.4)

65. How long do you think you should exercise in one session for heart health benefits?

> 60 minutes	☐ 1	30 (6.5)
31-60 minute	☐ 2	186 (40.2)
15-30 minutes	☐ 3	182 (39.3)
< 15 minutes	☐ 4	8 (1.7)
Time does not matter	☐ 5	9 (1.9)
Not sure	☐ 8	47 (10.2)
Missing	☐ 9	1 (0.2)

66. If you exercise regularly, why? *Check all that apply.*

I enjoy it	☐ 263 (56.8)	To lower risk of heart disease	☐ 91 (19.7)
To lose weight	☐ 214 (46.2)	My friends exercise	☐ 47 (10.2)
To maintain weight	☐ 161 (34.8)	To decrease stress	☐ 211 (45.6)
It is something to do	☐ 89 (19.2)		
Other, specify:_____			☐ 28 (6.0)
N/A, Missing			☐ 89 (19.2)

67. In what types of exercise do you take part? *Check all that apply.*

Aerobics	☐217(46.9)	Cycling	☐84(18.1)	Team sports	☐98(21.2)
Walking	☐410(88.6)	Weights	☐129(27.9)	Raquet sports	☐25(5.4)
Running	☐120(25.9)	Dancing	☐133(28.7)	Cardio equip	☐87(18.8)
Swimming	☐160(34.6)	Martial arts	☐8(1.7)		
Other, specify:_____					☐25(5.4)
Missing					☐8(1.7)

68. If you do not exercise regularly, what prevents you from exercising more? *Check all that apply.*

Lack of time	☐ 225 (48.6)	Lack of transportation to gym	☐32 (6.9)
Too expensive	☐ 62 (13.4)	Not interested	☐25 (5.4)
Intimidating	☐ 27 (5.8)	Do not know what to do	☐30 (6.5)
Other, specify_____			☐19 (4.1)
N/A, Missing			☐205 (44.3)

69. What are the benefits of exercise? *Check all that apply.*

It makes you more productive in other areas of your life	☐400 (86.4)
It improves general well-being	☐444 (95.9)
It decreases the risk of a heart attack	☐402 (86.8)
It decreases stress levels	☐415 (89.6)
It boosts self-esteem	☐415 (89.6)
Other, specify:_____	☐27 (5.8)

70. Do you intend to alter your exercise patterns in the next 12 months?

Yes	☐ 1	229 (49.5)
No	☐ 2	115 (24.8)
Not sure	☐ 8	117 (25.3)
Missing	☐ 9	2 (0.4)

SECTION 9 STRESS

71. Does stress negatively impact on your health?

Yes	☐ 1	372 (80.3)
No	☐ 2	31 (6.7)
Sometimes	☐ 8	58 (12.5)
Missing	☐ 9	2 (0.4)

72. How often do you feel very stressed?

Most of the time	☐ 1	86 (18.6)
Some of the time	☐ 2	306 (66.1)
Almost never	☐ 3	64 (13.8)
Never	☐ 4	0
Missing	☐ 9	7 (1.5)

73. Do you believe it is important to relax regularly?

Yes	☐ 1	461 (99.6)
No	☐ 2	0
Missing	☐ 9	2 (0.4)

74. Do you take time daily to relax?

Yes	☐ 1	356 (76.9)
No	☐ 2	104 (22.5)
Missing	☐ 9	3 (0.6)

75. If yes, how do you relax? *Check all that apply.*(N=463), (n=356)

Smoke	☐47(10.2), (13.2)	Talk to friends	☐286(61.8), (80.3)
Bathing	☐230(49.7), 64.6)	Exercise	☐154(33.3), (43.2)
Listen to music	☐260(56.2), (73.0)	Eat	☐113(24.4), (31.7)
Drink alcohol	☐45(9.7), (12.6)	Watch T.V.	☐280(60.5),(78.6)
Other, specify:_____			☐23(5.0), (6.5)
N/A			☐104(22.5)
Missing			☐3 (0.6)

76. If no, why don't you take time to relax? (N=463), (n=104)

Do not need to relax	☐ 1	2(0.4), (1.9)
No time	☐ 2	80(17.3), (76.9)
Other, specify:_____	☐ 3	13(2.8), (12.5)
N/A	☐ 99	356(76.9)
Missing	☐ 9	12(4.3)

77. What types of situations do you find stressful? *Check all that apply.*

Living away from home	☐	96 (20.7)
Writing exams	☐	414 (89.4)
Studying	☐	338 (73.0)
Conflicts with friends	☐	274 (59.2)
Feeling pressure to do well academically	☐	332 (71.7)
Worried that I am going to fail	☐	310 (67.0)
Other, specify:_____	☐	60 (13.0)
Missing	☐	1 (0.2)

SECTION 10 ORAL CONTRACEPTIVES

78. Have you ever been prescribed oral contraceptives?

Yes	☐ 1	290 (62.6)	
No	☐ 2	169 (36.5)	**(Go to question 83)**
Missing	☐ 9	4 (0.9)	

79. Are you presently taking oral contraceptives? (N=463), (n=291)

Yes	☐ 1	227 (49.0), (78.0)
No	☐ 2	64 (13.8), (22.0)
N/A	☐ 99	172 (37.1)

80. Indicate name of oral contraceptive _____(Table D5, page 188)

(N=463), (n=208)

81. When you were first prescribed oral contraceptives, did your doctor take your blood pressure? (N=463), (n=290)

Yes	☐ 1	226 (48.8), (77.9)
No	☐ 2	45 (9.7), (15.5)
Not sure	☐ 8	16 (3.4), (5.5)
N/A	☐ 99	176 (38.0), (60.7)

82. When you were first prescribed oral contraceptives, did your doctor discuss possible risk? (N=463), (n=290)

Yes	☐ 1	241 (52.1), (83.1)
No	☐ 2	37 (8.0), (12.8)
Not sure	☐ 8	9 (1.9), (3.1)
N/A	☐ 99	175 (37.8)
Missing	☐ 9	1 (0.2)

SECTION 11 EXPOSURE TO HEART HEALTH

83. Which of the following healthy living choices did your high school offer?
Check all that apply

Gym classes	☐	421 (90.9)	Not sure	☐	17 (3.7)
Health classes	☐	209 (45.1)	Low fat food	☐	60 (13.0)
Nothing	☐	21 (4.5)			
Other, specify:_____				☐	19 (4.1)
Missing				☐	1 (0.2)

84. Does your community offer any programs to increase awareness of heart health (such as cholesterol screening)?

Yes	☐ 1	140 (30.2)	
No	☐ 2	122 (26.3)	**(Go to question 86)**
Not sure	☐ 8	201 (43.4)	**(Go to question 86)**

85. What is offered? *Check all that apply.*(N=463), (n=140)

Blood pressure checks	☐ 103 (22.2), (73.6)
Exercise class	☐ 115 (24.8), (82.1)
Cholesterol screening	☐ 59 (12.7), (42.1)
Weight loss clinics	☐ 115 (24.8), (82.1)
Workshops to enhance heart health knowledge	☐ 51 (11.0), (36.4)
Healthy eating classes	☐ 54 (11.7), (38.6)
Diabetes education	☐ 56 (12.1),(40.0)
Smoking cessation	☐ 50 (10.8), (35.7)
N/A	☐ 322 (69.5)
Missing	☐ 2 (0.4)

86. Indicate which of the following topics related to healthy living you would be interested in learning more about? *Check all that apply.*

Blood pressure control	☐ 154 (33.3)	Healthy eating	☐ 358 (78.3)
Diabetes control	☐ 113 (24.4)	Cholesterol control	☐ 151 (33.0)
Weight control	☐ 323 (69.8)	Smoking cessation	☐ 72 (15.8)
Stress management	☐ 363 (78.4)	Physical fitness	☐ 328 (70.8)
Not interested	☐ 16 (3.5)	**(Go to question 90)**	
Other, specify:_____			☐ 4 (0.9)
Missing			☐ 6 (1.3)

87. Indicate which of the following sessions you would attend, if offered at MUN?

Type of session	would attend session 1	would not attend session 2	Not sure 8	Missing
Diabetes education	70 (15.1)	165 (35.6)	108 (23.3)	120(25.9)
Diabetes screening	103 (22.2)	141 (30.5)	103 (22.2)	116 (25.1)
Cholesterol education	107 (23.1)	117 (25.3)	124 (26.8)	115 (24.8)
Cholesterol screening	135 (29.2)	102 (22.0)	110 (23.8)	116 (25.1)
Healthy eating	318 (68.7)	27 (5.8)	60 (13.0)	58 (12.5)
Stress management	327 (70.6)	29 (6.3)	59 (12.7)	48 (10.4)
Smoking cessation	67 (14.5)	227 (49.0)	51 (11.0)	118 (25.5)
Blood pressure control	93 (20.1)	133 (28.7)	115 (24.8)	122 (26.3)
Blood pressure screening	116 (25.1)	116 (25.1)	103 (22.2)	128 (27.6)
General session on heart health	148 (32.0)	87 (18.8)	125 (27.0)	103 (22.2)

88. I would like to get some idea of which day of the week is most convenient for you to attend any or all of the sessions you would like to attend? *Check all that are convenient.*

Mon. ☐114(24.6) Wed. ☐119(25.7) Fri. ☐91(19.7) Sun. ☐165(35.6)

Tues. ☐171(36.9) Thurs. ☐178(38.4) Sat. ☐133(28.7) Miss. ☐28(6.0)

89. Which times of the day are most convenient? *Check all that apply.*

Morning	☐ 114 (24.6)	Evening	☐ 140 (30.2)
Afternoon	☐ 173 (37.4)	Variable	☐ 112 (24.2)
Missing	☐ 28 (6.0)		

90. If you are not interested in attending any sessions, why? *Check all that apply.*

I am not interested	☐ 23 (5.0)
I am too busy with school	☐ 64 (13.8)
I am young and this does not affect me	☐ 6 (1.3)
I am too busy with other responsibilities	☐ 32 (6.9)
Transportation is difficult	☐ 17 (3.7)
Other, specify:_____	☐ 4 (0.9)
N/A	☐ 383 (82.7)

SECTION 12 DEMOGRAPHICS

91. How tall are you without shoes?

__feet __inches __metres (See Table 2, page 46 for BMI)

92. Approximately how much do you weigh?

__pounds __kilograms (See Table 2, page 46 for BMI)

93. At the present time, are you:

Living with your parents	☐ 1	185 (40.0)
Living in residence	☐ 2	57 (12.3)
Living on your own in an apartment or house	☐ 3	73 (15.8)
Sharing a house/apartment	☐ 4	132 (28.5)
Other, specify_____	☐ 5	15 (3.2)
Missing	☐ 9	1 (0.2)

94. Where do you live when not attending MUN?

St. John's	☐ 1	196 (42.3)
Avalon Peninsula	☐ 2	99 (21.4)
West of Avalon Peninsula to Gander	☐ 3	50 (10.8)
West of Gander	☐ 4	62 (13.4)
Nothern Peninsula/Labrador	☐ 5	24 (5.2)
Outside of province	☐ 6	22 (4.8)
Missing	☐ 9	10 (2.2)

95. If you live in NF, when not attending MUN, please indicate the first three numbers in Your home telephone number following 709.

__/__/__

96. In what year were you born?

19__ (See Table 2, page 46)

97. Indicate the highest educational level obtained by your father and mother?

Educational level	Father	Mother
< high school	104 (22.5)	90 (19.4)
Completed high school	70 (15.1)	94 (20.3)
Some post-secondary	86 (18.6)	92 (19.9)
Completed post-secondary	178 (38.4)	172 (37.1)
Not sure	20 (4.3)	12 (2.6)
Missing	5 (1.1)	3 (0.6)

98. In what year of post- secondary education are you presently enrolled?

____ (See Table 2, page 46)

99. Indicate which of the following best describes your student status?
(*Choose one answer only*)

Undergraduate Arts	☐ 1	110 (23.8)
Undergraduate Science	☐ 2	102 (22.0)
Professional schools		
- Health related: Medicine, Nursing, Pharmacy, Social Work	☐ 3	156 (33.7)
Professional Degree Programs		
- Non-health related: Business, Engineering, Education	☐ 4	95 (20.5)
Other, specify:_____	☐ 5	0

100. In addition to studying, are you working at a job?

Yes	☐ 1	144 (31.1)	**(Go to question 101)**
No	☐ 2	317 (68.5)	
Missing	☐ 9	2 (0.4)	

101. How many hours per week do you work at your job?

___hours (See Table 2, page 46)

Thank you for your cooperation !

The tables presented here, D1-D5 provide results that are not contained in the body of the questionnaire.

Table D1

Blood Pressure Readings (Q12)

Blood pressure reading	number (n)	Percentage (%), N=463	Percentage (%), n=109
Systolic			
< 140 mmHg	105	22.7	96.3
≥140 mmHg	4	0.9	3.7
Missing	4	0.9	3.7
N/A	350	75.6	
Diastolic			
< 90 mmHg	104	22.5	95.4
≥ 90 mmHg	5	1.1	4.6
Missing	4	0.9	3.7
N/A	350	75.6	

Table D2

Age of Diagnosis: Diabetes (Q21)

Age of Diagnosis of Diabetes (Years)	number (n)	Percentage (%) N=463	Percentage (%) N=8
2	1	0.2	12.5
12	1	0.2	12.5
14	1	0.2	12.5
16	2	0.4	25
17	1	0.2	12.5
Missing	2	0.4	
Not Applicable	455	98.3	

Table D3

Number of Cigarettes Smoked per Day (Q50)

# Cigarettes	number (n)	Percentage (%) N=463	Percentage (%) N=81
1-10	68	14.7	84
11-25	11	2.4	13.6
≥ 26	2	0.4	2.5
Missing	3	0.6	
N/A	377	81.4	

Table D4

Age of Initiation of Smoking (Q51)

Age	Number (n)	Percentage (%) N=463	Percentage (%) n=94
4-10	15	3.2	16
35748	36	7.8	38.3
16-21	43	9.3	45.7
Missing/ N/A	369	79.7	

Table D5

Name of Oral Contraceptives (Q80)

Oral Contraceptive	Number (n)	Percentage (%) N=463	Percentage (%) n=208
Triphasil	42	9.1	20.2
Triquilar	27	5.8	13
Marvelon	26	5.6	12.5
Ortho 777	20	4.3	9.6
Loestrin	14	3	6.7
Tricyclin	14	3	6.7
Unspecified	12	2.6	5.8
Minovral	11	2.4	5.3
Cyclin	9	1.9	4.3
Synphasic	6	1.3	2.9
Demulin	4	0.9	1.9
Brevicon	1	0.2	0.5
Orthocept	22	4.8	10.6
Missing/ N/A	255	55.1	

APPENDIX E

This section details which questions have been collapsed and the manner in which they have been collapsed to facilitate statistical analysis.

The knowledge questions examined included: Q2 variables 1-9, Q17,Q31, Q41, Q57, Q61, Q62, Q65, Q69, and Q71. The behaviour questions examined included: Q9, Q18, Q27, Q32, Q34, Q35, Q60, Q63, Q64, and Q74.

In each table, questions that were collapsed to facilitate use of the chi square statistic are noted by the abbreviation (c), following the relevant question (c). The following questions are those used to examine associations. Only those relationships (significant or not) that satisfy criteria for use of the chi square statistic (each cell must have a expected value of five or greater) are detailed.

Questions that were collapsed were done so in one of the following ways, which are detailed below.

Type 1: In the following questions the possible responses included: yes, no, and not sure. No and not sure were collapsed to form one category, if necessary. These questions included: Q1, Q3, Q5, Q6, Q9, Q13, Q18, Q27, Q32, Q81, and Q82.

Type 2: In question 2, variables 1-3 and 5-9, the categories decrease risk and no effect were excluded in looking at knowledge with respect to associations because the number of respondents in those two categories was negligible.

Type 3: Question 4 consisted of eight separate variables. Each was summed to compute one score- number of relatives with CVD in total.

Type 4: In the following knowledge questions, subjects were asked to check all the relevant answers. Each respective answer was coded as a separate variable. In order to generate a 'knowledge' score, all correct variables were summed. These questions included: Q17, Q31, Q41, Q56, and Q69.

Type 5: The following questions were collapsed to generate fewer categories, to facilitate use of the chi square statistic. These questions included: Q33, Q34, Q35, Q60, Q61, Q62, Q64, and Q65.

APPENDIX F

The following tables illustrate associations described in the Results section.

Table F1

Relationship between Knowledge and Behaviour with Respect to Blood Pressure

Knowledge Question	Behaviour Question	P value
Effect Hypertension has on development of CVD (c)	Blood Pressure measured in the past (c)	0.41
Effect Hypertension has on development of CVD (c)	Intention to have BP checked in the next 12 months (c)	0.06
Measures one can take to control Blood Pressure (c)	Blood Pressure measured in the past (c)	0.17
Measures one can take to control Blood Pressure (c)	Intention to have Blood Pressure checked in the next 12 months (c)	0.02

Table F2

Relationship between Knowledge and Behaviour with Respect to Cholesterol

Knowledge Question	Behaviour Question	p value
Effect high cholesterol in the blood has on the development of CVD (c)	Cholesterol measured in the past (c)	0.26
Effect high cholesterol in the blood has on the development of CVD (c)	Intention to have cholesterol measured in the next 12 months (c)	0.3
Effect HDL in the blood has on the development of CVD (c)	Cholesterol Measured in the past (c)	0.08
Effect HDL in the blood has on the development of CVD (c)	Intention to have cholesterol measured in the next 12 months (c)	0.9
Measures one can take to control cholesterol (c)	Cholesterol measured in the past (c)	0.51
Measures one can take to control cholesterol (c)	Intention to have cholesterol measured in the next 12 months (c)	0.83

Table F3

Relationship between Knowledge and Behaviour with Respect to Eating

Knowledge Questions	Behaviour Questions	p value
Effect excess salt has on development of CVD (c)	Frequency of adding salt to food	0.01
Health problems related to consumption of too much fat in the diet (c)	Do you consider ingredients prior to eating something (c)	0.03
Health problems related to consumption of too much fat in the diet (c)	Plans to alter one's diet in the next 12 months	0.54
Effect of a high fat diet on development of CVD (c)	Frequency of eating high fat food in one week	0.14

Table F4

Relationship between Knowledge and Behaviour with Respect to Smoking

Knowledge Question	Behaviour Question	p value
Effect smoking has on the development of CVD (c)	Smoking habits at the present time	0.23
Can health problems associated with smoking be reversed	Smoking habits at the present time	0.24
Health problems associated with smoking (c)	Smoking Habits at the present time	0.35

Table F5

Relationship between Knowledge and Behaviour with Respect to Exercise

Knowledge Question	Behaviour Question	p value
Number of times per week one should exercise to promote heart health (c)	Frequency of exercise sessions (c)	0
time one should exercise to promote heart health (c)	Length of time spent exercising (c)	0
Percentage of exercise session that is strenuous(c)	Is it important to elevate heart rate for heart health benefits (c)	0.31
Benefits of exercise (c)	Length of time spent exercising (c)	0.03

Table F6

Relationship between Knowledge and Behaviour with Respect to Stress

Knowledge Question	Behaviour Question	p value
Does stress negatively impact on your health	Taking time to relax daily	0.02
Effect of excess stress on development of CVD	Taking time to relax daily	0.06

Table F7a

Relationship between Family History and Behaviour

Family History	Behaviour Question	p value
Family history of CVD (c)	Cholesterol measured in the past (c)	0.01
Family history of CVD (c)	Intention to have cholesterol measured in the next 12 months (c)	0
Family history of CVD (c)	Percentage of exercise sessions strenuous enough to cause sweating/breathing heavy (c)	0
Family history of CVD (c)	Blood Pressure measured in the past (c)	0.11
Family history of CVD (c)	Intention to have BP measured in the next 12 months (c)	0.05
Family history of CVD (c)	Do you consider ingredients prior to eating something (c)	0.49
Family history of CVD (c)	Frequency of adding salt to food (c)	0.71
Family history of CVD (c)	Frequency of eating high fat food (c)	0.38
Family history of CVD (c)	Length of exercise sessions (c)	0.43
Family history of CVD (c)	Taking time daily to relax	0.52

Table F7b

Relationship between Number of Family Members with CVD and Behaviour

Family History	Behaviour Question	p value
Number of family members with CVD (c)	Intention to have BP measured in the next 12 months (c)	0.51
Number of family members with CVD (c)	Cholesterol measured in the past (c)	0.86
Number of family members with CVD (c)	Intention to have cholesterol measured in the next 12 months (c)	0.67
Number of family members with CVD (c)	Smoking habits at present	0.24
Number of family members with CVD (c)	Percentage of exercise sessions, strenuous enough to cause sweating/breathing heavy (c)	0.13
Number of family members with CVD (c)	Taking time daily to relax	0.05

Table F8a

Results of the Kruskal-Wallis Statistic for Determining Differences among Geographic Groups with Respect to Knowledge

Knowledge: Effect each of the following has on development of CVD	**p value**	**Knowledge Question**	**P value**
Diet high in fat (c)	0.15	Measures one can take to control BP (c)	0.43
High cholesterol in the blood (c)	0.51	Measures one can take to control cholesterol (c)	0.62
Excess salt in the diet (c)	0.54	Health problems related to consumption of too much fat in the diet (c)	0.48
HDL in the blood (c)	0.37	Health problems associated with smoking (c)	0.07
Hypertension (c)	0.02	Number of times per week one should exercise to promote heart health (c)	0.32
Excess stress (c)	0.47	Length of time one should exercise to promote heart health (c)	0.56
Smoking (c)	0.31	Benefits of exercise (c)	0.54
Overweight (c)	0.76		
Family history (c)	0.45		

Table F8b

Results of the Kruskal- Wallis Statistic for Determining Differences among Geographic Groups with Respect to Behaviour

Behaviour	p value	Behaviour Question	p value
Do consider ingredients prior to eating something (c)	0.45	Frequency of exercising	0.25
Frequency of adding salt to food (c)	0.85	Length of exercise sessions	0.96
Frequency of eating high fat food (c)	0.39	Percentage of exercise sessions, strenuous enough to cause sweating/breathing heavy (c)	0.19

Table F9a

Results of the Kruskal-Wallis Statistic for Determining Differences among Academic Groups with Respect to Knowledge

Knowledge	p value	Knowledge Question	p value
Effect of high fat on development of CVD	0.14	Effect of overweight on CVD	0.73
Effect of high cholesterol on CVD	0.28	Effect of family history on CVD	0.66
Effect of excess salt on CVD	0.65	Measures one can take to control Blood Pressure (c)	0.002
Effect of HDL on CVD	0.01	Measures one can take to control cholesterol (c)	0.44
Effect of Hypertension on CVD	0.53	Health problems related to consumption of too much fat in the diet (c)	0.32
Effect of excess stress on CVD	0.58	Health problems associated with smoking (c)	0.02
Effect of smoking on CVD	0.95		

Table F9b

Results of the Kruskal-Wallis Statistic for Determining Differences among Academic Groups with Respect to Behaviour

Behaviour	p value	Behaviour Question	p value
Do you consider ingredients prior to eating something (c)	0.43	Frequency of B exercising in the last month (c)	0.24
Frequency of adding salt to food (c)	0.75	Length of exercise sessions (c)	0.08
Frequency of eating high fat food (c)	0.01	Importance of elevating heart rate for heart health benefits	0.91

Table F10

Relationship between Use of Oral Contraceptives and Behaviour

1) Taking OC's or 2) MD discussing risks	Behaviour Question	p value
MD discussing risks (c)	MD taking BP when prescribing OC's (c)	0
Presently taking OC's	Smoking at present	0.37
MD discussing risks (c)	Smoking at present	0.67

Table F11

Relationship between Family History and Perceived Susceptibility

Family History	Perceived Susceptibility	p value
Family history of CVD (c)	Belief that CVD can be prevented (c)	0.81
Family history of CVD (c)	Concern about CVD and risk factors (c)	0
Family history of CVD (c)	Belief that present health behaviours will affect future health (c)	0.01
Family history of CVD (c)	Likelihood of developing CVD at present age	0.01
Number of family members with CVD (c)	Concern about CVD and its risk factors (c)	0.13
Number of family members with CVD (c)	Likelihood of developing CVD at present age	0.4