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Exercise Counselling By Family Physicians In Canada

By

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A THESIS

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ABSTRACT

The purpose of this study was to assess physician confidence, knowledge, current practice, exercise habits and barriers related to the counselling of exercise by family physicians in Canada.

A two-page questionnaire was created and a pre-test was conducted with 13 local family physicians. The national study was a cross-sectional survey that included a random selection of family physicians in six provinces, with a 61.2 % response rate or final n = 330.

Data analysis revealed only 12.1 % of family physicians provided exercise prescriptions that met American College of Sports Medicine (ACSM) recommendations, 9.7 % felt very knowledgeable in exercise counselling, and 11.8 % counselled 75-100 % of patients about exercise. A total of 22.4 % of family physicians exercised according to ACSM guidelines. Barriers cited as important included insufficient exercise education in postgraduate training and not enough time to counsel.

Several areas of sub-optimal exercise counselling by family physicians in Canada were identified. Future exercise counselling educational opportunities for physicians (during and after training) are necessary. More objective research including the use of standardized patients is required.

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DEDICATION

This thesis is dedicated to my husband Robin, for his unconditional support in every adventure I undertake. He genuinely appreciates my intellectual cravings for art and science and the curiousity that accompanies them. Above all, he treats me with the highest respect and fills my life with love.

To all the teachers in my life who have inspired me and treated me with respect, thank-you.

To Mom and Dad in The Pas, Manitoba, thanks for encouraging me to do work to help others. This degree comes with a book!

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1.1 Overview of the Research Problem

Despite the overwhelming evidence that physical activity is beneficial to those with or without an existing health condition, only two in five of Canadians are active enough to benefit their cardiovascular health.[1] More North Americans are at risk for heart disease from inactivity than any other risk factor.[2,3] Therefore, increasing the level of activity in the population has the potential to greatly reduce the incidence of cardiovascular disease.

Family physicians in Canada are in an ideal position to promote exercise. Up to 95% of Canadians consider their family physician the health professional they consult first.[4] However, exercise counselling and exercise physiology are not part of standard medical school curricula in Canada. Little information exists on whether family physicians are actually counselling their patients regarding exercise.

Currently, there are no Canadian studies that look at family physician exercise counselling on a national scale. It is important to establish current physician exercise counselling habits, knowledge, beliefs and barriers instead of assuming physicians are engaging in this practice. The results of this study may also raise new questions and lead to the study of exercise counselling interventions.

1.2 Purpose of the study

The purpose of this study is to assess current practice, desired practice, physician confidence, and barriers related to the counselling of exercise by family physicians in Canada by use of a pre-tested questionnaire.

1.3 Specific aims

1) To determine the proportion of family physicians that exercise counsel their patients and the level of confidence and knowledge that they feel they possess in exercise counselling.

2) To evaluate how important family physicians consider exercise and exercise counselling for different ages and health groups.

3) To evaluate the content of written exercise prescriptions and determine how frequently various counselling techniques are used.

4) To determine the proportion of family physicians that exercise according to American College of Sport Medicine (ACSM) recommendations.

5) To determine which barriers to exercise counselling are considered important by family physicians.

6) To determine the variables that are associated with physicians who counsel > 50% of their patients.

1.4 Significance

With an aging Canadian population, chronic disease is increasing and health care costs are escalating. If this study found that primary care physicians were exercise counselling in high quantity and quality, then the reasons why patients have not followed physician advice should be explored. If counselling was not optimal, then new strategies/educational tools can be designed. If physicians identified lack of training as a

barrier, then this lack of education has implications regarding the addition of exercise counselling education to medical training. If lack of time and lack of reimbursement were identified as barriers, then physician payment will have to be addressed. This project generated the first Canadian evidence in this field. This study had the potential to provide a unique insight into the state and quality of a part of preventive medicine in the current Canadian health care system.

1.5 Project objectives

1.5.1 To Develop and Pre-test an Exercise Counselling Questionnaire

- A questionnaire was designed specifically for this study and evaluated for validity and reliability.

1.5.2 To Conduct a National Study of Family Physicians Using the New Questionnaire

- Family physicians in six provinces in Canada were surveyed by mail.

1.5.3 Answer Specific Research Questions Pertaining to Exercise Counselling by Family Physicians

- The specific aims were addressed using data from the questionnaires.

This chapter is followed by a review of the current literature pertaining to exercise recommendations and exercise counselling by family physicians. The questionnaire design and pre-test will then be addressed, followed by the national study results, discussion and conclusions.

CHAPTER 2: CURRENT KNOWLEDGE

2.1 Introduction

Exercise counselling by family physicians is a relatively new research area. Research work in this field began in the early 1980s. This section will first define terms used in this study, examine the evidence for exercise in various populations and explore previous exercise counselling studies that have been done with family physicians.

2.2 Definition of Terms

In order to understand what exercise means it is important to define physical activity. *Physical activity* is bodily movement that is produced by the contraction of skeletal muscle that increases energy expenditure above the basal level.[5] *Exercise* is planned, structured, and repetitive bodily movement done to improve or maintain one or more components of physical fitness.[5] It is considered to be a subcategory of *physical activity*.[5] *Exercise* refers to planned physical activity sessions such as jogging or playing a game of basketball. *Physical activity* can include activities such as walking to the mailbox or climbing a flight of stairs in addition to jogging and basketball. *Physical activity* includes more everyday activities than exercise and thus, it may be easier for people to engage in *physical activity*. Many health benefits can be achieved through regular *physical activity* and do not require *exercise*.[6] *Physical activity* has become the preferred term used by fitness/exercise researchers because it has health benefits and includes daily activities that may attract more people to regular bodily movement.[5]

Although some studies [7] have used the phrase "physical activity" exclusively, the investigator felt that exercise was a more familiar term with family physicians than physical activity. Thus, exercise is the predominant word used in the study. Certainly, for the purpose of communication with patients, exercise is a term both patients and physicians understand, be it walking or playing a game of tennis. For this project, exercise is specifically defined as continuous physical activity. The definition was not provided to physicians in more detail since this definition would have provided them with answers to questions in the questionnaire. In addition, most research so far has examined the health effects of endurance type physical activity, which meets this study's definition of exercise.

There is not a universal definition of *exercise counselling* in the field of primary care medicine. Frequently, what constitutes counselling has not been explained in studies. Even the Canadian Task Force on the Periodic Health Examination [8] had a chapter on physical activity counselling but did not define this term.

For this study exercise counselling was clearly stated as the encounter where:

- a physical activity history is taken from the patient;
- a physical exam and/or fitness testing is done if necessary; and
- an exercise prescription is given to the patient.

This definition was created by the investigator based on the general approach a family physician would take to a patient and their presenting problem. It was meant to be a broad description so that answers to parts of the questionnaire were not provided to the physicians in advance.

It is important to note that for this study, *family physicians* included both general practitioners and family physicians (Certificants of The College of Family Physicians of Canada or CCFP). This term was chosen instead of *primary care physicians* because some internists and pediatricians also consider themselves to be primary care physicians which may create some confusion as to which group is being studied.

2.3 Physical Activity Benefits and Recommendations

2.3.1 General

The evidence that regular physical activity is beneficial to human beings with or without a medical condition is growing. Numerous studies have shown that regular physical activity has a role in the prevention and control of many chronic diseases. [9-21] Furthermore, a more positive affect, stimulation of creative thinking, increased energy, reduced stress, enhanced self esteem and quality of life are also by-products. [5,22] It also reinforces other positive lifestyle changes such as healthier eating habits and smoking cessation.[22] Physically active people over the age of 45 are less likely to experience disability or long term activity limitation or to need physicians' services. [23]

2.3.2 Mortality

Exercise studies gained recognition in the 1980s when several projects [10,24,25,26,27] examined physical activity levels and subsequent mortality. These studies [10,24,25,26,27] recorded physical activity levels of men, age 22 and up and then followed the subjects over time for mortality. The longest follow-up was over a period of 20 years in the US

Railroad study by Slattery and Jacobs. [26] All of the above studies demonstrated a relative risk of up to two times of dying in sedentary men versus physically active men over time. They also confirmed that less active men have an increased risk of any cause mortality.

In 1989, Blair [9] included both men and women in a prospective study that evaluated physical fitness and subsequent mortality. This was one of the first studies to evaluate physical fitness by maximal treadmill testing compared to the previous self-report method of physical activity levels. This project again confirmed that low fitness level resulted in an increased risk for all-cause mortality. [9] Literature in the 1990s reflected a shift to establish a stronger causal relationship between physical activity and mortality by looking at changes in level of activity over time and subsequent mortality (a dose-response effect). These studies have shown a decrease in death rate if subjects change from a sedentary state to a moderately active lifestyle. [28,29,30] Although higher levels of physical fitness or vigorous physical activity result in the greatest risk reduction, the largest drop in reduction occurs when subjects change their activity from sedentary to moderately active.

2.3.3 General recommendations

The American College of Sports Medicine (ACSM) has developed exercise prescription guidelines for adults with the most recent edition published in 1995. The majority of studies thus far in exercise counselling have used these recommendations. These include 3-5 days/week of continuous aerobic activity, 20-60 min. duration, with an intensity of 60-90% of maximum heart rate or 50-85% of VO2 max (maximum oxygen consumption). Resistance training has also been recommended at least 2 days/week,

beginning with 8-10 exercises that train the major muscle groups with one set of 8-12 repetitions. [31]

However, more recent studies have shown cardiovascular benefits from exercise at less intensity. The ACSM and The Center for Disease Control have recommended accumulated, moderate intensity physical activity totaling a minimum of 30 minutes on most (preferably all) days of the week for adults. [5,6,32] There has been ongoing debate in the exercise science/sport medicine community as to whether these new recommendations should replace the prior guidelines. Therefore, in this study, both sets of recommendations were considered as correct in order to reflect current reality regarding this issue.

2.3.4 Age

This project asked physicians to answer questions regarding the importance of age, exercise and exercise counselling. Estimates are that by the year 2030, almost 25% of the Canadian population will be age 65 and older.[33] Therefore, it was important to note literature that is specific to age. Although there is a decline of VO2 max with age, active older persons can maintain high levels of cardiovascular and metabolic function including VO2 max. [34] Progressive resistance exercise in the elderly has lead to strength gains of more than 100% over a ten week period, [35] which contributes to prolonged independent living.

Healthy children should be encouraged to engage in physical activity on a regular basis. [31] Physically active children have been shown to have higher HDL-C versus their inactive counterparts. [5] Active children also have lower blood pressure versus inactive

children, which is partly explained by a lower BMI (body mass index). [36] In Canada, inactivity in children is a significant problem with 2/3 of children not sufficiently active for optimal growth and development and 25% classified as being overweight. [37] Family physicians cannot assume children are active, so exercise counselling is important.

2.3.4.a Age recommendations

The general recommendations noted previously apply to adults who are healthy. The ACSM has provided recommendations for the elderly but they do not state an age when these guidelines become effective. This lack of guidelines is attributable to the fact that physiological aging does not occur uniformly across the population with chronological age.[31] The Canadian Periodic Health Examination has acknowledged the numerous benefits of exercise in the elderly but has only cited exercise counselling as a B (fair evidence) recommendation. [33] Certainly, there is ample reason to exercise counsel elderly patients and the importance of this issue should not diminish because the patient happens to be "older".

The ACSM also provides safety guidelines for aerobic exercise and resistance training for children, [31] but these are not written as official recommendation statements.

2.3.5 Health conditions

An explosion of research has recently occurred regarding exercise and different medical conditions. Since healthy adults have been shown to prolong their lives through regular physical activity, the obvious shift in research is now to those who live with a chronic illness or a temporary health condition. Studies have been done that look at the

role of physical activity in prevention of chronic illness and in secondary prevention of deterioration or complication(s) of the condition. Numerous conditions such as osteoporosis have been studied in relation to exercise, but only those covered in this project will be addressed in this section. A brief review of the literature on the relationship between physical activity and the health condition will be presented, along with any current exercise prescription recommendations.

2.3.5.a Ischemic Heart Disease

Cardiovascular disease (CVD) includes primarily coronary heart disease (CHD) and stroke. This thesis uses the term ischemic heart disease (IHD) as an equivalent to coronary heart disease. More North Americans are at risk for coronary heart disease from physical inactivity than any other risk factor. [2,3] A total of 25% of CVD deaths in Canada are the direct result of sedentary living. [37]

Many exercise and mortality studies [9,10,24,30,38,39,40,41,42] have recorded the onset of non-fatal cardiovascular disease cases. An inverse association and a dose-response relationship between level of physical activity and risk of CVD outcome has been revealed.[10,38,39,40] When physical fitness measurement was used instead of physical activity reports, again an inverse dose-response relationship was found between the level of fitness and CVD mortality or non-fatal CHD events. [9,24,30,41,42]

As well, it is important to note that very few prospective studies have explored the relationship between women, physical activity and CHD incidence or events. Thus far, results from such studies have been equivocal. [43,44,45,46]

2.3.5.a.(i) Ischemic Heart Disease Recommendations

Overall, regular physical activity has been recommended for patients with stable, non-acute, ischemic heart disease if no concerns are found on an exercise stress test. [31,47] The evaluation of cardiac risk factors has played a role in IHD recommendations. Cardiac risk factors are considered to be: age (men>45 years, women>55 years or premature menopause without HRT), family history (MI or sudden death before 55 years in father or other male first-degree relative or before 65 years of age in mother or other female first-degree relative), current cigarette smoking, hypertension, hypercholesterolemia (≥ 5.2 mmol/L or HDL <.9 mmol/L), diabetes mellitus and physical inactivity (sedentary jobs and no regular exercise or active recreational pursuits). [31] Exercise recommendations for those with one cardiac risk factor are the same as for a healthy person. [31,47]

The American College of Sports Medicine has suggested that people with two or more cardiac risk factors or one or more signs/symptoms of cardiopulmonary disease that want to engage in an exercise program (especially if vigorous exercise, >60%VO2 max) should have a medical examination and a clinical exercise test (supervised by a physician), prior to engaging in a program. This also applies to asymptomatic men > age 40 or women > age 50. [31] Generally, the greater the number of risk factors, the higher the pre-test probability of cardiac disease. [48,49] Also, it is important to note the decreased specificity of exercise stress testing in pre-menopausal women. [48,49]

2.3.5.b Hypertension

As mentioned above, hypertension is a risk factor for cardiac disease. It can lead to numerous other medical problems including stroke, aneurysms, renal failure and retinopathy. [5,47] Several population cohort studies [50,51,52,53] have been done in both men and women that show anywhere from a 30-52% higher risk of developing hypertension in those less active or with low cardiorespiratory fitness. These studies did not include minority populations. After 30-45 mins. of moderate intensity exercise in a person with hypertension, a drop in systolic blood pressure occurs by 10-20 mmHg within the first three hours post-exercise. Endurance training over time has resulted in an average reduction of 10 mmHg in both systolic and diastolic blood pressure in stage 1 or 2 hypertension. [54,55,56]

2.3.5.b.(i) Hypertension recommendations

The ACSM has recommended regular aerobic exercise (40-70% VO2 max, 3-7 days/week, 30-60 mins./session) to prevent the incidence of high blood pressure and as a definitive or adjunctive therapy in established hypertension. [47] Resistance training has also been recommended in combination with aerobic activity using only low resistance and high repetitions since heavy resistance exercise elicits a pressor response (acute increases in blood pressure). [47] If a person has an additional cardiac risk factor besides hypertension then they will require a medical examination and exercise stress test.

2.3.5.c Hypercholesterolemia

High blood cholesterol level or hypercholesterolemia is a cardiac risk factor that also can be attenuated with regular physical activity. Two studies [57,58] have shown an improved lipid profile that lasts for several days after a single exercise episode. In contrast, numerous studies [59,60-64] have been done examining the effect of regular physical activity on blood lipid levels. These have confirmed that for both men and women, exercise training results in an increase in HDL-C with a dose-response relationship (as exercise increases, HDL-C increases). This change is further augmented by weight loss, a low fat diet, and a decrease in adiposity. [47]

2.3.5.c.(i) Hypercholesterolemia Recommendations

Exercise is a recommended adjuvant therapy for hypercholesterolemia. Since moderate intensity has been shown to increase HDL-C by a similar amount as vigorous exercise, [64] exercise recommendations for hypercholesterolemia are the same as for a healthy individual with intensity at 40-70% of VO2 max. If other cardiac risk factors are present, further medical evaluations are required as previously mentioned.

2.3.5.d Obesity

Obesity is a condition of excess body fat, where persons weigh more than 20% higher than their desirable weight or have a body mass index (BMI) of >27.0 kg/m^2. [47] A total of 31% of Canadians are obese and while there is a decrease in men over age 65, the rate rises for women ages 65-74. [65] Obesity is a major factor in the development of Type

II diabetes mellitus and presents an increased risk for CHD, hypertension, osteoarthritis, dyslipoproteinemia, various cancers and all-cause mortality.[66-68] Obesity is not considered to be an independent risk factor for CAD because its effects are exerted through other risk factors.[31]

It is unclear whether there is a causal relationship between physical inactivity and obesity. There have been a handful of prospective studies that confirm an inverse relationship between physical activity and weight gain.[69,70] Other studies have not shown this relationship for men.[71,72] The question still exists as to whether weight gain leads to physical inactivity or physical inactivity leads to weight gain.[5] Overweight children tend to remain overweight as adults[73] which puts them at increased risks for the same diseases as adults outlined above.[74]

2.3.5.d.(i) Obesity Recommendations

The ACSM exercise prescription for obesity is virtually the same as for healthy adults except duration is 40-60 min. per session.[47] It is still not known definitively whether two divided sessions per day will result in a higher total energy expenditure vs. one long session. Physical activity has been recommended for obesity because it increases non-resting energy expenditure which, along with decreasing caloric intake, leads to weight reduction.[5]

2.3.5.e Type II Diabetes Mellitus

In Canada, 12% of men and 9% of women over the age of 55 have Type II diabetes.[65] This number will likely increase as the proportion of seniors in the population continues to climb. Weight gain leads to the insulin resistance, hyperinsulinemia, and glucose intolerance which are the hallmarks of Type II diabetes. The disease usually occurs after age 40 and at least 80% of patients are obese.[5]

Prospective cohort studies[75,76,77] have shown that physical activity protects against the development of Type II diabetes. Two of these studies,[75,77] displayed an inverse dose-response relationship between physical activity and the development of Type II diabetes (less physical activity, increased incidence of diabetes). Exercise training results in improved insulin sensitivity, especially in the earlier stages of the disease before insulin is required and also leads to weight reduction.[47]

2.3.5.e.(i) Type II Diabetes Mellitus Recommendations

Exercise is recommended along with diet and medication to improve blood glucose control in Type II diabetes. The exercise prescription is the same as for a healthy adult but with special precautions regarding hypoglycemia, retinopathy, illness, ketosis and fluid intake.[47]

2.3.5.f Osteoarthritis

Osteoarthritis (OA) results in degeneration of joint cartilage and new bone growth around the joint. In Canada 10% of the population has OA (85% by age 70), and it is the

most common cause of lost time from work and leisure activity.[78] Regular physical activity of moderate intensity can raise pain thresholds, improve energy levels, relieve symptoms and improve function in persons with OA.[79,80]

2.3.5.f.(i) Osteoarthritis Recommendations

The ACSM recommendations for aerobic exercise are very similar as to those for a healthy person except that higher impact activities are not recommended and session duration should start at 5 mins., then build up to 30 mins.[47]

2.3.5.g Cigarette smoking

This behaviour is a definite risk factor for CVD. [5,31,65] Approximately 25% of the Canadian population smokes and this figure increases to 35% in the 18-44 year age group. [65] A total of 21% of deaths in Canada were due to smoking in 1991.[65] It has been found that smokers who exercise regularly report more confidence in their ability to refrain from smoking versus those who do not exercise on a regular basis.[81] A physically fit smoker has more than a 40% decrease in mortality risk compared to an unfit smoker, [30] or an unfit non-smoker. [82]

2.3.5.g.(i) Smoking Recommendations

There are no specific exercise recommendations for cigarette smoking.

2.3.5.h Depression

Persons who are inactive are twice as likely to have symptoms of depression compared to more active persons.[5] However, there has been no evidence to show that inactivity leads to depression. Dose-response studies [83,84] are few in number but thus far show more depressive symptoms or diagnosed depression in less active men versus highly active men. These studies [83,84] have lacked frequent follow-up so it is unknown if depressive symptoms and activity levels fluctuated during the study periods. There have been cross-sectional studies such as the Canadian study by Stephens and Craig in 1990,[85] that show an inverse relationship between physical activity and symptoms of depression.

2.3.5.h.(i) Depression Recommendations

There are no current exercise recommendations specifically for depression.

2.3.5.i Stress

There have been studies [86,87] that show reduced perceived stress and anxiety with regular physical activity in those with or without a mood disturbance . A reduction in anxiety can occur for up to six hours following a session of physical activity.[88] Many studies have equated stress with anxiety which is controversial. Anxiety is defined as "a feeling of apprehension, uncertainty and fear without apparent stimulus, associated with physiological changes" [89] Stress is " the sum of the biological reactions to any adverse stimulus, physical, mental, or emotional, internal or external, that tends to disturb an organism's homeostasis" [89] The main difference between stress and anxiety is that with

stress there is an identifiable adverse stimulus. Overall, the research in this area is still growing and no evidence currently exists of any dose-response relationships.

2.3.5.i.(i) Stress Recommendations

There are no specific exercise recommendations for persons suffering from stress.

2.3.5.j Pregnancy

Exercise during pregnancy in normal, healthy women has not been shown to adversely affect fetal growth and development [90] There has been no evidence that pregnant women need to exercise because they are pregnant, but regular exercise may result in a decreased risk of pre-eclampsia and other complications. [90]

2.3.5.j.(i) Pregnancy Recommendations

The American College of Obstetricians and Gynecologists has recommended that women who were exercising prior to their pregnancy continue to do so (with a few exceptions) and those who want to start an exercise program do so in the second trimester. [91]

2.4 Exercise Counselling by Family Physicians

2.4.1 Introduction

It has been estimated that 75% of the population has contact with a primary care physician on a yearly basis.[92] Up to 95% of Canadians consider their family physician the health professional they consult first.[4] Family physicians are a resource and already

counsel the public in many areas of preventive medicine. They have ongoing relationships with patients that allow for continuity and follow-up. In addition, their broad medical knowledge as clinicians and experience with the life cycle make them an important part of any community consultant team. For all these reasons, family physicians are in an ideal position to promote exercise.

Despite the logical assumption that family physicians counsel about exercise, the quality of this counselling remains an unknown. The effects of primary care intervention have been well studied in areas such as alcohol, nutrition and smoking, [93-96] but little research has been done regarding the promotion of physical activity. Specifically, there is a paucity of research that has explored whether physicians are prescribing exercise. The literature becomes even more scarce when counselling frequency rates and the actual content of prescriptions are to be determined. While a handful of studies have surveyed patients on a recall basis for their physician's exercise prescription habits, the focus for this project was on physician based research.

Since most of the previous studies [32,97-101] on exercise counselling are American, it is important to acknowledge differences in primary care in Canada compared to the United States. A primary care physician in the United States does not necessarily equate to a family physician in Canada. Internists, pediatricians, obstetricians and family physicians may consider themselves to be primary care physicians for their patients. Many American family physicians are paid by salary and do not have to see the same number of patients as in the Canadian fee for service system. There have been no exercise counselling studies that have compared physician counselling between the two countries, but the differences do deserve some consideration.

2.4.2 Previous Exercise Counselling Research

2.4.2.a Description/Overview of Methods of Previous Studies

All of the studies referred to in this section were cross-sectional surveys of physicians that used self-adminstered questionnaires for the data collection. These prior studies are descriptive studies. Simple, descriptive statistics such as percentages were used to express results and odds ratios of the characteristics of physicians who are more likely to exercise counsel were estimated.

2.4.2.b Physician Confidence in Exercise Counselling Ability

In order for family physicians to deliver advice on exercise, they need to believe that they are competent to do so. It is unlikely that a physician will want to exercise counsel if they do not feel knowledgeable in the subject area or they do not believe that they can cause a behaviour change in the patient. Another phrase used to describe this capacity is *self-efficacy*, which can be viewed as the physican's self-appraisal of their capabilities to execute successful exercise counselling.[96] Sherman and Hershman [99] found that general internists in a U.S. study were more likely to exercise counsel >75% of their patients if they perceived a high level of success at getting patients to start exercising (odds ratio of 22.7). Reed et al. [98] found only 27% of a U.S. study group of family physicians and general internists considered themselves very knowledgeable for counselling about exercise. More physicians (46 %) felt very comfortable with exercise counselling.

In a survey of 1040 primary care physicians in the U.S. done in 1986, most physicians believed they should attempt to modify risk factors in patients but few

believed they were successful.[102] Lewis et al.[103] completed a survey of 1349 internists in the U.S. and found that only 26.6% felt they were moderately effective in changing patient behaviour regarding exercise. Only 3.7% of physicians claimed they were very effective. Wechsler et al.[104] sampled 433 primary care physicians in the U.S. and found 40% felt very prepared to exercise counsel patients. Wells et al.[100] sampled 200 Californian physicians (mix of specialties) and found 47% thought they were not effective at exercise counselling.

A Canadian study by Stevenson and McKenzie,[105] involving 115 Vancouver general practitioners showed 50.4% of physicians considered themselves very prepared to counsel about exercise, the remainder 48.7% felt somewhat prepared. However, only 5.3% believed they were very successful in changing patients' exercise behaviour. A major problem with the above studies is that they have not defined what exercise is or what exercise counselling is considered to be, so it is not clear if all physicians follow the same definition or practice when these terms are used. Future studies should provide a definition of exercise counselling. Physicians should be surveyed from across Canada to see if confidence levels differ from the regional Vancouver study.[105]

2.4.2.c Physician Perception of the Importance of Exercise

While lack of knowledge may leave the physician feeling unprepared to do exercise counselling, a lack of belief in the importance of exercise by the physician may also affect their counselling. Stevenson and McKenzie,[105] found 75.4% of general practitioners believed exercise was very useful as a therapeutic tool. Wechsler et al.[104]

reported only 27% of physicians considered aerobic activity three or more times per week as very important. A second study,[106] 13 years later, found 49% of primary care physicians stated they believed that regular, daily physical activity was very important for the average patient. Reed et al.[98] in a survey of American family physicians and internists, found an impressive 87% believed in the value of exercise for all patients. However, when physicians were asked about stressing exercise to patients with chronic diseases only 36% believed this was important. In Sherman and Hershman's study of general internists, >60% of physicians thought exercise was important for a 55 year old patient. [99]

Overall, there is support in the literature [98,99,104,105,106] for exercise, however, the importance of exercise for specific conditions, personalities and ages has not been explored. With the exception of the study by Wechsler et al.,[104] exercise has not been well defined. This lack of uniformity in the exercise definition makes it difficult to compare studies. Future projects should have a clear definition of exercise. Also, physicians should be questioned about the importance of exercise for different stages of the life cycle and for common medical conditions.

2.4.2.d Counselling Frequency

How frequent family physicians exercise counsel has been the most common variable assessed in exercise counselling studies to date. Williford et al.[97] found that 91% encouraged their patients to participate in regular physical activity although there was no definition of "regular physical activity". Bull et al.[7] in Australia surveyed 789 general

practitioners and only 21.2% recommended physical activity often or almost always to all patients. In Reed's study, [98] 44% of primary care physicians said they prescribed exercise to at least 50% of their patients. Sherman and Hershman [99] study of internists revealed 33% counselled more than 75% of their patients about exercise. Orleans [101] found 40% of family doctors advised most of their inactive patients to get more exercise even though they estimated 69.4% of their adult patients engaged in too little physical activity.

The Vancouver study [105] found an impressive 92.9% of general practitioners asking their patients about exercise habits all or some of the time. It is unclear whether any actual exercise prescription took place after the physician's inquiry. Since these studies [7,98,99,101,107,105] did not have a definition of exercise and exercise counselling, it is unknown whether the act of counselling was different for physicians within the same study. Also, whether counselling frequency would change depending on the reason for the patient visit or the season of the year has not been evaluated. Explanations for the wide range of frequencies can only be speculative since the surveys were done on different types of physicians, in different regions and in some cases, as part of a general study on health promotion versus just exercise.

There have been published projects that have evaluated counselling frequency based on patient feedback. A Canadian cross-sectional study [107] assessed preventive care given to unannounced standardized patients. A total of 58.5% provided exercise counselling although what exactly the physicians were supposed to say to be correct was not mentioned. While patient recall has been a limiting factor regarding accuracy, there has been substantial reliance on physician recall in physician surveys. Also, the

possibility that physicians may be overestimating their good behaviour has been speculated, [99] but not demonstrated in prior studies.

Future studies looking at counselling frequency need to define exercise counselling and use clear patient scenarios. These scenarios should ideally identify the patients regarding age, health condition and psychological state of readiness for change. The type of visit (check-up or brief visit) and whether the counselling is patient driven or physician driven should also be noted.

2.4.2.e Current Versus Desired Practice

Bull et al.[7] suspected that physicians knew that prescribing exercise was a good idea. However, they discovered a difference between the practice they thought they should be doing (desired practice) and what they were actually doing (current practice). Some doctors (21.2%) claimed they "often or almost always" prescribed physical activity to all patients, but 51.5% "agreed or strongly agreed" it was a desired practice. Differences were also found for chronic disease patients, mental health patients, "minor, self-limiting problems" and for "patients with symptoms of conditions that could benefit from physical activity". Obviously, some of these categories were poorly defined and thus, results are difficult to interpret. It is not clear why the discrepancies in practice existed.

A Canadian study has yet to evaluate this comparison (desired vs. current practice), so such a study would be desirable. Since Bull [7] used very broad categories for health conditions, the use of specific health conditions in a future study would be

desirable. This would eliminate any confusion regarding which conditions were being evaluated. Also, asking physicians for the reasons responsible for differences in desired and current practice needs to be done.

2.4.2.f Exercise Counselling for Different Health Groups

A small number of studies [7,99,108,109] have sought physician information regarding more specific patient groups. In an Australian study by Bull,[7] physicians were asked if they would prescribe exercise for a variety of medical situations. Under an "often or almost always" category, >90% would prescribe for "patients in need of weight management" and "patients with symptoms that could benefit from physical activity". 53.7% for "sedentary patients with chronic diseases" and 36.1% for "patients on a waiting list for elective surgery" and "patients with mental health problems".

Sherman and Hershman [99] asked specific questions regarding counselling a healthy 35 yr. old, 55 yr old, 75 yr. old (gender not evaluated) or a person with coronary artery disease (no specific age). They stated that physicians that felt exercise was very important were more likely to counsel these groups. However, the only data that was presented was for a healthy 55yr. old patient and this referred to three items relating to >75% counselling frequency (odds ratios) not overall counselling frequency data.

Even from patient surveys there has been very little information available regarding exercise counselling to different health groups. In a study of family physicians in the U.S., it was found that having a high BMI was the strongest predictor of receiving

advice to increase physical activity.[108] In the U.K., a survey of general practitioners found only 38% of those with mild or moderate hypertension received exercise advice.[109]

Future projects should try to identify specific health conditions. This will ensure that physicians are answering questions about the same condition instead of a general group of conditions. Different levels of severity for health conditions should also be included in future surveys. Conditions with exercise recommendations or those that include exercise as part of treatment, should be the initial focus in future studies. This will make it possible to discern whether physicians are aware of exercise guidelines for these conditions.

2.4.2.g Counselling Methods and Content

Unfortunately, methods and content have been rarely explored in exercising counselling research. This lack of specific assessment of methods reflects the fact that this is a relatively new area of research.

In a study of U.S. family practitioners,[101] 38.6% said they would "discuss health risks and give specific advice for increased activity (to >50% of patients) if a patient's problem was "insufficient exercise". No definition of health risks, specific advice or insufficient exercise was given. For a "systematic behavioral/psychological treatment", 5.0% would use this for >50% of patients. These methods were vague and lack detail.

Bull et al., [7] found general practitioners discussed general benefits of physical activity more often versus specific programs and only 20% "often" or "almost always" recorded a patient's level of activity. A U.S. study [98] of general practitioners and family

physicians revealed 41% stated they used a follow-up plan as part of counselling. Sherman and Hershman [99] found of those who counselled >75% patients, 72% spent two minutes or longer counselling. With those who counselled <25% of their patients, only 44% took longer than two minutes. Wells et al.[100] showed through physician self-report that only 13% of physicians counselled for 5 minutes or longer and 43% counselled about exercise more than once per year.

Mullen and Tabak[110] surveyed family physicians in the U.S in 1986 to look at counselling patterns. Techniques with the highest frequency of use were "suggest specific steps to take" and "bring up the subject later at future visits". Referring "to other office personnel for counselling" had the lowest frequency. In 1992, Williford et al., [97] surveyed family practitioners and internists together and discovered 49% obtained an exercise history from their patients, and 30% developed exercise prescriptions.

From a patient perspective, physician practices such as a written and negotiated exercise prescription, providing instruction, and providing regular counselling were rated (70% approval) as likely to increase willingness to follow exercise recommendations. In contrast, 59.6% of patients reported having to sign a contract to follow an exercise program would have little effect or decrease their willingness to comply. [32]

A Canadian study is now required to determine the content of exercise counselling by family physicians in Canada. There are no prior studies that have undertaken objective evaluation of exercise prescriptions. Therefore, it is still unknown if physicians are delivering the correct information to their patients. Future studies should include objective evaluations by using open-ended questions or patient interview after physician encounter. None of the above studies [7,32,97,98,99,100,101,110] contained a

comprehensive evaluation of counselling methods or techniques. Only one study [98] addressed the issue of follow-up. Evaluation of counselling methods should include a list of specific items that address the areas of education (verbal or written), written prescription, counselling duration, follow-up plan, goal setting and record keeping.

2.4.2.h Physician Exercise Habits

Why should it matter whether physicians exercise? While it makes sense to set an example and practice what one preaches, does this really affect how patients will respond to exercise advice? A study performed at The University of Indiana in 1992/1993 examined the relationship between physician characteristics and patient acceptance of exercise recommendations.[32] It showed 70.1% would increase their willingness to comply with exercise recommendations if their physician exercised regularly.

A few surveys have asked physicians about their exercise regimes. Wells et al.,[100] in 1978, found 71% of family physicians reported one hour or less per week of strenuous exercise. Sherman and Hershman found 56% of general internists exercised at least three times per week.[99] Another survey of internists in the U.S.,[103] revealed 38.7% claimed to be extremely or quite active and 30.4% believed they were getting enough exercise. Reed's study of family practitioners and internists found 40% exercised at least three times per week, and for >20 minutes duration. [98] The Vancouver family physician study[105] showed 39.1% of physician activity met the ACSM guidelines for adequate amounts of exercise in 1991 and only 28.9% of physicians felt they were exercising

enough. While 65.7% claimed to exercise at moderate intensity, moderate intensity was not defined.

The Vancouver study [105] was the only project that measured physician exercise habits against known guidelines (ACSM recommendations). The other studies [98,99,100,103] reported on one or two components of the exercise program only such as duration or frequency. Future studies should assess physician exercise habits for the four basic components of an exercise program: type of activity, frequency, duration and intensity. This information is required before a judgement can be made as to whether the physicians surveyed are exercising according to recommended guidelines. Another Canadian study is necessary to see if physicians across the country have similar exercise patterns as those in Vancouver.

2.4.2.i The Role of the Family Physician in Exercise Counselling

Most studies [7,92,98,99,100,105] start from the premise that the primary care physician is an ideal person to do exercise counselling. However, none of the studies have actually asked the physicians if they feel that they are the professionals that should be doing the job. Past studies [97,101] have inquired about referral action by physicians but there have been no direct questions that allow the physician to make their opinion clear that another professional should be doing the counselling. The frequency of choosing referral ranges from 3.8%-13%.[97,101] One study [97] showed that when a decision was made to refer, 68% were sent to physical therapy, 20% to other physicians, 9% to exercise physiology and

3% to a nurse. The problem with that study is that exercise was not defined and referrals to physical therapy could be for rehab exercise.

Despite what physicians or other health professionals may think about the family physicians ability to do exercise counselling, there have been several intervention studies[92,111-118] that show promising results from physician exercise counselling. Most of these studies [92,114,116,117,118] have assigned one group of physicians to undergo a training course in physical activity promotion and another group of physicians has served as a control group. Patients were subsequently contacted to see what items the physician discussed with them. Some studies [113,116,117,118] have also evaluated patient exercise over time to see if the physician intervention resulted in an increase in exercise. Nearly all of the studies [92,113,114,116,117,118] have shown increased physical activity after physician counselling. Problems with these studies have included physicians not being blinded to the intervention, physicians and patients often not being randomly chosen, various time frames for follow-up and often short study duration.

Future projects need to ask family physicians if they think they should be doing exercise counselling and if this changes with the type of patient, age of patient or health condition. The issue of referral for exercise counselling should also be explored. This can be done by asking family physicians which professionals they refer patients to for exercise counselling. The type of patient and health condition that the physician believes requires referral should also be recorded.

2.4.2.j Barriers to Exercise Counselling

Barriers or obstacles to exercise counselling have been addressed in several studies.[7,99,101,105] Not enough time to counsel about exercise was cited by 47.0-55.0% of physicians. Pessimism about people's abilities to change their lifestyles was also noted by 21-64.0% of physicians. Other commonly mentioned barriers include lack of continuing education, unsure what is important in exercise counselling and reimbursement is not sufficient for the time spent counselling.

Aids that help physicians exercise counsel have also been addressed. Wechsler et al. [104] discovered that information on where to refer patients and financial reimbursement for time spent counselling were rated the most valuable forms of assistance. The Vancouver study found literature for patients considered to be helpful and financial renumeration for counselling the least helpful.[105]

There are differences in medical education, resources and reimbursement in Canada versus the United States, so a Canadian study on a larger scale than the Vancouver study would be useful. In addition, there have been many financial changes in the Canadian health care system since the Vancouver study of 1991. One important barrier that was not addressed in the previous studies [7,99,101,105] was insufficient exercise education during postgraduate training after medical school.

A Canadian study should assess whether physicians feel insufficient training in general practitioner (GP) or family physician (CCFP) training serves as a barrier to exercise counselling. Also, physicians should be asked whether they feel a lack of clear guidelines on exercise counselling serves as a barrier to exercise counselling as this issue has been addressed previously.

2.4.2.k Predictors of Exercise Counselling

Recent exercise counselling research has examined which physician characteristics are associated with an increased frequency of exercise counselling. Reed et al.[98] surveyed a group of family physicians and general internists in the U.S., gathering information in four variable categories (demographics, cognitive variables, beliefs, and behaviors). Factors found to be associated (via logistic regression) with physicians prescribing exercise to >50% of their patients were being in practice more than ten years, believing that >10% of their patients had an exercise program, having a method for follow-up and the physician having their own personal exercise program.

Another American study of general internists [99] found (using logistic regression) four factors associated with physicians counselling >75% of their patients about exercise. These factors were physician age >40, physician resting heart rate <65 beats per minute, physician rating of the importance of exercise and physician's perceived level of success at getting patients to start exercising. The latter factor had an odds ratio of 22.83 while the other factors had odds ratios between 3.45 and 4.86.

In 1978, Wells [100] evaluated an interesting comparison when he found that those who exercised regularly and did not think they were overweight counselled all those with poor lifestyle habits (inactivity, weight, smoking, excess alcohol), practising primary and tertiary prevention. Those who did not exercise regularly and thought they were overweight counselled only those patients who already had diseases affected by the poor lifestyle habits. Unfortunately, the statistical testing used was for continuous data instead of the categorical data generated in the study.

The Vancouver study [105] looked at attitude and physician exercise habits and their relation to "inquiring more often about exercise on initial visits". They reported physicians who believed exercise was important to overall health inquired more often than those who did not consider exercise to be very important. In addition, they stated that counselling frequency "did not seem to depend" on physician exercise habits. The results in this study are difficult to interpret as there was no identification as to what statistical test was used to reach the stated result.

Statistical analyses are needed to assess which factors predict exercise counselling by Canadian family physicians. Of interest is to note whether or not the demographic variable of training (general practitioner vs. family physician) was a predictor of exercise counselling in Canada. In the current climate of health care reform, it is important to assess whether certain barriers and demographics (lack of time, lack of reimbursement, lack of education, salary vs. fee for service, practice location) are predictors of exercise counselling.

2.5 Summary

Exercise counselling by family physicians is a growing research area. It is also a complicated issue since there is no universal definition of exercise counselling and the ACSM has two current sets of general exercise recommendations. The benefits of regular physical activity are well known for healthy individuals and those with certain health conditions. These include dose response relationships between physical activity and mortality, CVD, hypertension, hypercholesterolemia, and Type II diabetes mellitus.

Previous research in family physician exercise counselling using questionnaires has been very general. These studies lack definitions of exercise and exercise counselling which make study comparisons very difficult. Research addressing the counselling of health conditions is very limited. No previous study has used objective questions to assess physician exercise prescription or surveyed physician opinion about their role in exercise counselling. Although some previous studies used pre-tested questionnaires, no actual questionnaires or details of the pre-tests have been published. The challenge in the following chapter was to design and pre-test an exercise counselling questionnaire that could address the above problems while still being specific and comprehensive.

CHAPTER 3: THE EXERCISE COUNSELLING QUESTIONNAIRE

3.1 Introduction

Since a suitable questionnaire to survey Canadian family physicians about exercise counselling did not exist, a new questionnaire was created for this study. This involved question selection/creation and design of the overall questionnaire and then a subsequent pre-test with a group of local family physicians.

3.2 Questionnaire Design

3.2.1 Presentation

Family physicians are very busy professionals with a significant amount of paper work to complete on a daily basis. Therefore, brevity of the new questionnaire was considered paramount. Although questionnaire content should not be compromised for length, [119] it was felt that a questionnaire that took more than 15 minutes to complete would not be well received by family physicians. The questionnaire was two double-sided pages and also included a cover letter. The questionnaire paper was purposely made a yellow color to attract the attention of physicians. The first section of the questionnaire began with demographic questions. These questions were not threatening and easy to complete so that the physician will be encouraged to continue answering subsequent sections.

3.2.2 Questionnaire Construction and Wording

Some questions were adopted from other studies, [7,97,98,99] primarily for their content since exact wording was either unknown or not appropriate for this study. The

majority of questions were created specifically for this study. Questions were constructed with careful attention to wording and presentation. Since the study group had very similar education levels, language that was overly simple was not required. Negative terms, biased terms and double-barreled questions [120] were avoided. Most of the questions followed a closed-end style where choices were provided for an answer on an implied continuum using Likert scales [119] or a range of percentages. The exception to this was the use of open-ended questions to evaluate physician prescription content.

A cover letter was designed according to the University of Calgary Office of Medical Bioethics requirements which included a description of the project, assurance of confidentiality of responses and intentions of data use. A formal written consent form was not necessary since physicians were not taking part in any intervention or therapy. The completion of the questionnaire constituted implied consent. Participants were also left a contact number to reach the investigators if they had any questions. This cover letter can be viewed in Appendix B. The questionnaire took approximately ten minutes to complete and included four main sections: 1) demographics; 2) current and desired exercise counselling practices; 3) physician exercise habits; and 4) barriers to exercise counselling. *Exercise* and *exercise counselling* were defined at the start of the questionnaire.

The demographics section included some items explored in previous studies [7,92,97,98,99,100,105] including level of training and type of practice. Wording was modified so questions would be applicable to a Canadian family physician. Answer categories were clearly defined. Physicians simply checked-off an answer choice for each question.

Question 1 (Appendix A) asked the respondent to identify if they had family medicine (CCFP) versus general practitioner training and if they had a CASM diploma is sport medicine. The question does not acknowledge those who had some partial or extra specialty training but practiced only family medicine. Question 2 was crucial to the study in that it served as a way to determine which physicians were eligible for the study. A mechanism was required to establish which physicians practised another type of medicine other than family medicine, despite officially being listed as family practitioners. Therefore, question 2 was designed to reveal which physicians practised general family medicine >75% of their time. If a physician did not check off practising general family medicine as >75% of their practice, they were considered not to be a family physician for the purpose of this study.

Questions 3-6 (Appendix A) looked at physician age, years in practice, gender and body mass index. The determination of physician BMI permitted a simple assessment of obesity (Chapter 2) amongst physicians. A BMI chart was supplied separate from the questionnaire that allowed physicians to instantly determine their BMI by drawing a line across a table. Instructions on how to find their line were provided. Questions 7-10 examined practice setting, type of financial renumeration, and number of patients seen per hour or week. These variables were also tested for their relationship to exercise counselling frequency. Since physicians in the Canadian health care system are paid according to how many patients they see and not according to the quality of the care they provide, it was conceivable that physicians that saw high numbers of patients would not have the time to exercise counsel. The categories for number of patients seen were arbitrary and had no proven relationship with quality of care.

Question 11 asked if physicians had a special training background in exercise science or exercise counselling. Only yes or no answer choices were provided. While this narrowed full exploration of this variable, there was not enough room in the questionnaire to pursue ranges of exercise education in any detail. It was felt to be adequate for determining what proportion of the study sample had special exercise training.

On page 1 of the questionnaire, the left side of the page contained demographic questions with the heading: General Information. The right side was labeled: Section1:Exercise Counselling. Section 1 contained questions12-26 which assessed numerous variables pertaining to exercising counselling beliefs and practices. Questions 12-15 looked at physician confidence in exercise counselling. They asked the physician how confident they felt that patients would begin and continue exercising with their counselling. This was followed by questions to determine how knowledgeable and qualified they were to do the counselling. Questions similar to questions 12-14 have been surveyed in other studies.[98,99] Question 15 was added because asking physicians if they are qualified required them to make a stronger judgement concerning their "expertise" in exercise counselling.

Exercise counselling frequency was addressed in questions 16 and 17. Question 16 pertained to desired counselling practice and question 17 asked about current practice. Similar questions to these have been used elsewhere.[7] Question 16 purposely preceded 17 because it was felt physicians should be given the opportunity to express what they would ideally like to be doing first before identifying what they are able to currently do. An argument could have been made to reverse the order so that current practice was

surveyed before desired practice. However, a lower frequency result for current practice could have discouraged the physician or made them feel they were doing an inadequate job. These questions applied to all patients in general and did not distinguish the reason for the patient's visit.

Questions 18-22 were very difficult to design (Appendix A). The goal was to include an adequate number of age groups to be as discriminating as possible and survey as many health conditions that apply to family practice and exercise within the allocated space. There was an obvious downside to listing so many choices in a small space as it could have been confusing to the responder and it may have encouraged them to answer categories and conditions as a group instead of considering each one individually. A scale of importance was created from not important (1) to extremely important (5). Questions 19 and 21 also provide respondents with a sixth choice if they feel exercise counselling should be done by another health professional. For the age group and health condition questions physicians were given the opportunity to distinguish the importance of exercise for a particular age group or health condition from the importance of exercise counselling (either by the family physician or another health/fitness professional).

This study uses ACSM exercise recommendations as a benchmark to evaluate objective written answers on exercise prescription. Obvious content information should include the ACSM exercise recommendations components which require specifying type of activity, frequency, duration, intensity, a warm-up and cool down, musculoskeletal flexibility exercises and resistance training. [31] As well, physicians should know when these recommendations need to be altered when health conditions are present.

Objective evidence of physician exercise prescription knowledge was the goal behind the design of questions 23 and 24. There were no prior questionnaires from other studies that contained this kind of objective questioning. A brief two sentence introduction to these questions asked responders to complete the questions without referring to a reference source and if they did not know the answer, print "don't know". The purpose of this was to make it clear that physicians were to answer the questions using their current knowledge at the time of questionnaire completion. Question 23 represented a common patient presentation in family practice (the 40 year old male with a cardiac risk factor and insufficient levels of physical activity). Question 24 added a new condition (hypertension) to the patient scenario of question 23 and tested the physician's knowledge as to whether this additional health condition required a change in their prescription. The knowledge that physicians were expected to display in the answers to these questions can be viewed in the answer key in Appendix I.

Closed questions (with a restricted number of categories for response options) increase the likelihood that there will be enough answers in a category to make the results clinically interesting.[121] Although *closed questions* produce answers that are easier to interpret; responders typically like the opportunity to answer some questions in their own words.[121] Questions 23 and 24 were *open questions* where the physician could write down any answer they desired in the allotted space. This allowed many irrelevant answers from respondents which could not be easily organized along a continuum. However, questions were scored according to an answer key, so extraneous information was not reported as data. Questions 23 and 24 were deliberately placed in the middle of the questionnaire to allow physicians a break from checking off answers and to

encourage them to answer these questions in sufficient detail. This may not have occurred if the open questions were placed at the end of the questionnaire and physicians were in a hurry.

Questions 25 and 26 addressed the use of counselling techniques and methods. Variations of question 25 have appeared in other questionnaires.[97,98,99] Two minutes was used in this as a minimal time for exercise counselling but this was entirely arbitrary. It was the investigator's estimate that covering ACSM exercise recommendations would likely take two minutes or longer. The question did not specify the type of visit (e.g., an annual check-up) or the type of patient to which this applied. Question 26 listed a series of counselling methods and required physicians to rate the frequency of their use. This question was purposely listed after questions 23 and 24 because physicians could have used information in question 26 to aid completion of these questions (if question 26 preceded 23 and 24). Counselling techniques evaluated in this study included providing educational materials, writing a take-home prescription, evaluating if patients can find their target heart range, recording BMI, making a follow-up plan, counselling duration ($<$ or $\geq$ 2 minutes), recording patient exercise habits and asking patients about their barriers to exercising.

Section 2 of the questionnaire began on the third page of the questionnaire (Appendix A). It contains questions 27-35 and is entitled: Physician Exercise. Question 27 required the physician to identify their resting heart rate range. Resting heart rate was included as an indirect measure of physical fitness. This question was used in a prior study [99] where the questionnaire underwent two pilot tests but validity and reliability results were not stated. Question 28 was included in this study since a physician's heart

rate (at rest or during exercise) could be lowered by a beta blocker medication. This drug influence would make the use of heart rate as an indirect measure of physical fitness inaccurate for those physicians taking a beta blocker.

Question 29 asked physicians about their enjoyment of aerobic exercise. Questions 30-34 were designed to elicit information regarding whether the respondent's own exercise habits met ACSM recommendations. An overall score from these four questions was used to assess physician exercise habits. The score key can be viewed in Appendix K. Question 32 was an open question because there was not enough room in the questionnaire to list all types of aerobic activity. A restricted choice list could have resulted in some physicians receiving a false rating since their activity may not have been present amongst the choices.

Question 33 also left one category open in order to save space and allow physicians to enter their method of assessing their intensity. Actual intensities were not elicited since it would have taken a considerable amount of time to verify if individual physician target heart rates were correct. Also, there are other accepted methods of gauging intensity (e.g., rating of perceived exertion) that cannot be accurately compared to the target heart rate range. The investigator felt that physician opinion on whether they were exercising enough (question 35) could only make sense with a dichotomous answer scenario (yes or no).

The final section of the questionnaire is Section 3: Barriers to Exercise Counselling (Appendix A) or question 36. . In this study, a *barrier* is considered to be any personal, financial, patient or educational factor that may compromise the physician's ability to do exercise counselling. A definition of what constitutes a barrier

was not supplied to the responder because it was felt that the listed barriers were self-explanatory. Physicians were asked to rate the how important the barriers were to them. A simple Likert-type scale was used from not important to extremely important. This allowed the physician to answer the last question with relative ease and hopefully encourage completion. Some of the barriers were previously tested in pilot studies before larger studies were done. [7,99] However, the wording of the question that preceded the barriers was different in these studies versus this project. Also, this questionnaire separates lack of exercise education at different medical training stages (medical school, GP/CCFP training, continuing medical education) which has not been done before.

3.3 Validity

A good measuring instrument such as the questionnaire designed in this study cannot be made without considering validity. According to Fowler, [121] *validity* is "the extent to which an answer given is a true measure and means what the researcher wants or expects it to mean." There are two main kinds of validity to address; *measurement validity* and *study validity*.[119]

3.3.1 Measurement Validity

There are four types of measurement validity usually cited: *face validity*, *content validity*, *construct validity* and *criterion validity*. *Face validity* is assessed by looking at the presentation of the instrument. It refers to "whether the empirical measures fit with common agreements or individual mental images associated with a particular concept."[119] The questions should "make sense" to the respondent. *Content validity refers* to the degree to which a measure covers the range of meanings included within the concept.[119]

This addresses the actual content of the questions. Face validity and content validity are not determined by statistical testing but by judgement and opinion.

For example, if one wanted to evaluate the validity of the exercise stress test as a measure of significant ischemic heart disease in men, it could be said that on the surface, the test appears to have *face validity*. This conclusion would be reached because an ischemic heart reacts to exercise and this reaction is reflected by the EKG monitor with an ST depression on the screen. The test would have *content validity* if it resulted in more than one sign of ischemia. In this test, the period of exercise may not only cause an EKG ST depression change but also angina-type chest pain, both reflective of ischemic heart disease.

Construct validity is the extent to which relationships between measures agree with the relationships predicted by theories.[122] If the exercise stress test demonstrated "positive" results in those men with ischemic heart disease, then it would have construct validity. *Criterion validity* is the extent to which the measurement agrees with some criterion or "true" value of the measure.[122] It can be evaluated as *predictive validity* and *concurrent validity*. *Predictive validity is* the ability of the measure to predict the "true" value compared to a "gold" standard. *Concurrent validity* means the comparison of the measure to the "true" value is established at the same point in time. Using the exercise stress test example, predictive validity could be determined by comparing "positive" stress tests with subsequent angiography. If ischemic heart disease was evident on angiography, then the stress test would have predictive validity. If angiography was performed just after the stress test and ischemic heart disease was present, then the stress test measure would also have concurrent validity.

How did these measurement validity issues relate to the exercise counselling questionnaire and this study? In regards to *face validity*, the questions were deliberately very direct so that even at first glance it would be clear what the questionnaire was about. To achieve *content validity*, the different sections and questions tried to cover as many important aspects of the concepts as space in the questionnaire would allow. For example, to address counselling methods (Appendix A), the questionnaire not only inquired about counselling time spent with the patient but also whether the physician recorded the patient's exercise habits, made a follow-up plan, asked about barriers to exercising, recorded the patient's BMI, gave out education materials and wrote a prescription for the patient to take home.

What made this process difficult was that with the exception of ACSM exercise recommendations, there were no standard lists of components to the concepts in the study. Every attempt was made to make the different concepts examined in the study (as described in chapter 2) as comprehensive as possible. Ultimately, face and content validity determination relied on peer/expert feedback in the questionnaire pre-test stage, although validation should be viewed as an on-going process.

There are no established relationships in exercise counselling which made a proper evaluation of *construct validity* very difficult. However, certain expectations were identified before the pre-test was done. These expectations included a positive relationship between: counselling frequency and follow-up frequency, counselling frequency and confidence in getting patients started, counselling frequency for IHD and perceived importance of exercise for IHD, and perceived level of exercise counselling knowledge and actual objective prescription scores.

Criterion validity was not determined in this study. No gold standard for assessing physician exercise counselling behaviour exists. In addition, the ultimate criterion to assess predictive validity would be patient knowledge or behaviour following counselling. The personnel and other resources to undertake a study of patients was beyond the scope of this project.

3.3.2 Study Validity

Study validity consists of *internal validity* and *external validity*. *Internal validity* means that conclusions drawn from the results of the study are reflective of the variable under investigation. This means the study results are not due to a confounding variable(s), bias, statistical regression or chance.[119] Although this study pre-identified several questions to be answered, there were no hypotheses to be tested. Nevertheless, possible confounding or sources of bias may have been present and deserve commentary. *External validity* represents the generalizability of the results to the "real world".[119] This would mean that the results of this study could be extended to apply to family physicians other than the group studied.

3.4 Reliability

Reliability refers to the stability and equivalence of repeated measures of the same concept.[122] Stability is the consistency of the answers people give to the same question when they are asked it at different points in time. This is also known as *test-retest reliability*[121] It assumes no real changes have occurred over time that would cause physicians to answer the question differently.

Equivalence refers to the consistency of answers when different people administer the same questionnaire or different groups complete the questionnaire. Since a very similar group completed this study questionnaire, it would have been very difficult to make a group to group type comparison. *Inter-rater reliability* examines the equivalence or correlation between answers to the same questions obtained by different data gatherers. [121] There was only one data gatherer for this study, but inter-rater reliability could be assessed for open-ended questions on the questionnaire since two physicians marked and scored question 23 and 24. *Inter-observer reliability* is a subset of *inter-rater reliability* where there are two different people administering or observing the completion of the same study and correlation between answers to the same questions is assessed comparing results from the presence of each observer. This type of reliability did not apply to this study since the questionnaire was not administered by any person but by the respondent reading instructions.

Internal reliability is the correlation between answers to different questions about the same concept.[122] If there is nonequivalence of these questions, then different conclusions about the concept may result. For example, it is reasonable to expect a correlation between a physician who feels knowledgeable about exercise counselling to also feel confident about counselling. The correlation becomes higher as more questions are asked about a topic and the higher the average correlation between the scores.

3.5 The Pre-Test

3.5.1 Introduction

The study questionnaire was pre-tested before the national mailing stage. The pre-test version was only slightly different then the final version (described in the previous section). The pre-test questionnaire can be viewed in Appendix D. The purpose of the pre-test was to evaluate the newly created questionnaire for validity, reliability and overall presentation. Specifically, this was to determine what degree of face validity, content validity, test-retest reliability and inter-rater reliability was present. The participants (family physicians) had to reflect the ultimate group that would be surveyed.

3.5.2 Methods

Once the pre-test questionnaire was reviewed with the project supervisor, fourteen volunteer physicians were recruited to participate in the pre-test in December, 1997. These physicians were chosen by a member of the investigator's thesis committee and not by random selection. After discussion with the supervisor and thesis committee, it was decided that 20 family physicians would be desirable for the pre-test, along with 2-3 other physicians with research experience, preferably in questionnaire design. These numbers were not based on a sample size calculation. Inclusion criteria for the 20 pre-test participants included: current practice in general family medicine and a commitment to complete the questionnaire on two occasions and return them promptly as instructed.

Unfortunately, only 10 family physicians were willing to complete the questionnaire and 4 additional physicians were willing to provide feedback without completing the questionnaire. Thirteen of the physicians were family physicians (one

had the CASM diploma in sport medicine). One physician was an orthopedic surgeon with a CASM diploma in sport medicine and questionnaire design/validation/evaluation experience. Twelve of the physicians were in active practice in Calgary, AB and two in Red Deer, AB. One of the physicians in Red Deer also held a PhD and thus had some research experience. All physicians were asked to evaluate the questionnaire for face and content validity. In addition to a demonstration cover letter, two pages were attached that consisted of instructions for the pre-test and a list of goals for each section of questions (see Appendices E, F,G). There was also blank space left for feedback to two evaluation questions and for general comments. All pre-test sheets were faxed to the participants and returned to the investigator by fax.

Ten of the Calgary family physicians were asked to complete the questionnaire twice, at 10-14 days apart so an assessment of test-retest reliability could be made. This assumed no real changes had occurred over time that would have caused them to answer the questions differently. The time between first and second completion had to be at least one week so recall of the first completion would not influence their answers for the second. On the other hand, a two-week limit between completions was set so that changes in answers were not due to behavioural changes. Physicians were faxed the second copy of the questionnaire with a brief introductory letter (Appendix H) that reminded the respondents that no feedback was required, just a completion of the instrument. In order to compare the test-retest answers the Pearson correlational coefficient was used for interval data and the Spearman rank coefficient for ordinal and nominal data.

Face validity and content validity were evaluated by written feedback. Responders were encouraged to write this feedback on the questionnaire itself and were asked to answer two questions on the introductory instruction page (Appendix F). Question1 asked for opinion regarding the overall look/presentation and organization of the survey. Question 2 asked if the questions under the different sections were appropriate for the heading and goals for that section. The terms face and content validity were not formally introduced since it was the investigator's opinion that these terms were too technical and would have made the process more confusing for the responder. Instead, the responders were asked to address the issues relevant to these terms in questions 1 and 2 on the introductory instruction pre-test letter. Construct validity was tested on pre-specified relationships using the Spearman rank order coefficient to comply with several ordinal data variables.

An answer key was designed for questions 12-14 of the pre-test (Appendix I) which were open questions. Two physicians (both recent family medicine graduates and sport medicine fellows) including the investigator, assigned a score to questions 12,13 and 14 for the ten physicians who completed the first copy of the survey. To assess for inter-rater reliability, a Bland and Altman Plot was constructed to look for agreement between the two markers.

3.5.3 Results

All fourteen physicians provided feedback and ten physicians completed the questionnaire. Table 3.1 below shows the demographic breakdown of the ten participants based on their completion of questions 1-10 in the General Information section. All ten

completed a 2 year family medicine residency to obtain their CCFP. A total of 60% were female, all physicians were in the age range of 31-40 and 60% had a BMI of between 20-25. All physicians were practising in Calgary and receiving fee for service renumeration. Years in practice revealed 60% choosing the range of 11-19 years. A majority (80%) saw ≤ 150 patients/week and 60% saw ≤ 5 patients/hour. Only two physicians (20%) marked that they had completed special training in exercise science/counselling.

TABLE 3.1 - Pre-Test Participants Demographics*

Participant Number	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
1	CCFP	11-19	F	31-40	20-25	U	FFS	6-10	≤150	NO
2	CCFP	11-19	F	31-40	< 20	U	FFS	≤5	≤150	YES
3	CCFP	6-10	F	31-40	20-35	U	FFS	≤5	≤150	NO
4	CCFP	11-19	F	31-40	< 20	U	FFS	6-10	151-300	NO
5	CCFP	11-19	F	31-40	< 20	U	FFS	≤5	≤150	YES
6	CCFP	11-19	M	31-40	20-25	U	FFS	≤5	≤150	NO
7	CCFP	<5	M	31-40	20-25	U	FFS	≤5	≤150	NO
8	CCFP	6-10	M	31-40	>25	U	FFS	6-10	≤150	NO
9	CCFP	<5	F	31-40	20-25	U	FFS	6-10	≤150	NO
10	CCFP	11-19	M	31-40	20-25	U	FFS	≤5	≤150	NO

*(Qi= Question Number on Questionnaire, U= Urban, FFS =Fee For Service)

Six of the original ten doctors completed the survey a second time. Two follow-up telephone calls were required for six respondents to return the first copy. Numerous (up to five) telephone calls were made to obtain the second copy and two physicians that agreed to a second completion did not return this copy.

Unfortunately, many respondents provided very general instead of specific comments. One physician gave feedback regarding the study cover letter (Appendix E). She objected to the phrase "preventive sport medicine" as she felt sport medicine to her and other family physicians was about athletic injuries. One physician thought the white paper that the questionnaire was printed on created a "dull" appearance, but did not elaborate further. Eight physicians answered question 1 on the introductory letter regarding the overall organization and appearance of the questionnaire. All of these respondents wrote "good" or "looks good".

Two reviewers did provide more specific feedback regarding the order of questions. One reviewer felt that question 16 was a prompt for question 12 (objective prescription) because it mentioned the words "target heart rate". Since five point Likert-type scales were used for many of the questions, one reviewer thought question 24 (barriers to exercise counselling) should also have five options because the four listed were not consistent with other questions. One reviewer thought questions 5 and 6 (desired vs. current exercise counselling frequency) should have been reversed in order but did not state why. Finally, for questions 7-10, one respondent thought answers with five options should be separated from those with six options. A total of 3 out of 4 of the above comments were provided by one reviewer.

The introductory wording of question 24 (barriers to exercise counselling) was identified as being "awkward" by five of the reviewers. The question read: "How important are the following barriers as they apply to you and your ability to do exercise counselling?" Although the majority of respondents did not state a problem with this

wording, the five replies were nearly identical suggesting the wording of the question could be confusing for some physicians in the national study that followed the pre-test.

A few issues were raised as face validity feedback. One reviewer identified that "cigarette smoker" was not a health condition in questions 9-11. Another reviewer thought that question 17 did not fit with the concept of physician exercise in Section 2. Two respondents found the definition of exercise counselling on page 1 of the questionnaire problematic. One thought the wording was confusing and the other stated that the definition was not what they "understood" it to be. Despite the latter criticism, the reviewer did not elaborate further on what they thought the "proper" definition was. Therefore, it is unclear whether the reviewer only had a problem pertaining to the face validity of the question or if there was a content validity issue as well.

A total of five questions were addressed in content validity feedback. Three of these questions were from the General Information section. One reviewer thought question 1 should have included a category for CCFP trainees who fail their CCFP exams. Another reviewer disagreed with the number categories used in question 8 (number of patients seen/hour). One reviewer thought question 10 had too many concepts pertaining to special training in exercise science/counselling. In Section 1, one reviewer thought another category should have been added to questions 7-10 for recording referral patterns. Another reviewer thought osteoporosis should have been added as a health condition to questions 9-11.

Although construct validity was not a main feature of the pre-test, it was explored for interest sake. Table 3.2 shows the relationships that were tested and their corresponding correlation coefficients. There were no strong relationships identified.

The correlation coefficient(r) can range form –1.0 to +1.0. An r = 0 means there is no association between the two variables tested. A positive r means the two variables increase together and a negative r means as one variable increase the other decreases. Current exercise counselling frequency and follow-up frequency had a weak, positive correlation with r = .2670. Frequency of counselling and confidence in getting patients started had an r =.2593. These two results did not provide strong support for the above theoretical relationships.

Perceived importance of exercise for ischemic heart disease (IHD) and frequency of counselling for IHD had an r = -.4764. The predicted theoretical relationship was a positive correlation. It is unknown if the negative correlation result may have been confounded by exercise counselling referrals for this group as the survey did not evaluate that option. An unexpected negative correlation was also found between how knowledgeable the physician thought they were at exercise counselling and the score they received for question 12 (objective exercise prescription) with r = -.5210. Overall, the above results, along with the other two relationships tested (listed 4^{th} and 5^{th} in Table 3.2), did not match the theoretical relationships predicted. Thus, the questionnaire did not demonstrate construct validity in the pre-test.

TABLE 3.2 - Pre-test: Questionnaire Construct Validity

Relationship	Spearman Rank Coefficient
Frequency of current exercise counselling and frequency of using follow-up	+0.2670
Importance of exercise for stress and frequency of counselling for stress	+0.1831
Importance of exercise for IHD and frequency of counselling for IHD	-0.4764
Frequency of current exercise counselling and perceived knowledge in exercise counselling	-0.1167
Frequency of current exercise counselling and objective prescription score	+0.0541
Perceived knowledge in exercise counselling and objective prescription score	-0.5210
Frequency of current exercise counselling and confidence patients would start exercising with counselling	+0.2593

Test-retest reliability scores were compiled using the two questionnaire replies completed by six of the participants. There were only minor changes with a few questions when comparing answers from the second completion to the first. These consisted of a one point higher or lower on the question scales chosen the second time. Correlation between answers was between .75 and 1.0. A summary of questions with result changes from the first to second completion is presented in Table 3.3. The amount of change for each question from first to second completion is shown with the number of items affected in brackets.

The minor changes mainly occurred in Section 1, questions 7-11 (see Appendix D), where many conditions and ages are listed. Question 16 (section on counselling methods) also produced the same degree of variation. The only other question that consistently had a minor change on the second copy was question 24 (barriers to exercise counselling). The differences were only one point higher or lower compared to the first completion. This applied to dynamic barriers that are determined by day to day practice such as not enough time to counsel versus more static barriers such as insufficient exercise education during medical school. There were no patterns identified regarding items within questions affected by change. This means when comparing the six physicians no one item was changed by more than three respondents from the first to the second completion.

TABLE 3.3 - Pre-test: Questionnaire: Test -Retest Reliability*

	Question Number										
Physician	7	8	9	10	11	16	24	1	3	4	12
#1	+1 (1)	+1 (1)	±1 (2)	±1 (3)	-1 (1)	±1 (2)	-	-	-	-	-
#2	-	-	-1 (2)	±1 (3)	-	±1 (4)	-1 (2)	+1 (1)	-	-	-
#3	-	±1 (5)	-	+1 (5)	-	±1 (3)	±1 (3)	+1	+1	+1	+1
#4	-	-	-1 (1)	+1 (1)	-	+1 (1)	-1 (1)	-	-	-	-
#5	+1 (1)	+1 (1)	±1 (2)	±1 (6)	-1 (1)	±1 (8)	±1 (3)	-	-	-	-
#6	+1 (1)	+1 (1)	±1 (4)	±1 (3)	-1 (1)	±1 (7)	-	-	-	-	-
Correlation Coefficient	.80	.80	.80	.80	.80	.80	.75	.75	.75	.75	.80

*(For each of the question numbers shown, the amount of change to answers from first to second completion ranged from +1 to -1. For questions with multiple items, the total number of items that the physician changed from first to second completion is in brackets.)

Finally, inter-rater reliability results revealed only slight variation in scores assigned. A calculation of a correlation coefficient would only show the strength of the relation of the scores by the two markers. It would not have demonstrated whether the scores assigned by the two markers were in agreement. A Bland and Altman graph (Figure 3.1) was used to plot the difference between the scores (marker1-marker2) on the y axis against the mean of the scores ((marker1+marker2)÷2) on the x axis. The 95% confidence interval of the mean contained the value of 0, which meant the marker1 and marker 2 scores were considered to be identical. Also, the marker differences in scores were within the mean ± 2 SD so the two markers were in agreement. This result meant the markers could have been used interchangeably to score question 12 in Section 1.

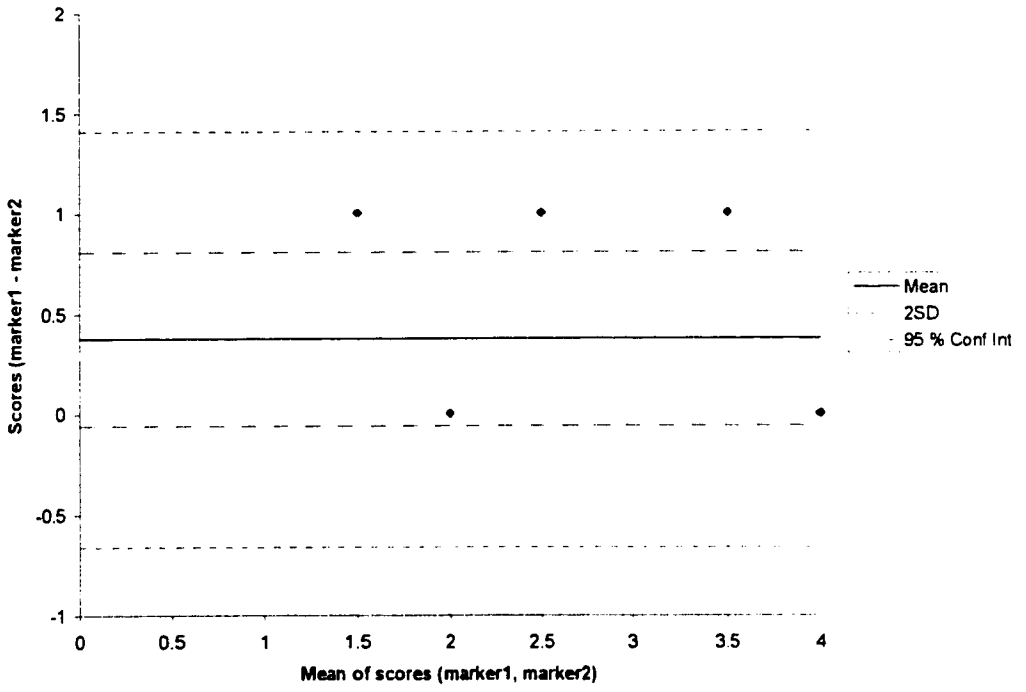

FIGURE 3.1 - Bland and Altman Plot for Inter-Rater Reliability for Scoring of Question 12, Section 1.

3.5.4 Discussion

3.5.4.a Physician Sample

The pre-test produced information that allowed for constructive changes to be made to the questionnaire for the national mail-out stage. Although the pretest surveyed a small number of physicians (20-30 is often recommended [121]), it generated useful feedback and demonstrated face and content validity along with test-retest and inter-rater reliability. One downfall of the pre-test was that the physician participants formed a homogeneous group demographically with regards to CCFP background, age and practice setting (urban). The pre-test would have served as a better test model for the national survey if general practitioners were included in the sample, as well as a variety of age groups and some rural participants.

3.5.4.b Methods

The use of the facsimile was a quick and convenient way of conducting the pre-test. However, it was felt that this could not be adapted to the national survey since some physicians may not have a fax and results could be viewed by staff not involved with the study. Many fax returns had fax numbers and physicians names printed next to the number as part of the fax transmission. Physicians in the pre-test were identified by name. Although, this could have been considered as a breach of confidentiality, they were assigned a number for data recording purposes.

Detailed feedback is an important part of a pre-test. The lack of specific comments in this process may have been due to the fact that the physicians had a limited

amount of time to devote to the pre-test. Nevertheless, questions asked to the participants could have been more specific, including definitions of face and content validity. Also, a separate session of verbal feedback either in person or by telephone may have supplied more information or opinion. This method was not used because of concerns regarding the additional physician participation required for such an undertaking. There were difficulties encountered (repeated phone calls) in obtaining the questionnaire returns from the pre-test physicians and it was the investigator's opinion that participation may have declined if another layer of evaluation was added to the process.

3.5.4.c Questionnaire Changes-Appearance

References below to questions singled out in the pretest will contain the number that question assumed on the final instrument (Appendix A) in brackets. The fact that almost 60% of respondents thought the questionnaire looked good and no negative remarks were stated regarding the overall appearance was reassuring. As a result, the appearance of the instrument changed very little from the pre-test (Appendix D) to the national mail-out (Appendix A).

Due to the feedback provided, the paper that the questionnaire was printed on was changed from white to yellow. Family physicians receive many questionnaires and a large amount of mail in addition to their regular paper work. The yellow colour would hopefully result in the questionnaire standing out amongst a pile of papers. This would also be helpful if phone follow-up was required to remind the physician which questionnaire was being referred to. The numbering of the questions was also changed as

the investigator thought it was too confusing having questions under the General Information heading numbered 1-10 and questions under Section1:Exercise Counselling also numbered 1-10. Instead, all questions were listed in order from 1-36.

Answer options in question 24 (36) (Barriers to Exercise Counselling), were extended to five to be consistent with the other 5 point Likert-type questions in the survey. For questions 8(19) and 10(21) on page 2, the sixth answer option was separated from the other five choices spatially since it could be mistaken as being part of the "importance" continuum. It was not possible to separate questions with six choices from those with five as one respondent suggested because this would require mixing health condition and age questions together. The investigator thought it was more important to keep topic questions together. Also, the introduction to questions 7-10 (which became questions 18-21 on the final questionnaire) was changed to clearly show that option 6 was to be used only when applicable.

The order of questions 5 (16) and 6 (17) was left unchanged. Since past investigation [7] has shown that desired practice frequency is higher than current counselling frequency, providing the opportunity for physicians to show what they would like to do (versus what they are doing) first, was considered a less threatening form of presentation. It is recognized that an argument could be made that reversing the order could allow the physician to leave these two questions "feeling good" because of the higher scores the desired practice might produce (the small number of surveys in the pre-test confirmed that scores were higher for desired practice).

Complete trust was placed in the physicians by the investigator which included the assumption that the questions were completed in order. Question 16 could only have

been a prompt for question 12 if physicians did not complete the survey in order or if they went back and changed answers. It was the investigator's opinion that the inclusion of instructions regarding this would have been negatively received by the participants as it would have been basically asking the physicians "not to cheat".

Next, the introductory wording of question 24 (36) was changed. Since the wording seemed confusing to several respondents, it was changed to: "Rate how important the following exercise counselling barriers are to you." Ideally, it would have been preferable to conduct a second pre-test to evaluate the changes made to the questionnaire but the time line of the project did not permit this.

3.5.4.d Questionnaire Changes-Face Validity

No changes were made to the pre-test version of the questionnaire on the basis of face validity comments. Previous research [99] has shown a relation between lower resting rate (as a measure of physical fitness) and increased frequency of exercise counselling. Thus, question 17 (27) was not removed from the survey and was considered relevant to the Physician Exercise section. The investigator did agree that "cigarette smoker" was not a condition but a person with a condition. The wording should have been changed to "cigarette smoking" for the final questionnaire, but a simple oversight resulted in the wording remaining unchanged. Overall, it was felt that the wording "cigarette smoker" still clearly conveyed the smoking condition and the question was still be valid despite the oversight.

Criticism regarding the exercise counselling definition was reviewed. The definition is arbitrary since there is no standard to which it can be compared. It is

consistent with physician exercse counselling being evaluated in programs such as PACE (Physician Assisted Counselling of Exercise)[116] in the U.S. Unfortunately, the two reviewers that had a problem with the definition did not mention which part(s) of the description were in dispute. Thus, the definition was left unchanged since in the investigator's opinion it was the best version of the most encompassing definition possible. If the definition was made too narrow, it would have excluded components that many physicians would consider essential. To draw attention to the definition, part of the introductory sentence to the definition was changed to bold letters.

3.5.4.e Questionnaire Changes-Content Validity

Feedback about content validity resulted in some positive changes to the study instrument. Concerns were expressed by the thesis project committee regarding detection of those physicians who had a "selective" practice. The pre-test questionnaire did not have a mechanism to sort out whether any physicians were specialists (who also in addition may have a CCFP or GP background). Also, there are family physicians who do not have formal or complete specialty training but choose to limit their practice to certain patients or health problems (e.g., obstetrics). Therefore, a new question was added (question 2) to the final questionnaire that required responders to choose a medical area that comprised at least 75% of their practice.

The investigator did not feel another category was warranted in question 1 (1) for CCFP trainees who fail their CCFP exams. If a physician did not have their CCFP for whatever reason, they would qualify as a general practitioner if they were licensed to practise medicine. It was agreed that categories used in question 8 (9), may not be

reflective of actual practice numbers. Based on a reviewer's suggestion, the categories for number of patients seen per hour was changed from ≤ 5 to ≤ 4, 6-10 to 5-7 and ≥ 11 to ≥ 8. The wording of question 10 (11) was changed as the investigator thought the reviewer raised a valid point regarding the number of concepts in the question. Instead of asking: "Have you completed a course or special training or focused reading in exercise science or exercise counselling?", the question was simplified by deleting the phrase "or focused reading".

Despite the fact that one reviewer stated questions 7-10 (18-21) seemed "redundant", none of these questions were deleted or underwent a content change. The investigator thought it was necessary to keep a distinction between the importance of exercise and exercise counselling. Also, a separate category was not added to gauge exercise referral numbers. One reviewer requested this, but a category was already in place to acknowledge physician opinion regarding whether another professional should be doing the counselling. While osteoporosis is an important health condition for family physician exercise counselling, it was not added to the questionnaire. The health conditions in the survey were not meant to represent an exhaustive list. Space and brevity of the questionnaire did not permit the inclusion of many other important and relevant health conditions.

The reviewers did not identify any problems with question 14, "Define and give an example of moderate physical activity". The investigator thought physicians should show that they know what this term meant since it is used in the newer, modified ACSM exercise recommendations [6] discussed in chapter 2. However, the definition (see Appendix I) was very technical and likely too difficult for the average family physician to

answer correctly. None of the 10 physicians that completed the questionnaire supplied the correct answer. Thus, question 14 was deleted.

Another change made at the discretion of the investigator was assigning a BMI value (BMI = 28) to question 12 (23). The pre-test version had read "borderline BMI". It was felt that the question was fairer to physicians with a clear value assigned to a measure such as BMI. This change did not result in a different answer being required for that question, that is, the answer key remained the same.

3.5.4.f Questionnaire Changes-Construct Validity

Results from construct validity testing were based on a small number of pre-test participants. Validation is an evolving and ongoing process in a project of this magnitude and construct validity results could have changed with the larger, national study. The approach in establishing construct validity typically involves examining previously established or known relationships. Unfortunately, no such "reference standard" exists in this field, rendering such comparisons arbitrary. This makes the entire process of determining construct validity arbitrary and the results whether strong or weak have questionable value.

3.5.4.g Questionnaire Changes-Test-Retest Reliability

The investigator did not feel any questionnaire changes were required on the basis of test-retest reliability results. When chosen answers differed from the first to the second completion it was only by one item up or down on the scale. The questions that were most affected by this were Section1:questions 7-11,16 and 24. All of these questions addressed several items each with a four to five point Likert-type scale. What

this did indicate was that physicians may not have mentally perceived a great difference from one point to the next. As an example, the difference between "important" and "very important" may have been very little for some physicians although no respondents gave that specific feedback.

It is reasonable to expect some variation in the ages and conditions physicians will see from week to week. The most recent patient encounters may have been on the physician's mind when they completed the questionnaire which could influence their judgements on rating importance and frequency. Question 16 answer variation could also be explained by week to week differences in counselling practices. The key issue is that there was no evidence of a behavioural change between the first and second completions. When answers did change the second time, they moved one point up or down so responders did not necessarily "improve" their answers the second time.

Similar reasoning applies to question 24 as items that displayed variation were dynamic barriers that could change from week to week such as not enough time to counsel or patients not being interested in exercise. The more "static" barriers such as insufficient exercise education in medical school, did not show variation which makes the above explanations more plausible. Overall, the stability of the questionnaire was adequately demonstrated.

3.5.4.h Questionnaire Changes-Inter-Rater Reliability

The results from the Bland and Altman plot were reassuring regarding inter-rater reliability. The scoring by the two markers was shown to be the same. For the national study, one of the two markers could have scored all the questionnaires with a reasonable

assumption that the scores assigned were accurate and not reflective of marker bias. However, one possible bias that was not possible to assess in the pre-test was marker fatigue since only ten questionnaires were scored. The marker could conceivably change their scoring approach due to fatigue when marking hundreds of questionnaires in the national study.

3.5.4.i Questionnaire Changes-Cover Letter

Finally, minor changes were made to the cover letter. The phrase "preventive sport medicine" was changed to "preventive medicine" because it was felt that family physicians understood the meaning of the latter term better. The third sentence in paragraph two was deleted since the new question 2 on page 1 of the survey addressed the issue of selective/specialist practices. The pre-test cover letter is located in Appendix E and the final cover letter in Appendix B.

CHAPTER 4: NATIONAL STUDY: METHODS, PHYSICIAN RESPONSE AND DEMOGRAPHICS

4.1 Introduction

Once the pre-test analysis was completed in January of 1998, preparations were made for the national study. The design of the study was a cross-sectional survey using the revised version of the pre-tested questionnaire. All of the research work was based out of the University of Calgary Sport Medicine Centre. The study was approved by the Office of Medical Bioethics, Faculty of Medicine at the University of Calgary. For the purposes of this project, *national* referred collectively to the six provinces included in the study: British Columbia, Alberta, Manitoba, Ontario, New Brunswick and Nova Scotia. These provinces were chosen for their geographic locations so that physicians would be sampled from different parts of the country. The study took place over 5 months from February-June, 1998.

4.2 Subjects

4.2.1 Physician Selection

A list of 800 Canadian physicians who declared themselves as general practitioners or family physicians was obtained from Cornerstone List Managers Inc. in Toronto, Ontario. Cornerstone publishes the annual Canadian Medical Directory and updates their physician lists on a weekly basis based on information obtained directly from The College of Physicians and Surgeons in each province/territory. It was the original intention of the investigator to obtain physician names from the provincial

college registries. Unfortunately, many colleges charge large amounts of money for this information. The budget of this project could not meet the college prices. Cornerstone provided a stratified (by province) random sample of 800 physicians using a computer generated random number selection program. The proportion of family physicians selected from each province equaled the number of family physicians in that province divided by the total number of family physicians in the six study provinces combined. If the same proportion of physicians was selected from each province, it would not have represented the actual number of physicians in the province relative to the total number of family physicians in all of the six provinces. The information available to the investigator included physician name, address and work telephone number. No other demographic information such as gender of the physicians was known. The physician information was supplied to the investigator in disk format only.

4.2.2 Inclusion Criteria

. In order for a physician to be eligible for the study, they had to meet the following criteria:

- Since the questionnaire had not been translated into French, only those physicians who identified English as their main language or co-main language were included.
- Physician had to be a general practitioner or a family physician to be labeled a *family physician* for the purpose of this study.
- Physician had to be actively practising family medicine at the time of the study to be considered as a *family physician* in the study.

The first two criteria were met before the investigator received the physician sample disk. Cornerstone was made aware of these criteria and ensured the sample contained only physicians that met these stipulations. However, neither Cornerstone or the investigator could start the study with certainty that the third inclusion criteria had been met. Many physicians list themselves as qualified general practitioners or family physicians even if they are practising another area of medicine (with or without formal specialty training). It was true intent that question 2 on the questionnaire would screen for those physicians who did not meet this third criteria.

4.2.3 Exclusion Criteria

A physician was declared ineligible for the study if they met any of the following criteria:

- Physicians who were not practising general family medicine at least 75% of their practice time.
- Any non-physician primary care practitioner.

Although only physicians were requested for the supply list, the latter exclusion was added since some nurses practise primary care medicine.

4.3 Sample Size

With the aid of a statistician, the sample size was determined to be 400, using a power of .80. This allowed a 95% confidence that estimates would have a precision of at

least ± 5%. The sample size determination was based on the 95% confidence interval for a proportion using the normal approximation to the binomial. A sample size of 300 would decrease the precision to ± 6%. A response rate of > 50% was desired to minimize response bias. Based on previous response rates, it was decided that 700 physicians would be sent a questionnaire. Since the original sample contained 800 physicians, 100 physicians were removed from the sample. The removal of the 100 physicians was accomplished by using a computer generated random number selection program with the same proportion of physicians from each province as in the original sample of 800.

4.4 Data Collection

4.4.1 Mail-Out Stage

All physicians were assigned a number that appeared in the upper right corner of page 1 of the questionnaire. Physician data was tracked by using this number. Two mail-out rounds were used. If a physician did not return the first questionnaire, they received a second copy. Both times questionnaires were sent by mail, with a postage paid, pre-labeled return envelope included. The first mail-out was sent out on February 18,1998. Physicians were asked in the cover letter to return the questionnaire within three weeks from the date of the letter. Those who completed the first questionnaire were entered in the database and not sent any further copies of the questionnaire.

When a response was returned indicating that the physician was a specialist or did not meet the inclusion criteria, another physician from the 100 physician sample was selected and sent a questionnaire. The replacement physician was chosen from the same province as the original physician using a computer generated random number selection program. In other words, at the first mail-out stage, any non-family physician was

replaced with another. This ultimately increased the total number of questionnaires sent out to 747. The second mail-out round began March 18, 1998. Again, physicians were given three weeks to return the completed questionnaire. If the physician did not reply to the second mail-out, then they were automatically transferred to the phone stage of the study.

4.4.2 Phone Stage

The third and final stage of data collection consisted of telephone calls to encourage non-respondents to complete the questionnaire. The original intention was to conduct as many telephone calls as required until the number of returned questionnaires reached 400 (the desired sample size). A very aggressive telephone campaign was undertaken by the investigator over 4 weeks from April 27 to May 29,1998. A list of non-respondents was generated with names and telephone numbers. It was at this point that it became evident that a total of 20 physicians either did not have a phone number listed in the file or the listed number was incorrect.

The phone list consisted of 451 names with proper work phone numbers. The investigator made up to 5 calls per physician. Repeat phone calls ceased when either the physician was spoken with personally or when a message was left with clinic staff. The investigator asked to speak with all physicians personally but was often denied the opportunity by clinic staff. Many clinic staff were instructed to ask physicians if they were calling about a patient. The investigator gave the truthful answer that the call was not about a patient. Then, staff often demanded to know what the call was about despite the fact that the investigator was a physician calling long distance. Again, the

investigator gave a truthful answer and stated the call was to see whether the study questionnaire was received and if the physician could complete it. The next response was often that the physician did not "fill out questionnaires".

It was estimated that the investigator made more than 2000 phone calls. Lines were frequently busy and physicians occupied with patients. In addition, scheduling was a challenge as five different time zones were involved. One piece of information obtained by phone was if the physician was practising family medicine. When the investigator was able to personally speak with a physician, a set of standard questions were asked after personal introductions. These included: 1) "Did you receive a yellow, two-page, exercise counselling questionnaire from us?" 2) "Do you think you could complete it and send it back to us? I really appreciate your help." OR 3) "If you did not receive it, would you be willing to complete it if we sent you another copy? I really appreciate your help."

If the physician requested another copy, it was sent to him/her and they were given three weeks to return it from the date of the cover letter. An additional cover note (Appendix J) was included in phone stage mail-outs to remind physicians of the telephone conversation that took place and that their time was appreciated. Also, envelopes had "personal and confidential" stamped on them to discourage staff from opening up the physician's survey letter and discarding it.

Other than determining if physicians practised family medicine, time did not permit the investigator to obtain any other demographic information from those who had refused to participate. These physicians simply would not permit the phone call to continue. On the other hand, if physicians had questions about the study purpose or

methods used, the investigator answered questions pertaining to such issues. The deadline for responses that were included in the data analysis was June 12,1998.

4.5 Data Analysis

Most of the data was expressed as percentages. The difference between current and desired exercise counselling was determined by calculating the difference between two proportions with a confidence interval. A chi square analysis was used to look for a relation between physicians exercise habits and physician belief in whether they are exercising enough.

An exploratory analysis was done to see which variables addressed in the questionnaire were associated with those who exercise counsel to >50% of their patients. The 50 % mark was chosen arbitrarily to distinguish frequent counsellors from infrequent counsellors. The 50 % percentage has been previously used to evaluate the same relationship. [98] One disadvantage of using 50 % as a division mark, is that it does not discriminate between percentages that are around the 50 % mark. An example of this problem would be labeling 45 % of patients counselled as infrequent counselling and 55 % of patients counselled as frequent counselling. The difference between 45 % and 55 % is not that great, but the division into infrequent and frequent counselling implies a greater difference.

Odds ratios were used to estimate the association between physician variables and those physicians who counsel > 50 % of their patients about exercise. Odds ratios start with a known "disease" outcome variable (physicians who do or do not exercise counsel

> 50 % of their patients) and look for a possible association between "exposure" variables (physician characterisitics/variables) and the outcome variable. Relative risk estimates start with known "exposure" variables and look for the risk of a particular outcome in one "exposure" group in comparison to another. An example of a relative risk estimate in this study would be assessing whether rural physicians were more likely ("at a greater risk") to exercise counsel in comparison to urban physicians. Odds ratios were used instead of relative risk estimates because this study was not looking for the risk of an outcome within "exposure" groups. Instead, the association of characteristics/variables to the outcome was explored. An odds ratio = 1.0 indicated no association was present. No formal hypotheses were tested, but confidence intervals were used to indicate the precision of odds ratios.

The data was entered into a computer file using a custom designed data entry program developed in Visual Basic. Stataquest for Windows was employed for all statistical analyses including proportions, difference between two proportions, chi square analysis and odds ratio calculations.

4.6 Physician Response

A total of 700 questionnaires were mailed out at the start of the study (stage one). This initial mail-out revealed that 47 physicians were ineligible for the study. Therefore, 47 more physicians were chosen by computer random selection from the remaining 100 in the pool, to replace the ineligible physicians. Each of these 47 physicians was mailed a questionnaire. Thus, a total of 747 questionnaires were mailed in the first stage. Physicians discovered to be ineligible after the first mail-out were recorded but not

replaced. In addition to the first 47, another 161 physicians were found to be ineligible during the second and third stages of the study. The final total of ineligible physicians was 208 or 27.8 % of the original 747 physicians. The number of eligible physicians was 539. A total of 330 physicians returned the questionnaire, producing a response rate of 61.2%.

Table 4.1 shows the number of returns received at each stage of the project. A total of 71.2 % of ineligible physicians were found to be ineligible during the phone stage. Of note, 208 physicians committed to complete the study in the phone stage, but only 101 (48.6%) completed and returned the survey by the deadline date of June 12,1998.

TABLE 4.1 - Response Rates at Different Study Stages*

Study Stage	No. of questionnaires mailed	No. pledged returns by phone	No. questionnaires received	Proportion of total questionnaires received by stage
Stage one mail- out	747	N/A	158	47.9%
Stage two mail-out	524	N/A	71	21.5%
Phone stage	193	208	101	30.6%
			n=330	

*(Where N/A = not applicable)

In order to be considered ineligible for the response rate calculation, physicians had to be either not practising family medicine or could not be contacted by phone. Specifically, ineligible categories included: specialist (not practising family medicine at least 75% of the practice), incomplete address, incorrect or no phone number, on personal or professional leave of absence, retired, moved and on vacation. As seen in Table 4.2 specialists made up the majority of exclusions with 128 (61.5%). Other reasons included 22 physicians that had moved, 20 on vacation and 20 without a correct phone number. The remainder of the ineligible physicians are shown in Table 4.2.

TABLE 4.2 - Breakdown of Ineligible Physicians

Reason for Physician Ineligiblity	Number of Physicians
Specialist	128
Moved	22
No Phone #	20
Vacation	20
Non-Practising	17
Incomplete Surveys	1
	n=208

Table 4.3 shows the original proportions of physicians from each of the study provinces. A large physician contingent from Ontario (51.7 %) was present which is due to their greater share (51.6 %)[123] of Canada's family physicians compared to the other

provinces in this study. This table also shows the proportion breakdown by province of the 330 respondents. The greatest change from start to completion was for Ontario where their physician share decreased by 3.7 %. Alberta had a 3.0 % increase in its proportion of the physician share. All of the remaining provinces had proportion changes in the range of 0.2-0.7 %. Overall, the original study proportions were satisfactorily maintained despite the moderate response rate.

TABLE 4.3 - Provincial distribution of study physicians at original mail-out and at study completion

Province	Original Distribution	Proportion	Responses	Proportion
British Columbia	159	21.3%	71	21.5%
Alberta	104	13.9%	56	16.9%
Manitoba	41	5.5%	17	5.2%
Ontario	386	51.7%	160	48.5%
New Brunswick	21	2.8%	8	2.4%
Nova Scotia	36	4.8%	18	5.5%
Total	747		330	

Questions 1-10 of the questionnaire produced the physician demographic information. The results of questions 1, 3-6 are displayed in Table 4.4. A total of 163 physicians (49.4 %) did not complete a family medicine residency but 1 yr. intern training. This also included 18 physicians who cited answers such as "2 yr. intern training", 1-2 yr. " internal medicine plus 1 yr. intern training" and "1 yr. pediatrics plus

1 yr. intern training". There was no separate category available for these responses, so they were included with the 1yr. intern training data. The number of respondents that had completed a 2 yr. family medicine residency was 123 (37.3 %). Physicians who had obtained their CCFP designation via the practice eligible route totaled 44 (13.3 %). Only 2 physicians (0.6 %) had a CASM Diploma in Sport Medicine.

Most physicians (70.6 %) had been in practice > 10 years. This included 37.3 % ≥ 20 years and 33.3 % 11-19 years. Those in practice 6-10 years comprised 20.6 % and only 8.8 % were in practice < 5 years. The study sample was majority male (63.8 %) and 36.2 % were female. The greatest number of respondents were in the 41-50 years age category, with 28.1 % at 31-40 years of age and 19.5 % 51-60 years of age. At the two ends of the age spectrum, 7.6 % were ≥ 61 years and 3.0 % were 20-30 years of age. It takes 9 years of schooling (since the early 1990s) for an 18 yr. old to become a family physician (2 yr. residency program), so numbers were small in the 20-30 year age category. Most physicians (70.9 %) had a healthy range BMI of 20-25. A total of 19.4% had an elevated BMI (>25) and 9.7% had a low BMI (< 20).

TABLE 4.4 - Demographics of Respondents I

Question 1 : Primary care training

	N	Proportion
1 yr. intern training	163	49.5%
2 yr.family medicine residency	123	37.3%
CCFP via practice eligible route	44	13.4%
Total	330	
CASM Diploma	2	0.6%

Question 3 : Number of years in practice

	N	Proportion
< 5 years	29	8.8%
6-10 years	68	20.6%
11-19 years	110	33.3%
≥ 20 years	123	37.3%
Total	330	

Question 4 : Your Gender

	N	Proportion
Female	119	36.2%
Male	210	63.8%
Total	329	

Question 5 : Your Age

	N	Proportion
20-30 years	10	3.0%
31-40 years	92	28.1%
41-50 years	137	41.8%
51-60 years	64	19.5%
61+ years	25	7.6%
Total	328	

Question 6 : Your body mass index (BMI)

	N	Proportion
< 20	31	9.7%
2-25	227	70.9%
>25	62	19.4%
Total	320	

TABLE 4.5 - Demographics of Respondents II

Question 7 : Practice setting

	N	Proportion
Urban	236	71.5%
Rural	94	24.5%
Total	330	

Question 8 : Type of practice

	N	Proportion
Fee for service	313	94.8%
Salary	17	5.2%
Total	330	

Question 9 : Approximate number of patients seen per hour

	N	Proportion
≤ 4	87	26.5%
5-7	227	69.2%
≥ 8	14	4.3%
Total	328	

Question 10 : Approximate number of patients seen per week

	N	Proportion
≤ 150	181	55.2%
151-300	142	43.3%
≥ 301	5	1.5%
Total	327	

Question 11 : Completed a course in exercise counselling

	N	Proportion
Yes	16	4.9%
No	310	95.1%
Total	326	

A description of physician practices was obtained through questions 7-10. Table 4.5 displays this information as well as question 11 results. The physician sample was divided at 71.5 % urban (> 30,000 population size) and 24.5 % rural. Remuneration method was overwhelmingly fee for service (94.8 %) with only 5.2 % receiving a salary form of payment. Most physicians (69.2 %) saw 5-7 patients per hour, with 26.5 % seeing ≤ 4 patients per hour. A small number (4.3 %) saw ≥ 8 patients per hour. Since some physicians do not work every morning and afternoon, the number of patients seen per week was also recorded. Although 69.2 % saw 5-7 patients per hour, some of those physicians were likely not working every morning and afternoon because 55.2 % of the total physicians claimed they saw ≤ 150 patients per week. Another 43.3% of respondents saw 151-300 patients per week and only 1.5 % saw ≥ 301 patients per week. Finally, it was clear the physicians did not represent a sample with previous special training in exercise science or exercise counselling as 95.1 % claimed they did not have such a background.

CHAPTER 5: NATIONAL STUDY: RESULTS

5.1 Introduction

This chapter contains the results of questions 12-36 of the questionnaire. These results are displayed with statistical answers to the specific aims of this study. Since the respondents left some data items blank, all questions do not contain the same number of responses.

5.2 Physician Confidence

Questions 12 and 13 addressed physician confidence in exercise counselling. Specifically, these questions determined the proportion of physicians that felt confident that their exercise counselling would result in patients starting and continuing to exercise. A total of 58.2 % of respondents thought they could convince 0-25 % of their patients to start exercising. The patient percentage categories of 0-25 % and 26-50 % were selected by 91.5 % of physicians. This left only 7.3 % who thought they could motivate 51-75 % of their patients to start exercising and 1.2 % that thought 76-100 % would take action based on their counselling.

Respondents were then asked a variation of the same question (question 13) that gauged whether they thought patients would continue exercising if they gave them exercise counselling with follow-up visits. The results from this question were almost identical to the question above (question 12). With the precision of measurement in this

study at ± 5-6 %, the results of questions 12 and 13 could not be declared different. Table 5.1 displays these results.

TABLE 5.1 - Physician Confidence in Their Exercise Counselling

Percentage of Patients	Physicians Who Believe Patients Will Start Exercising Due to Counselling		Physicians Who Believe Patients Will Continue Exercising Due to Counselling	
	N	Proportion	n	Proportion
0-25%	192	58.2%	195	59.3%
25-50%	110	33.3%	101	30.7%
51-75%	24	7.3%	29	8.8%
76-100%	4	1.2%	4	1.2%
Total(n)	330		330	

5.3 Physician Knowledge and Qualification

Perceived level of knowledge and qualification were evaluated with questions 14 and 15. These questions determined what proportion of physicians felt they were very to extremely knowledgeable in exercise counselling, and very to extremely qualified to do exercise counselling. Most respondents (42.4 %) chose "moderately knowledgeable" as an answer. Only 9.7 % felt they were very to extremely knowledgeable. The results were similar for belief in qualification. The most common answer was 41.3 % as "moderately qualified". Again, only 9.1 % considered themselves very to extremely qualified. The data for both of these questions is shown in Table 5.2.

TABLE 5.2 - Physician Belief in Their Knowledge and Qualifications

Patient Percentages	Physician Knowledge		Physician Qualification	
	n	Proportion	n	Proportion
Not: Knowledgeable/Qualified	57	17.3%	56	17.0%
Slightly: Knowledgeable/Qualified	101	30.6%	107	32.5%
Moderately: Knowledgeable/Qualified	140	42.4%	136	41.3%
Very: Knowledgeable/Qualified	22	6.7%	21	6.4%
Extremely: Knowledgeable/Qualified	10	3.0%	9	2.7%
Total(n)	330		329	

5.4 Current and Desired Exercise Counselling

Question 17 on the questionnaire determined the proportion of physicians that exercise counsel a certain percentage of their patients. Only 11.8% of physicians claimed to counsel between 76-100% of their patients. Most respondents counselled < 50% of their patients (67.0%). The 0-25% category was selected by the greatest number of physicians (35.8%). These results are summarized in Figure 5.1.

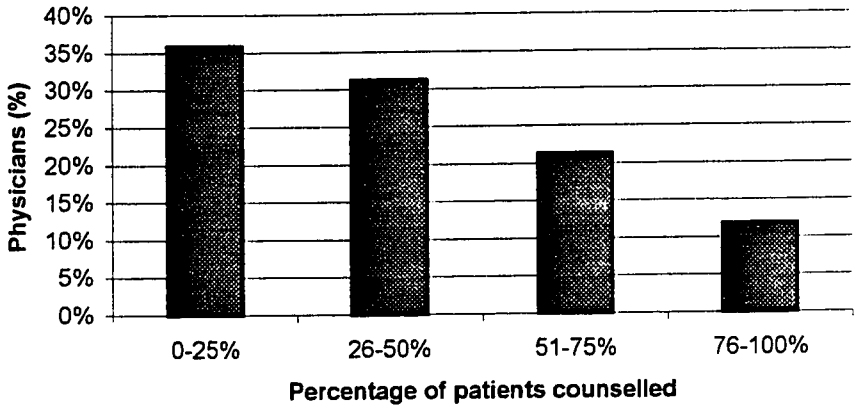

FIGURE 5.1 - Proportion of Physicians that Counsel a Certain Percentage of Their Patients.

The percentage of patients that physicians think they should be counselling was asked in question 16. The results from this question were combined with the results in question 17 to look for a difference between the proportion of physicians who were currently counselling their patients versus the proportion who think they should be counselling their patients. The number of patients was represented by four percentage categories. The raw data is displayed in Table 5.3 including confidence intervals. There were significant differences identified in each category using a 95 % level of confidence. Clearly, there was a difference between current and desired counselling. Physicians felt they should be counselling more of their patients about exercise. The power of this study enabled differences as small as ± 6 % to be detected, so these results were considered true differences.

TABLE 5.3- Differences Between Current (Q17) and Desired (Q16) Counselling*

Percentage of Physicians that Exercise Counsel	Percentage of Patients Counselled 0-25%	Percentage of Patients Counselled 26-50%	Percentage of Patients Counselled 51-75%	Percentage of Patients Counselled 76-100%	Percentage of Patients Counselled Total(n)
Currently Counsel	35.8%	31.2%	21.2%	11.8%	330
Desire to Counsel	6.7%	20.0%	30.0	43.3	330
Difference Between Currently Counsel and Desire to Counsel	(+) 29.1%	(+) 11.2%	(-) 8.8%	(-) 31/5%	
Standard Error of Diff.	.030	0.34	.034	0.33	
CI	(29.0-29.2)	(11.1-11.3)	(8.7-8.9)	(31.4-31.6)	

*(Where Q = Question and CI = Confidence Interval)

5.5 Exercise Importance and Counselling by Age Group

The importance of exercise for different age groups was examined in question 18. Table 5.4 contains these results. Although age 41-60 generated the highest percentages for very important (47.1 %) and extremely important (44.7 %) ratings, the power of this study did not allow a declaration that age 41-60 was considered the most important age for exercise. Age 21-40 also produced similar results with 44.3 % choosing very important and 43.4 % extremely important. There was a slight decrease in importance

from the above age groups for ages < 20 and 61-75. The upper two categories of importance were chosen by 83.4 % for age < 20 and 82.6 % for age 61-75.

The most noticeable difference in the data was for the 75+ age group. The level of importance was mostly divided between moderately important (20.8 %), very important (37.0 %) and extremely important (32.4 %) compared to the other age groups where > 80 % of responses were in the very and extremely important categories. When the responses from these two upper categories were grouped together (see Table 5.4), the 75+ age group appeared lower (69.4%) compared to the other age groups.

TABLE 5.4 - Importance of Exercise for Different Age Groups *

Level of Importance	Age Groups				
	< 20	21-40	41-60	61-75	75+
Not Important	0.9%	0.3%	0.3%	0.3%	1.2%
Slightly Important	3.7%	0.9%	0.3%	3.0%	8.6%
Moderately Important	12.0%	11.0%	7.7%	14.0%	20.1%
Very Important	40.2%	44.3%	47.1%	44.5%	37.0%
Extremely Important	43.3%	43.4%	44.6%	38.1%	32.4%
VIP + EIP	83.5%	87.7%	91.7%	82.6%	69.4%

*(Where P = Proportion, VIP = very important, EIP = extremely important)

Physicians were also asked if they considered exercise counselling by a family physician important for different age groups. These results are displayed in Table 5.5. The highest percentage answer for the 41-60 age group was 41.8% choosing exercise counselling by a family physician as extremely important. This closely resembled the percentage (44.7 %) of physicians who thought exercise was extremely important for that age group (Table 5.5). A similar level of the importance of physician exercise counselling was apparent for the age 61-75 group with 33.8 % rating it as very important and 39.0 % extremely important. Counselling the < 20 age group was viewed as very important by 19.4 % and extremely important by 28.3 %.

TABLE 5.5- Importance of Exercise Counselling for Different Age Groups*

Level of Importance	Age Groups				
	< 20	21-40	41-60	61-75	75+
Not Important	4.9%	0.6%	0.3%	0.6%	0.6%
Slightly Important	16.6%	7.6%	3.1%	4.0%	9.5%
Moderately Important	21.2%	21.3%	11.0%	11.6%	16.2%
Very Important	19.4%	27.7%	32.6%	33.8%	26.2%
Extremely Important	28.3%	33.2%	41.8%	39.0%	35.4%
VIP + EIP	47.7%	61.0%	74.4%	72.9%	61.6%

*(Where P = Proportion, VIP = very important, EIP = extremely important)

Overall, when the very important and extremely important (VIP+EIP) choice options were considered together for each age category, the ratings were higher for the importance of exercise (Table 5.4) versus the importance of exercise counselling by a family physician (Table 5.5). In particular, the 21-40 age group saw a decrease from 87.8 % (Table 5.4) to 61.0 % (Table 5.5) and the < 20 age group from 83.4 % (Table 5.4) to 47.7 % (Table 5.5). A small proportion of physicians thought another health or fitness professional should do the exercise counselling for different age groups. As seen in Figure 5.2, this ranged from 9.5 % for age < 20 and 12.2 % for age 75 +. Since the Likert-type scale for level of importance had five options, the percentage results for the above could not be assumed to account for any differences between the VIP+EIP results for importance of exercise versus importance of exercise counselling by a family physician for different age groups.

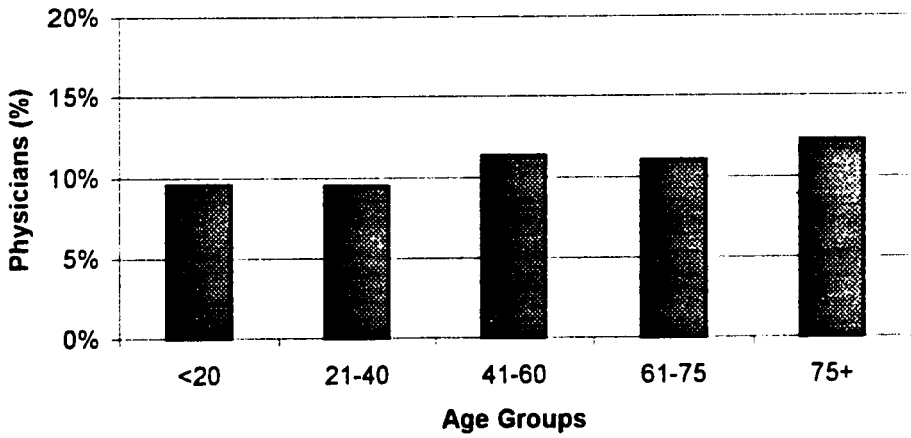

FIGURE 5.2 Physicians Who Believe That Exercise Counselling Should Be Done By Another Health/Fitness Professional For Different Age Groups.

5.6 Exercise Importance and Counselling for Health Conditions

A list of ten health conditions was provided for questions 20-22 of the questionnaire. One of the conditions, Type II Diabetes, appeared on only half of the returned questionnaires due to a printing error that was not caught before mail-out. Therefore, the data on Type II Diabetes was not presented in this thesis. For the purpose of this report, the results concerning the other nine health conditions were shown.

Questions 20-22 determined what proportion of physicians consider exercise to be important for various health conditions. These health conditions included: ischemic heart disease (IHD), pregnancy, osteoarthritis, obesity, depression, sedentary lifestyle, cigarette smoking(smoker), stress and elevated cholesterol. The results were summarized in Table 5.6. Few physicians rated exercise as not important or slightly important for the various health conditions.

The variation in the level of importance between the different conditions occurred in the upper three categories (moderately, very or extremely important). For obesity, 69.9 % rated exercise as being extremely important. IHD followed with a 57.0 % rating for exercise being extremely important. Since the power of this study detected answers with a precision of ± 6 %, obesity was considered the highest rated health condition for which exercise was deemed extremely important. At the lower end of the data was pregnancy, where only 20.1 % thought exercise was extremely important and osteoarthritis, where exercise was rated by 31.4 % as extremely important.

TABLE 5.6- Importance of Exercise for Different Health Conditions*

	1	2	3	4	5	4 + 5
IHD	0.6%	0.9%	4.6%	36.9%	57.0%	93.9%
Pregnancy	0.6%	7.0%	28.4%	43.9%	20.1%	64.0%
Osteoarthritis	0.3%	1.8%	21.7%	44.8%	31.4%	76.2%
Obesity	0.3%	.6%	2.4%	26.7%	69.9%	96.6%
Depression	0.3%	2.5%	15.6%	42.8%	38.8%	81.6%
Sedentary	0.3%	.6%	9.4%	40.1%	49.5%	89.6%
Smoker	0.3%	4.3%	15.5%	37.7%	42.2%	79.9%
Stress	0.3%	1.8%	10.1%	35.7%	52.1%	87.8%
Elevated Cholesterol	0.6%	1.5%	9.7%	37.7%	50.5%	88.2%

*(where 1= Not Important, 2= Slightly Important, 3= Moderately Important, 4= Very Important, 5= Extremely Important)

Since a large percentage of answers were rated as very important and extremely important (Table 5.6), it is worthwhile looking at the results when these two ratings are combined (VIP+EIP). Although pregnancy and osteoarthritis were the lowest rated conditions under the extremely important heading, 43.9 % and 44.8 % respectively, rated them as very important. Despite this, the combination of VIP+EIP placed pregnancy last and osteoarthritis in the bottom four conditions. The most important (VIP+EIP) conditions included IHD, obesity, elevated cholesterol, stress, and sedentary lifestyle.

Next, the importance of exercise counselling by a family physician for the different health conditions was evaluated. This corresponded to question 21 on the

questionnaire. These results are displayed in Table 5.7. Generally, the importance of exercise counselling by a family physician was rated lower than the importance of exercise for a condition. When the upper two levels of importance are combined (VIP+EIP), there was a minimum 10% decrease from importance of exercise to importance of physician counselling for the condition. The exceptions to this were for pregnancy and osteoarthritis, where the VIP+EIP ratings in Table 5.6 could not be declared different from those in Table 5.7. IHD saw a 25.5 % drop in VIP+EIP ratings from importance of exercise (Table 5.6) to importance of exercise counselling by a family physician (Table 5.7).

TABLE 5.7- Importance of Exercise Counselling for Different Health Conditions*

	1	2	3	4	5	4 + 5
IHD	0.3%	0.9%	3.7%	18.6%	49.9%	68.4%
Pregnancy	0.6%	5.0%	17.4%	29.5%	37.9%	67.4%
Osteoarthritis	0.3%	2.2%	14.6%	29.7%	42.1%	71.8%
Obesity	0.6%	0.9%	4.3%	21.0%	54.3%	75.3%
Depression	0.6%	2.5%	11.5%	27.9%	42.7%	70.6%
Sedentary	0.6%	2.5%	8.3%	25.9%	46.3%	72.2%
Smoker	0.3%	5.3%	11.2%	25.7%	44.3%	70.0%
Stress	0.3%	2.2%	7.7%	26.5%	47.5%	74.1%
Elevated Cholesterol	0.3%	2.2%	6.2%	27.5%	48.5%	75.9%

*(where 1= Not Important, 2= Slightly Important, 3= Moderately Important, 4= Very Important, 5= Extremely Important)

Physicians were allowed to choose an option for each health condition that stated exercise counselling should be done by another health/fitness professional other than a family physician. The results of those who chose that option are displayed in Figure 5.3. IHD was the condition most frequently chosen for other professional counselling at 26.6 %. The remainder of the conditions could not be distinguished statistically as different. Pregnancy (9.6 %) and osteoarthritis (11.2 %) appeared to be the conditions chosen least often for another professional to counsel.

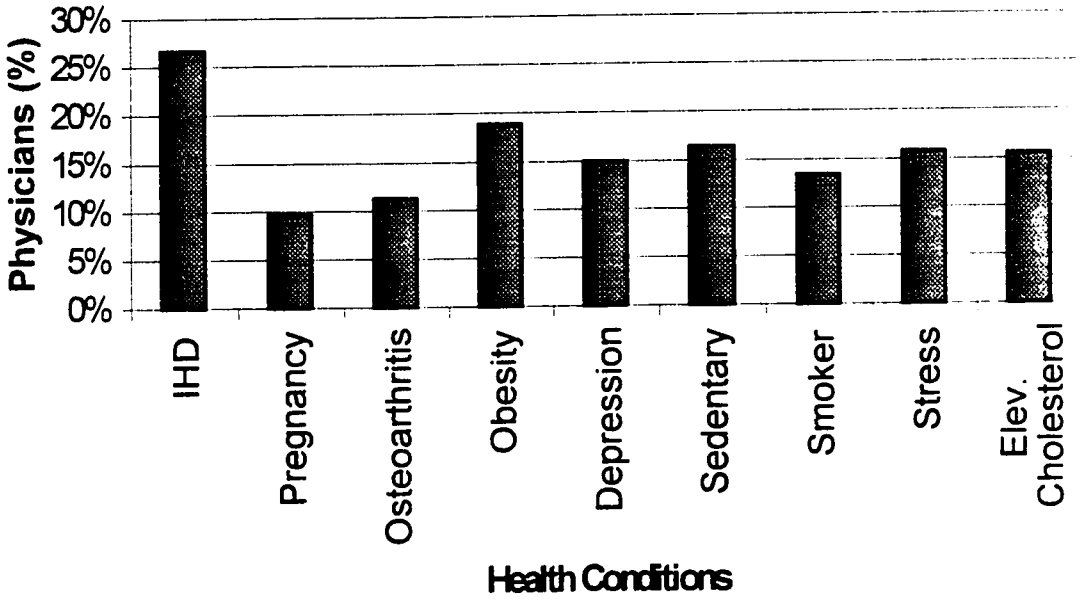

FIGURE 5.3- Physicians Who Believe Exercise Counselling Should Be Done By Another Health/Fitness Professional

TABLE 5.8- Frequency of Exercise Counselling by Physicians for Certain Health Conditions*

	1	2	3	4	5	4 + 5
IHD	0.6%	6.1%	20.5%	36.1%	36.7%	72.8%
Pregnancy	3.7%	21.4%	22.3%	30.3%	22.3%	52.6%
Osteoarthritis	0.3%	10.3%	31.3%	35.3%	22.8%	58.1%
Obesity	0.3%	3.1%	14.9%	24.7%	57.0%	81.7%
Depression	0.9%	16.1%	22.8%	30.1%	30.1%	60.2%
Sedentary	0.6%	7.0%	23.1%	31.9%	37.4%	69.3%
Smoker	1.2%	17.4%	25.6%	30.8%	25..0%	55.8%
Stress	0.3%	6.1%	25.9%	29.9%	37.8%	67.7%
Elevated Cholesterol	0.6%	5.8%	14.6%	28.7%	50.3%	79.0%

*(where 1= Never, 2= Seldom, 3= Often, 4= Usually, 5= Always)

When frequency of counselling the health conditions was rated, obesity (81.7 %) and elevated cholesterol (79.0 %) were cited by more physicians. (see Table 5.8 above). Most conditions were counselled at least usually by a similar proportion of physicians that had rated these conditions ≥ VIP for exercise counselling by a family physician. The exceptions to this were smoking, pregnancy and osteoarthritis which decreased in physician proportion for counselling frequency.

5.7 Physician Exercise Prescription

Questions 23 and 24 were designed to allow an objective assessment of physician exercise prescription. Physicians required a score of 4/6 for question 23 to meet minimal ACSM exercise recommendations. The four points had to consist of activity type, frequency, duration, and intensity. Table 5.9 shows these results. Only 12.1 % were able to score a 4/6. A more common scenario was a 3/6 score, achieved by 49.7 %. A total of 11.5 % scored a 0/6.

TABLE 5.9- Physician Exercise Prescription Scores for Questions 23 & 24

	Question 23		Question 24	
Score	n	Proportion	N	Proportion
0	38	11.5%	305	92.4%
1	19	5.8%	24	7.3%
2	65	19.7%	1	0.3%
3	164	49.7%	N/a	n/a
4	40	12.1%	N/a	n/a
5	4	1.2%	N/a	n/a
6	0	0.0%	n/a	n/a

Hypertension was added to question 23 to create question 24. The answers were scored out of a possible 2 points. This condition posed a problem for physicians as 92.4 % scored a 0/2. The remainder included 7.3 % scoring a 1/2 and 0.3 % scoring a 2/2. This information is also shown in Table 5.9.

5.8 Counselling Methods/Techniques

Time spent to do exercise counselling was addressed in question 25. This question determined the proportion of physicians that spend > 2 minutes exercise counselling. A total of 62.4 % claimed they spend > 2 minutes counselling. The remainder of physicians (37.6 %) chose ≤ 2 minutes as their counselling time.

In question 26, physicians had to rate how frequently they used certain counselling methods or techniques. A list of 14 methods/techniques were included in the question for rating. Table 5.10 shows the proportion of physicians that used certain counselling methods/techniques. The most frequent methods that physicians used "always" were specifying frequency of activity (22.5 %) and specifying duration (19.3 %). At the other end of the continuum, 31.5 % never give out education materials and 34.9 % never write down the prescription for the patient to take home.

TABLE 5.10- Frequency of Use of Different Counselling Methods/Techniques*

	1	2	3	4	5	4 + 5
Give out educational materials	31.5%	40.4%	19.4%	7.4%	1.2%	8.6%
Specify frequency	2.5%	4.0%	31.8%	39.2%	22.5%	61.7%
Write down prescription	34.9%	45.3%	11.0%	7.7%	1.2%	8.9%
Specify type/mode	2.8%	10.4%	39.3%	34.1%	13.4%	47.6%
Evaluate if patients know how to find target heart rate	21.7%	40.5%	19.8%	12.8%	5.2%	18.0%
Specify duration	2.5%	8.3%	29.7%	40.4%	19.3%	59.6%
Record patients BMI	23.5%	36.3%	18.6%	15.9%	5.8%	21.7%
Make follow up plan	11.0%	33.3%	28.4%	24.5%	2.8%	27.2%
Specify intensity	6.1%	21.3%	33.5%	29.3%	9.8%	39.0%
Record patients exercise habits	6.8%	29.5%	29.5%	26.7%	7.7%	34.4%
Recommend resistance training.	19.4%	51.7%	19.1%	7.1%	2.8%	9.9%
Specify warm up & cool down	10.4%	28.5%	29.5%	21.5%	10.1%	31.6%
Ask about barriers to exercising	8.0%	22.5%	33.0%	27.1%	9.3%	36.4%

*(where 1=Never, 2=Seldom, 3=Often, 4=Usually, 5=Always)

The following items were cited frequently in the "seldom" category: recommend resistance training (51.7 %), writing down a prescription (45.3 %), giving out education materials (40.4 %) and evaluating if patient's know how to find their target heart range (40.6 %). Items that were rated by >70 % of physicians when results from never and seldom categories were combined included: writing down a prescription 80.1 %, giving out education materials 71.9 % and recommending resistance training 71.0 %. Several items were split fairly evenly (21.3-33.5 %) between seldom, often and usually in frequency ratings. These included: asking about barriers to exercise, specifying warm up and cool down, recording patient's exercise habits, specifying intensity and making a follow-up plan. When frequency ratings of usually and always were combined, the following items were cited more often: specifying frequency 61.7 %, specifying duration 59.6% and specifying type/mode 47.6%.

5.9 Physician Exercise Habits

The proportion of physicians that exercised according to ACSM recommendations was determined by using the results from questions 30-34. Each physician was assigned an overall score based on their answers to these questions. An exercise program that met ACSM recommendations was given a score ≥ 4/5. The score key is shown in Appendix K. The four points had to include activity type, duration, frequency and intensity. Intensity was evaluated by the physician identifying a correct method of assessing their exercise intensity (question 33). Table 5.11 shows the

percentage of physicians that achieved a certain score. A total of 22.4 % scored a 4/5 and 13.3 % scored a 5/5. A score of < 4/5 was assigned to 64.2 %.

TABLE 5.11- Physician Exercise Scores

Score	n	Proportion
0	20	6.1%
1	51	15.5%
2	47	14.2%
3	94	28.5%
4	74	22.4%
5	44	13.3%
Total(n)	330	

A chi square analysis was done to look for a relation between physician belief in whether they are exercising enough (question 35) and current physician exercise habits. Table 5.12 shows the 2x2 table and chi square results. The variables were found to be strongly associated indicating that if a physician believed they were exercising enough, they likely were meeting ACSM exercise recommendations. If they believed they were not exercising enough, they were likely not meeting ACSM exercise recommendations.

TABLE 5.12- Chi Square Table for Relation Between Physician Exercise Habits and Physician Belief in Whether They Are Exercising Enough

	Physician Exercise Habits Meet ACSM Recommendations	Physician Exercise Habits Do Not Meet ACSM Recommendations	Total n
Physician Believes They Are Exercising Enough	61	47	108
Physician Believes They Are Not Exercising Enough	56	164	220
Total n	117	211	328

Pearson $X^2 = 30.390$ $Pr < 0.001$

5.10 Barriers to Exercise Counselling

The proportion of physicians that identified certain barriers as being important was determined from the answers to question 36. Table 5.13 displays the level of importance selected by physicians for each of the 12 listed barriers. One item that was clearly rated as not important was insufficient evidence of the benefits of physical activity (77.6 %). There were no items that were rated by >12 % as extremely important. When the upper three categories were combined (important, very important and extremely important), the following barriers were rated by at least 60 % of physicians: not enough time to counsel about exercise 65.7 %, insufficient exercise education during medical school 64.8 %, insufficient exercise education during GP/CCFP training 62.8 % and lack of continuing education offered in this subject area 60.9 %.

TABLE 5.13- Barriers to Exercise Counselling *

Barrier	Not Important	Somewhat Important	Important	Very Important	Extremely Important	I+VIP + EIP
Lack of Time	9.2%	25.1%	30.0%	24.8%	11.0%	65.7%
Patients Will Not Change	20.3%	38.3%	29.5%	10.1%	1.8%	41.4%
Patients Not Interested in Exercise	16.8%	33.5%	33.5%	14.9%	1.2%	49.7%
Lack of Evidence for Exercise	77.6%	9.5%	8.6%	3.4%	0.9%	12.9%
Other Lifestyle Changes More Important	25.3%	34.6%	31.2%	6.5%	2.5%	40.1%
Not Paid Enough	28.2%	25.2%	20.9%	13.8%	12.0%	46.6%
Lack of Personal Knowledge	19.5%	29.9%	27.4%	17.4%	5.8%	50.6%
Lack Exercise Education in Medical School	11.6%	23.6%	29.7%	23.6%	11.6%	64.8%
Lack of Exercise Education in GP/CCFP	13.6%	23.5%	28.5%	22.6%	11.8%	62.8%

*(where I=Important, VIP= Very Important, EIP = Extremely Important)

TABLE 5.13 - Barriers to Exercise Counselling (Cont.)*

Barrier	Not Important	Somewhat Important	Important	Very Important	Extremely Important	I+VIP + EIP
Lack of Continuing Education in Exercise	11.9%	27.2%	29.7%	23.2%	8.0%	60.9%
Patients Prefer Drugs	34.4%	26.7%	23.6%	12.3%	3.1%	39.0%
Lack of Guidelines on Exercise Counselling	17.7%	27.7%	25.0%	22.3%	7.3%	54.6%

*(where I=Important, VIP= Very Important, EIP = Extremely Important)

5.11 Variables associated with physicians who counsel >50 % of their patients

The final set of data involved a series of odds ratio estimations. The outcome (dependent) variable was counselling of > 50 % of patients and numerous (independent) "exposure" variables were tested for an association with the outcome variable. A total of 221 physicians counselled < 50 % of their patients and 109 physicians counselled >50 % of their patients about exercise. Odds ratios are shown in Table 5.14. The odds ratio (OR), and the 95 % confidence interval (CI) are displayed for each test. Odds ratio estimations were not adjusted for possible confounding variables and multiple p value testing. These results could be altered by such adjustments.

5.11.1 Demographic Variables

Demographic variables that were associated with physicians counselling >50 % of their patients were: practising in an urban setting, OR = 2.89 (1.61-5.20), female gender OR = 1.88 (1.18-3.01), BMI > 25 OR = .419 (.212-.826) and years in practice ≥ 20 years OR = .557 (.340-.914). For the odds ratios that were < 1.0, it can be stated that those individuals that had a BMI < 25 and fewer years in practice were about twice as likely to counsel their patients. The urban setting variable had a confidence interval that was not wide and the lower end was not near a value of 1, so a true association was very likely. Female gender had a narrow confidence interval that increased the precision of the OR.

5.11.2 Physician Confidence, Knowledge and Qualification Variables

These variables were all strongly associated with the outcome. Physicians who were confident that they could get >50 % of their patients to start exercising produced an OR = 2.55 (1.17-5.58). Physicians who were confident that they could get >50 % of their patients to continue exercising had an OR = 3.58 (1.71-7.51). Both of these results implied that physicians who counselled > 50 % of their patients were 2.5 and 3.5 times more likely to be confident in their ability to cause a patient behaviour change. If physicians believed they were very or extremely knowledgeable in exercise counselling, the OR = 4.56 (2.11-9.85). If they believed they were very or extremely qualified to do exercise counselling, the OR = 4.80 (2.16-10.7). These odds ratios were the largest among all the variables tested, demonstrating strong associations between the variables tested. The confidence intervals were not small which means the precision of the associations was not high.

5.11.3 Physician Prescriptions

If a physician counselled > 50 % of their patients, they were 2.28 times more likely to have scored a 4/6 or greater on question 23, OR = 2.28 (1.20-4.35). The confidence interval showed this value could possibly be as low as 1.2 times or as high as 4.4 times.

5.11.4 Counselling Methods/Techniques

Several variables in question 25 and 26 were found to have strong odds ratios. The four basic components of exercise prescription specifying type, duration, frequency and intensity all were associated with physicians who exercise counsel > 50 % of their patients. The confidence intervals were also smaller than results already mentioned above. This means the association had greater precision due to the narrower confidence interval. Specifying type had an OR = 3.24 (1.95-5.40), frequency OR = 4.00 (2.30-6.97), duration OR = 3.66 (2.15-6.23) and intensity OR = 2.79 (1.74-4.49).

Other significant results included recording patient's exercise habits OR = 3.52 (2.16-5.74), asking about barriers to exercise OR = 3.20 (1.98-5.19), making a follow-up plan OR = 3.25 (1.95-5.40). Also, the following variables had odds ratios with intervals that did not go below 1.5 and that were fairly narrow: evaluating if patients can find their target heart rate OR = 2.76 (1.55-4.91) and specifying warm up and cool down OR = 2.52 (1.55-4.11). Writing down a prescription OR = 3.27 (1.50-7.14) and recommending resistance training OR = 4.52 (2.09- 9.78) were strong results, but the confidence intervals were wider than other variables in this section so there was more uncertainty in

these odds ratios. Recording patient's BMI OR = 1.81 (1.06-3.11), and counselling > 2 mins. OR = 1.98 (1.19-3.29) had narrow confidence intervals which increased the precision of these associations. However, the strength of these associations was weak and the actual OR could be as low as 1.06 for BMI and 1.19 for counselling > 2 mins.

5.11.5 Physician Exercise Habits

Physicians who counselled > 50 % were almost two times more likely to have rated aerobic exercise as something they enjoy or enjoy very much, OR = 1.94 (1.19-3.16). Despite the narrow CI relative to other results, the OR could conceivably only have been 1.19 which would not have made the magnitude of the OR very impressive. If physicians counselled > 50 % of their patients, they were twice as likely to have exercise habits that met ACSM recommendations. Again, this result could have been anywhere from about 1.5 to 3.6 times more likely since the OR was = 2.27 and CI = (1.41-3.65).

5.11.6 Barriers to Exercise Counselling

Many of the barrier results displayed wide dispersion amongst the different levels of importance. Thus, the odds ratios for this section were not as strong as the counselling methods section. Insufficient education during medical school and during GP/CCFP training had near identical odds ratios, .568 (.343-.940) and .568 (.341-.947) respectively. The OR value in isolation meant that physicians who counselled > 50 % of their patients were twice as likely to not rate these barriers as being very important/extremely important. Another interpretation is that physicians who counsel < 50 % of their patients were twice as likely to rate these barriers. However, the CI range must be included in

these interpretations and it extended up to near 1.0 which makes this a potentially weak association. This also applied to lack of clear guidelines on exercise counselling, OR = .495 (.287-.853). The only other notable barrier result was lack of personal knowledge with an OR = .341 (.178-.653). Although the CI was not large for this barrier, the strength of the association was weak.

TABLE 5.14- Variables Associated With Physicians Counselling > 50% of Their Patients

Question	Odds Ratio	(95% Conf. Interval)
Demographics		
Q3: Years in practice ≥ 20	0.557	(0.340 , 0.914)
Q3: Years in practice ≤ 10	1.566	(0.956 , 2.564)
Q4: Gender is Male	0.539	(0.336 , 0.865)
Q5: Age > 40	0.627	(0.385 , 1.021)
Q6: BMI > 25	0.419	(0.212 , 0.826)
Q6: BMI = 20-25	1.057	(0.632 , 1.769)
Q7: Practice setting = Urban	2.894	(1.609 , 5.203)
Q8: Type of practice = Fee for Service	2.390	(0.672 , 8.499)
Q9: ≤ 4 patients seen per hour	1.100	(0.655 , 1.846)
Q10: ≤ 150 patients seen per week	0.865	(0.545 , 1.374)
Knowledge and Confidence in Counselling		
Q12: > 50% would start exercising with counselling	2.553	(1.169 , 5.579)
Q13: > 50% would continue exercising with counselling	3.578	(1.705 , 7.508)
Q14: Knowledge ≥ 4	4.556	(2.108 , 9.847)
Q15: Qualified ≥ 4	4.795	(2.157 , 10.660)

TABLE 5.14 - Variables Associated With Physicians Counselling > 50% of Their Patients (Continued)

Question	Odds Ratio	(95% Conf. Interval)
Prescription Scores		
Q23: Prescription score ≥4	2.287	(1.203 , 4.348)
Q24: Prescription part 2 score ≥ 1	1.979	(0.871 , 4.498)
Counselling Methods/Techniques		
Q25: > 2 min exercise counseling	1.980	(1.194 , 3.285)
Q26A: Give out educational materials	1.412	(0.636 , 3.134)
Q26B: Specify frequency	4.004	(2.300 , 6.968)
Q26C: Write down prescription	3.274	(1.502 , 7.137)
Q26D: Specify type/mode	3.238	(1.996 , 5.253)
Q26E: Eval if patients know how to find target heart rate	2.761	(1.553 , 4.908)
Q26F: Specify duration	3.662	(2.153 , 6.230)
Q26G: Record patients BMI	1.812	(1.056 , 3.108)
Q26H: Make follow-up plan	3.247	(1.954 , 5.396)
Q26I: Specify intensity	2.794	(1.737 , 4.494)
Q26J: Record patients exercise habits	3.523	(2.164 , 5.736)
Q26K: Recommend resistance training	4.520	(2.090 , 9.776)
Q26L: Specify warm up and cool down	2.522	(1.548 , 4.109)
Q26M: Ask about barriers to exercising	3.204	(1.977 , 5.192)

TABLE 5.14 - Variables Associated With Physicians Counselling > 50% of Their Patients (Continued)

Question	Odds Ratio	(95% Conf. Interval)
Physician Exercise Habits		
Q27: Heart rate ≤ 60 bpm	1.295	(0.788 , 2.130)
Q29: ≥ enjoy exercise	1.942	(1.194 , 3.160)
Q35: Physician exercise meets ACSM	2.271	(1.414 , 3.649)
Barriers to Exercise Counselling		
Q36A: Not enough time	0.801	(0.492 , 1.304)
Q36B: Counselling will not change patient	1.027	(0.505 , 2.088)
Q36C: Patients not interested in exercise	0.860	(0.455 , 1.628)
Q36D: Insufficient evident of exercise benefits	1.144	(0.374 , 3.500)
Q36E: Other lifestyle counselling more important	1.267	(0.576 , 2.787)
Q36F: Financial reimbursement not sufficient	0.812	(0.474 , 1.390)
Q36G: Lack of personal knowledge	0.341	(0.178 , 0.653)
Q36H: Insufficient exercise education in med school	0.568	(0.343 , 0.940)
Q36I: Insufficient exercise education during CCFP	0.568	(0.341 , 0.947)
Q36J: Lack of continuing education	0.734	(0.441 , 1.223)
Q36K: Patients prefer treatment with drugs	1.047	(0.554 , 1.980)

CHAPTER 6: NATIONAL STUDY: DISCUSSION

6.1 Introduction

In Chapter 1, specific project objectives were listed that included developing and pre-testing an exercise counselling questionnaire, conducting a national study of family physicians using the questionnaire and addressing the specific aims with the data generated from the questionnaires. All of these objectives were achieved. This final chapter will interpret the results found in Chapters 4 and 5. This will be followed by an assessment of the strengths and limitations of this project, the public health implications of this study and recommendations for future research.

6.2 Physician Response

6.2.1 Response Rate

A response rate of 61.2 % was disappointing considering the aggressive phone stage follow-up completed. The rate was consistent with past physician exercise surveys [7,97,98,99,101,103,110] where rates ranged from 57-75 %. The only previous Canadian study [105] had a response rate of 65.3 % using a one-page survey. A recent study that surveyed family physician opinion on massage therapy in Alberta had a response rate of 54 %.[124] Thus, the response rate of 61.2 % in this study was considered acceptable in comparison to these previous physician studies. A higher response rate would have decreased the bias that can result from non-respondents. However, it was not realistic to expect a higher response rate when previous physician studies [7,97,98,99,101,103,105,124] have not been able to achieve high response rates.

There were three main areas that may have affected this response rate. The first was the length of the instrument. This study collected a large amount of descriptive information that was condensed into two double-sided pages. Despite the effort made to keep the survey as brief as possible, some physicians may have found the document too long and this discouraged their participation. Although this was not identified as a problem during the pre-test, qualitative feedback during the phone stage revealed six physicians thought the questionnaire was too long. One physician made it clear that any survey longer than one page was thrown into their trash.

Next, was the time required to fill out surveys. Even though this questionnaire was designed not to take more than 10 minutes to complete, it was pre-tested on a small number of physicians that may not account for the total variation in completion times. Also, the pre-test physicians agreed in advance by telephone to complete the questionnaire. These physicians may have been willing to take more time to fill out the questionnaire since they knew they were assisting in the evaluation of the instrument. In the national study, many physicians through telephone feedback, claimed they were too busy to complete any questionnaires and some had a "no survey" policy where all surveys were automatically thrown out.

Thirdly, many of the non-participants could have represented a bias in the study. Perhaps, the 38.8 % that did not want to respond represented those who were not knowledgeable in exercise counselling or those who did not do exercise counselling. If it were true that the non-respondents were less interested or poor performers in exercise counselling, then the results of this study would have over-estimated the exercise counselling ability of family physicians.

6.2.2 Ineligible Physicians

The number of ineligible physicians in the data file obtained from Cornerstone Inc. was larger than expected. Many physicians still list themselves as general practitioners despite the fact they have gone on to become specialists. Unfortunately, many of these could not be detected until the phone stage which resulted in unnecessary labour and postal costs. It was concluded that no other method could have been used to obtain a random list of family physicians that would have met the budget of the project. A list from the College of Family Physicians of Canada only contains College members which primarily consists of those with a CCFP designation. Since this study required a definition of family physician to include general practitioners and CCFP family physicians, the College list would have been unsuitable.

It was considered reasonable to add those physicians that did not have a proper phone number, were on leave, moved, retired and on vacation to the number of ineligibles. Since some of these physicians could not be reached or were not practising family medicine, they could not be considered potential recruits. An argument could be made that those on vacation may have received a copy of the questionnaire and chose not to participate, so these physicians should be counted as eligible. This would have reduced the response rate to 59.0 % with a minimal decrease in the precision of the results generated. Since verbal contact was not possible with these physicians during the phone stage, it remains uncertain as whether they were non-respondents by choice.

Many physicians via phone feedback, stated they never received the questionnaire despite the investigator having the correct address for most physicians on

the study list. It was possible that the survey was buried in a large amount of paperwork and went unnoticed or was thrown out by staff before it reached the physician. Therefore, the 20 physicians that were on vacation may have at least partially fallen in such a category.

6.3 Demographics of the Respondents

Approximately half of the physician respondents were general practitioners and the other half held a CCFP designation. It is unknown how these figures compared to the actual breakdown of GP versus CCFP family physicians in Canada but the investigator was satisfied that the sample included adequate numbers of both training backgrounds. A separate category for the physicians who had partial specialty training would have been useful but their numbers were small.

The majority (63.8 %) of the sample was male which closely resembled the actual number of male family physicians in the six provinces combined (69.6 %).[123] If the original physician list was generated by random selection, the sampling frame should have contained a similar percentage of males. The sample represented an experienced group of physicians with 70 %+ in practice > 10 years. The pre-test had 60 % of physicians in practice > 10 years but none >19 years. The study sample did have 37 %+ in practice > 20 years, so the pre-test may have not been representative of the study sample on this demographic. Other ways in which the study differed from the pre-test demographically were in age, practice setting, number of patients seen per week, and type of primary care training. The pre-test had only physicians age 31-40 and the study had 68

%+ over the age of 40. The pre-test surveyed 10 CCFP physicians compared to the study split described above. The pre-test was a 100 % urban physician survey while the study was 70 % urban. A total of 90 % of pre-test physicians saw ≤ 150 pts/week and the study had 55 % seeing ≤ 150 pts/week.

If a questionnaire is used to survey a specific demographic group, then it should be pre-tested on a group with very similar or identical demographics. If the pre-test had surveyed the same demographic group as in the national study, the validity and reliability of the pre-test questionnaire could have been different. It is possible that older, more experienced physicians could have established practice styles and may less willing to add exercise counselling to their practices. These physicians could have found the exercise counselling definition too comprehensive if they were surveyed in the pre-test. Older, experienced physicians may also have a higher proportion of older patients in their practice that demand more medical specialty care. Thus, these physicians might have expressed a need for more referral categories on the questionnaire.

Since physicians in the national study saw more patients/week than those physicians in the pre-test, they may not have the time to do exercise counselling. Lack of time could have influenced their opinions regarding the face and content validity of the pre-test questionnaire. These physicians may have preferred a brief definition of exercise counselling. Physicians with high volume practices might have thought the questionnaire was too long and they may not have the time to fill out the open-ended questions. If rural physicians were included in the pre-test, they may have wanted a category added to the questionnaire pertaining to lack of resource personnel or time spent attending to hospital patients. It is unknown what specific changes may have occurred to the pre-test

questionnaire if the pre-test used the same demographic group as the national study. However, it is important to recognize that the final appearance and content of the questionnaire could have been different if the same demographic groups were tested at the pre-test and national study stages.

Question 8 on type of practice (remuneration), was not a very useful question as the small number of 5 % were on salary versus fee for service (FFS). While it was known before the study that a majority would likely be receiving FFS payment, it was not known how large this segment of physicians would be. The distribution of urban and rural physicians reflected the distribution of the Canadian population which is approximately 78 % urban.[125]

6.4 Physician Confidence

There was a problem with the level of physician confidence in helping patients make a behavioual change, such as starting to exercise or continuing to exercise. The proportion of physicians who thought they could be successful with > 50 % of their patients (8.5 %) was comparable to past studies [100,102,103] except the questions in those studies were worded differently versus this study. The one previous Canadian study [105] reported 5.3 % believed they were very successful in changing patients' exercise behaviour. Intuitively, it seems reasonable to assume that if physicians were able to get patients to start exercising, they may be more optimistic about their ability to keep them exercising. However, physicians rated both question 12 and 13 the same way. It is

unknown if this lack of confidence represented a lack of physician self-efficacy or a belief that patients cannot make a behaviour change.

6.5 Physician Knowledge and Qualification

While it was reassuring to see a large proportion of physicians (40 %) perceive themselves as "moderately" knowledgeable or qualified, it was concerning to see the bottom of the continuum containing 47-49 % of physicians. In particular, 17 % of physicians reporting that they were not knowledgeable and not qualified is a pubic health issue. One could debate the meaning of the second lowest choice "slightly" knowledgeable/qualified which about 30 % of physicians chose. However, "not" knowledgeable/qualified was not an ambiguous choice. This means that patients that see these physicians could conceivably not be receiving the exercise education they need. In one other study that asked a similar knowledge question, [98] 27 % felt very knowledgeable in exercise counselling which is considerably higher than the 6.3-6.6 % that chose the same answer in this study. However, the former study [98] was a survey of family physicians and internists mixed together so it is not the best comparison to this study of family physicians.

6.6 Current and Desired Exercise Counselling

If exercise counselling is considered ideal for all patients, physicians were not close to meeting that goal. In studies with comparable wording to question 17, physicians counselled slightly higher percentages of patients with about 33-40 % counselling at least 50 % of patients.[98,99] This study had about 32 % choosing the 50-75 % and 76-100 % categories. The wording of a similar question in the previous Canadian

study [105] was different then this study so the 92.9 % result in their study is not comparable to this one. One issue to consider when examining this section was the definition of exercise counselling that was provided to respondents. It is unknown if the percentage of patients counselled may have improved if the definition was not comprehensive. As an example, if we defined exercise counselling as "reminding patients that exercise is good for them", perhaps physicians would have identified counselling more patients.

A difference between current and desired counselling was demonstrated in this study. The results in the 76-100 % patient category that showed a 30 % difference were similar to the Australian study by Bull.[7] However, the categories in the latter study were descriptive and not percentages. What remains unclear are the reasons for the discrepancy between current and desired results. This study did not directly ask what factors would account for the difference between current and desired counselling. This was only indirectly assessed in the Barriers to Exercise Counselling section.

The Australian study [7] found about 50 % thought physical activity should be prescribed to all patients. Only 43 % thought they should be counselling 76-100 % of patients in this study. This means that 57 % do not think 76-100 % of patients should receive exercise counselling. Although there are no clear Canadian guidelines for family physicians on who "needs" to be counselled about exercise, there is ample evidence to show the benefits of physical activity for almost everyone and that physician counselling can be effective (Chapter 2). It would be interesting to know why physicians feel exercise counselling is not potentially for all patients.

6.7 Exercise Importance and Counselling by Age Group

The rating of the importance of exercise for different age groups displayed a concerning pattern of decreasing importance of exercise as age increased. Exercise is just as important (if not more important) for older adults as other age groups (Section 2.3.4). It would appear that some family physicians may not be aware of the evidence that supports exercise for older adults. A positive observation was that a minimum of 69 % of physicians rated exercise as very important or extremely important irrespective of age. Thus, there was a general level of acknowledgement of the importance of exercise throughout the life cycle.

When the focus switched to the importance of exercise counselling by the family physician, the counselling priority was for ages 41-75. The reasons for this are unknown but the age of the physicians surveyed could have influenced this result. A total of 68.9 % of physicians in this study were age 41 and older. If these physicians have a practice that is aging with them (their patients are close to them in age) then they may consider counselling to be most important for their patients which are age 41 and older.

Perhaps physicians felt that ages 41-75 bring a higher chance of having a medical condition(s) that requires greater physician supervision or intervention compared to those ≤ age 40. Unfortunately, this type of thinking negates the family physician's role in preventive medicine and encourages patients (and other health professionals) to seek physician advice only once they have an illness or medical problem. While it may be economically unrealistic for all ages to have exercise counselling by a physician, leadership from physician organizations is required to create guidelines on this issue.

Patients should know when they have the option to receive exercise counselling from a physician and when it should be done by a physician.

It is unclear why the > 75 age group was not rated as high as the 41-75 age groups. Hopefully, this is not a reflection of physicians believing that these patients are "too old" for counselling to make a difference. As outlined in Chapter 2, levels of physical fitness and independent functioning can be improved with exercise for this age group. With an increasing aging population, physicians will be neglecting a large number of people if they do not consider exercise counselling for this population.

Physicians did not think other professionals should be doing the exercise counselling. This applied for every age group. Since such a small number of physicians recommended counselling by another professional, there are still gaps that remain regarding who should counsel. Perhaps, physicians feel that exercise counselling in some cases, is not required at all and information through other mediums or community organizations is more appropriate. The above results cannot be compared to previous research because there are no prior studies that address these questions.

6.8 Exercise Importance and Counselling for Health Conditions

The high rating for the importance of exercise for obesity was expected since the role of exercise in weight reduction is well known to physicians and the general public. It was unclear if the increased importance rating for IHD applied to any patient with IHD or for post myocardial infarction (MI) IHD patients. The post MI patient is the traditional IHD patient associated with a need for an exercise program as these patients receive

routine lifestyle counselling just before or after hospital discharge. They are also the focus of cardiac rehab programs which are paid for by many provincial governments for a 6-12 week period. It was unknown why physicians rated exercise in pregnancy as less important. Unlike other conditions such as cigarette smoking, stress and depression, official guidelines do exist for exercise in pregnancy. However, this rating could have reflected the lack of evidence that exists regarding exercise and pregnancy outcome.

Osteoarthrtis (OA) also displayed lower ratings of importance. Again, the reasons for this were unclear since exercise is recommended for this condition (chapter 2). It could be possible that physicians were not aware of such recommendations or the benefits of exercise on OA. It was encouraging to see the high level of importance assigned to stress and depression which shows family physicians recognized that mental health conditions (not just physical conditions) benefit from exercise.

An important limitation was that the health conditions were not described in any detail which required physicians to make very general judgements. Often, more than one of these conditions exist in one individual. Also, listing so many conditions could have encouraged physicians to give a similar answer for all conditions so they could complete the questionnaire faster.

All of the health conditions were rated less important for physician counselling than in the previous section where only importance of exercise for these conditions was rated. It was possible that physicians decreased their ratings because they felt they were not the professionals who should be doing the counselling due to time, education, equipment and remuneration factors. There were no prior studies that addressed

physician perceived importance of exercise and exercise counselling for different health conditions, so a comparison to other research was not possible.

The familiarity of cardiac rehab programs which family physicians commonly refer post MI patients to, could be responsible for the 26 % of physicians choosing another professional to do exercise counselling for IHD. Some IHD patients can have complicated disease that a family physician may not feel comfortable supervising or they may not be familiar with IHD exercise recommendations. The other remaining health conditions may have been interpreted by physicians as "safe" for them to counsel since these were not "heart" problems. Thus, this could be why fewer physicians recommended another professional for these conditions. Overall, the percentage who chose another professional was consistent with results in other studies, [97,101] but these did not specify conditions.

Physicians rated how frequently they counselled patients with these health conditions. Mental health conditions were counselled more frequently in this study compared to the study by Bull.[7] In the latter study, patients with mental health problems (no specific conditions identified) were "often or almost always" recommended physical activity by 36 % of physicians. In this study, 60 %+ "usually or always" counselled patients with stress or depression. The difference between the two studies could reflect different family physician training in the management of mental health problems between Canada and Australia. However, the question in this study specified two mental health conditions and Bull [7] was very general, asking about "patients with mental health problems". The physicians in this study may have had lower counselling frequency ratings if the question was general or other mental health conditions were specified. The

listing of specific conditions is a strength of this study since results can be attributed to a specific health problem.

Similar reasoning applies to the difference in the obesity counselling frequency between the study by Bull [7] and this study. Bull asked physicians how frequently they would recommend physical activity to "patients in need of weight management" and this study specifically asked about obesity. The broad category in Bull's study could have included more than just obese patients, thus generating the higher result versus this study (97.2 % versus 81.7 % in this study). Again, the difference could also have been due to training differences in family physicians.

Cardiac risk factor conditions and obesity were more often counselled than other conditions listed in the survey. Since CVD is the leading cause of death in Canada,[65] perhaps physicians counsel these conditions more frequently because CVD can have a fatal outcome. Bull [7] found 76.4 % of physicians "often or almost always" would recommend activity to "patients in need of cardiopulmonary rehabilitation". This study showed 72.8 % usually or always counselled those with IHD. However, one could argue that these two results are not comparable since "cardiopulmonary" does not equate to IHD.

The percentage of physicians that identified smoking, pregnancy and osteoarthritis as very or extremely important for a family physician to counsel was higher than the percentage that at least usually counselled these conditions. The difference for smoking might be explained by physicians placing greater emphasis on smoking cessation. For OA and pregnancy, importance may not translate into action because

physicians may not be convinced of the benefit of exercise for these conditions. No other study has surveyed these last three conditions for counselling frequency.

6.9 Physician Exercise Prescription

The results for physician exercise prescription were concerning. Since this was an objective evaluation, the results displayed what physicians really know. The proportion that met ACSM standards (12.1 %) was unacceptable. If standards were lowered to allow the omission of one or two of the four basic components of exercise prescription then patients would be receiving a lower quality of care. This is not recommended for other areas of health care and exercise prescription should not be an exception. It was positive that almost half of physicians correctly identified three out of the four basics. However, these physicians are still providing incomplete prescriptions. In addition, if 11.5% of physicians cannot even identify one component, then it is likely that their patients that may be similar to the case scenario are not receiving the correct information for exercise.

Some of the respondents provided answers for general lifestyle counselling but there was no penalty for providing extra information. However, question 23 did specifically ask for an "exercise prescription". It is possible that this sentence was "skipped over" and not read in some cases. It could also mean that a segment of physicians do not know enough about exercise prescription to present it as a solo counselling issue.

Family physicians in this study had difficulty identifying changes in guidelines when a patient has 2 or more cardiac risk factors. The recommendation of stress testing

is regarded by some cardiology organizations as controversial and many family physicians may agree that evidence for it is lacking. However, the answer was based on ACSM recommendations. Considering the divergence of opinion that may exist regarding this issue, the investigator acknowledges that this may not have been a fair question. Certainly, family physicians should know about resistance training guidelines for hypertension because it is a very common medical condition. In this survey, the top of every page stated exercise = continuous physical activity and conceivably, this could have deterred respondents from mentioning resistance training in either question 23 or 24. There were no prior studies that allowed a comparison to be made to these results.

6.10 Counselling Methods/Techniques

A large proportion of physicians claimed to counsel > 2 minutes (62.4 %). In comparison to other studies, [99,100] the result in this study was high. The study by Wells[100] used 5 minutes instead of 2 minutes. It is the investigator's opinion that a 5 minute interval allows for more counselling content. Therefore, the Wells study was not a good comparison to this study. The Sherman [99] study only presented data for a 55yr. old patient for time spent counselling and this was divided according to percentage of patients counselled. For those who counselled < 25 % of their patients, 44 % counselled > 2 minutes and if >75 % of patients were counselled, 72 % counselled > 2 minutes. Since this study included all patients in the question, the Sherman study was also not the best comparison. There were no other studies that surveyed this issue.

Since physicians under FFS are paid by the number of people they see, there is a disincentive to spend prolonged periods of time with patients. The large number of physicians that spend more than 2 minutes counselling means that the exercise issue is being raised even if the content is unknown. The limitation of this question was its generality. It did not specify the type of patient(s) seen which could affect the time required to counsel. Also, with only two answer choices available one time may have been interpreted as "bad" and the other time as "good". Thus, some may have chosen the longer time because it made them appear like they were doing a better job.

Physicians claimed they frequently specified the four basic components of exercise prescription even if their answers to question 23 did not support this. It demonstrated that physicians can recognize the "right" methods if they are provided with the answers to choose from. Compared to the study by Reed (41 %) [98] the physicians in this study rated low (27.2 % usually or always) for making a follow-up plan. However, the follow-up question in Reed's study was dichotomous (follow-up plan: Yes/No) so a direct comparison with this current study cannot be made. The physicians in this study also rated lower for recording patient exercise habits and writing out prescriptions than those in the study by Williford. [97]

Two simple and effective techniques, [105,111] writing down a prescription and giving out education materials, were cited by about 30-35% of respondents as techniques they never use. Writing a prescription could be viewed as time consuming but a pre-printed script could be designed that would require circling options and little writing. Since patients view this favourably, [32] it is something physicians should be encouraged to

do. The problem with education materials and pre-printed scripts is that someone has to pay for them and this may deter physicians from using these methods.

6.11 Physician Exercise Habits

A majority of physicians do not exercise according to ACSM recommendations (64.3 %). It was intended that this would be an "easy" question for physicians to complete as the answers for four of the five components of an exercise program were provided to them. Physicians did not have to identify the degree of intensity; only the method they used to assess it. This made the question easier to answer. Although ACSM recommends a minimum frequency (as a beginner) for resistance training of twice/week, physicians were given a point if they chose the 1-2 times/week category since it contained the twice/week answer option.

Physicians should try to exercise to ACSM recommendations more earnestly as patients are more likely to comply with exercise recommendations if their physician exercises regularly.[32] The proportion of physicians exercising to ACSM guidelines (35.7%) was about the same as that found in other studies.[98,103] However, these studies only inquired about exercise frequency and duration. The Vancouver study[105] assessed physician exercise habits according to ACSM guidelines with 44.3 % meeting this standard. The higher result in the Vancouver study may have been a reflection of physician activity patterns in Vancouver only. Also, the wording of question(s) that elicited information on physician exercise habits may have differed from this study. The

number of physicians who thought they were exercising enough (32.9 %) was similar to the previous Canadian study (28.9 %) [105]

Why physicians are not getting enough exercise was not evaluated in this study. The Vancouver study [105] found 80 % cited lack of time as an "excuse" for not exercising enough. Certainly, this may apply to this larger study, as family physicians are very busy professionals. However, physicians are at risk for the same health problems as their patients. If physicians consistently exercise according to ACSM recommendations, they serve as a role model for their patients and increase their credibility.

A relation was found between physicians who met ACSM exercise guidelines and physicians who believed they were exercising enough. This was an interesting finding because despite overall poor physician exercise habits, those physicians who believed they were exercising enough likely were meeting ACSM guidelines. It showed that physician belief in their behaviour had a relationship to their actual actions. This relationship has not been tested in other studies.

6.12 Barriers to Exercise Counselling

Two "types" of barriers were rated by physicians as being most important. These can be divided into time issues and education issues. Physicians not having enough time to counsel (65.7 %), has been identified as an important barrier in other studies by a similar proportion of physicians. [7,99,101,105] Lack of continuing education was identified as being more important in this survey compared to a previous Australian study (22.8 %).[7] It is unknown if continuing education in exercise counselling is inadequate in Canada versus Australia. However, this could explain why Canadian physicians

perceived it as a more important barrier. The other two education barriers identified as important were insufficient education in medical school and in GP/CCFP training. There were no studies to compare these results to.

This is the first time stages of medical training have been surveyed and identified as barriers to exercise counselling. It is important that medical educators evaluate curricula to see if it is deficient in exercise science/counselling. Physicians in this study have rated these as more important barriers than insufficient financial reimbursement and counselling not leading to a change in patient behaviour. To help physicians with the time issue, they could use other professionals in or outside their clinics to assist them, use pre-scripted prescriptions or lobby their governments for a fee that matches the time spent counselling.

A limitation of the barrier question was the wording of the question. Although this problem was addressed after the pre-test, a few physicians in the national study wrote on the survey that they found question 36 to be "awkwardly worded". Also, some physicians noted that insufficient evidence of the benefits of physical activity was not a true statement and should not be a barrier. However, it was cited by many physicians as a weak barrier.

6.13 Variables Associated with Physicians Who Counsel > 50 % of their Patients

Variables that were associated with physicians who counsel >50 % of their patients were listed in Chapter 5 and several strong odds ratios were identified. The magnitude of the OR and their respective confidence interval were also outlined. If the CI contained 1.0, there was no association between a variable and those who counselled >

50 % of their patients. As mentioned in Chapter 5, no adjustments were made for confounding variables. Also, if a logistic regression model was constructed in the future to account for confounding variables, some of the OR results in this study may no longer be "significant". Thus, the OR results in this study had to be interpreted with an awareness of these factors.

For demographic variables, it was expected that ≤ 4 patients seen/hour would be associated with physicians who counselled> 50 % of their patients. However, this was not the case nor has it been identified in any previous study. The theory behind the prediction was that physicians would be more likely to counsel if they had more time (by seeing fewer patients). Years in practice ≥ 20 years has not been found previously to be inversely associated with the same outcome variable. One study [98] identified practice > 10 years to have an OR > 1.0 not <1.0 as in this study.

Why more experienced physicians counselled < 50 % of their patients is unclear. Perhaps the training of these experienced physicians (20 + years ago) did not emphasize health promotion counselling. If experienced physicians see only older or younger patients, then age of the patient could influence their counselling frequency. This study did show that physicians considered counselling less important for ages ≤ 40 and > 75. This result could have been confounded by other factors such as number of patients seen per hour and age of the physician. This variable may not remain significant once it is entered in a logistic regression model and possible confounding variables are considered.

A positive OR for female gender also cannot be explained until other variables are studied for gender association. Physicians who counselled < 50 % of their patients were twice as likely to be overweight with a BMI >25. If these overweight physicians

did not exercise or exercised very little, they may not have considered exercise and exercise counselling to be important and therefore, they counselled fewer patients. A physician who counselled > 50 % of their patients was almost three times more likely to be an urban physician. Other variables such as age and gender of the rural and urban physicians and age of patients need to be considered as possible confounders to this odds ratio. Rural physicians may not have the same access as urban physicians to continuing education in the area of exercise and exercise counselling which could also partially explain the odds ratio result.

Physician confidence, knowledge and qualification all produced odds ratios > 2.55. Physician confidence at getting patients to start/continue exercising generated odds of 2.55 and 3.58. In Sherman's study, [99] the OR for getting patients to start exercising was 22.8. However, the outcome variable was physicians who counsel > 75 % of their patients which may account for the higher OR versus this study. The strong OR for those physicians who felt knowledgeable or qualified suggests that it is not necessarily what you know but what you believe you know that is related to counselling action. This may be reflected in this study as an objective prescription score ≥ 4 had an OR that was only half the magnitude of the knowledge/qualified OR(s). However, the confidence intervals overlap between the score and knowledge/qualified odds ratios.

It is unclear why a more "accurate" assessment of exercise prescription such as the objective prescription score would not produce a higher OR. With the low end of the CI = 1.2, the association could be weak. This demonstrates a limitation with using counselling frequency as an outcome variable. Counselling > 50 % of patients has been chosen as something positive that physicians should strive to achieve. However, with

this "goal" comes an implied assumption that counselling more patients means higher quality exercise counselling. Due to the above reasons, such an "assumption" may be false.

Numerous counselling techniques/methods had strong odds ratios. Including a follow-up plan has been identified previously with physicians counselling >50 % of their patients [98] and it produced a strong OR in this study (3.25), similar in magnitude to the previous study (3.8)[98]. Other strong odds ratios in this section have not been previously identified in other studies. If physicians counselled > 50 % of their patients, they were 3-4.5 times more likely to identify six key components of an exercise program (listed in question 26) that are recommended by ACSM. Since the OR for objective prescription was 2.25, the ability to identify program components may be more related to counselling frequency then actually prescribing exercise components. Strong odds ratios for recording patient exercise habits, asking about barriers, addressing target heart rate and writing a prescription suggest that as physicians counsel more often, exercise counselling has the potential to be more comprehensive.

Physicians who counselled > 50 % of their patients were twice as likely to have exercise habits that met ACSM guidelines which is consistent with a previous study. [98] It makes sense that physicians who are getting enough exercise (and are personally experiencing the benefits) would be more likely to recommend "what they already do".

There were four barriers to exercise counselling with odds ratio confidence intervals that did not contain 1.0. Physicians who counselled fewer patients (<50 %) were twice as likely to identify a lack of exercise education during medical training, and lack of clear guidelines on exercise counselling as important barriers to exercise

counselling. These results show that the number of patients counselled can be negatively influenced by a lack of information on exercise counselling (whether education or guidelines). A physician that received inadequate training in exercise counselling or is unsure of what guidelines exist on exercise counselling is going to feel less prepared to exercise counsel. It seems reasonable that these physicians would not counsel as many patients. It is unknown whether these odds ratios would change if other possible confounding variables such as the age of the physician were considered. There were no prior studies that evaluated these barriers for their relation to those physicians who counsel < 50 % or >50 % of their patients.

6.14 General Strengths and Limitations

Overall, the main strength of the study was its random selection of physicians and the maintenance of the physician proportions for each of the six provinces from the beginning to the end of the study. This makes the results of this study representative of family physicians in these six provinces. Although the desired sample size was not achieved, results were attained with an acceptable precision of measurement. This precision only decreased from ± 5 % to ± 6 % due to the lower final sample size. A wealth of descriptive data was generated from this project, which is not only informative but can serve as a reference for further studies. The data was also generated using a pre-tested instrument that demonstrated content validity and reliability. The use of objective questions permitted a more accurate assessment of physician exercise prescription.

A limitation of the study is its generalizability. It cannot be generalized to family physicians in every province or to non-family physicians, so it does not have broad external validity. Despite the fact that the study sample was a representative sample of the family physicians in Canada, the large number of non-respondents (38.8 %) created a probable non-respondent bias. If non-respondents were poor exercise counsellors, then they would serve as a bias creating an overestimation of the exercise counselling abilities of the respondents in this study.

The study also relied on physicians to give truthful answers to all questions but there was no definitive way of proving that a respondent bias was not present in the form of physicians answering the "best" choices to "look good". If this type of bias was present, then answers provided by physicians may have overestimated their counselling frequency, knowledge and their exercise habits. As well, the pre-test was performed on a more homogeneous group of family physicians then the national study, so an argument could be made that the questionnaire had not been adequately pre-tested. Caution must be applied with the interpretation of odds ratios calculated in this study as there was no control for confounding variables.

6.15 Public Health Implications

The results from this project raise some important public health concerns. If a total of 67 % of family physicians are providing exercise counselling to < 50 % of their patients, than many patients are not receiving information on how exercise can improve their health. Information regarding the benefits of physical activity in relation to the

development and modification of chronic health problems such as IHD, type II diabetes, obesity and hypertension has been documented in this thesis (Chapter 2) and in numerous [5,9-21,65] publications. These conditions are very common in Canada where 37 % of all deaths are from cardiovascular disease, 21 % have hypertension, 31 % are obese and 12 % over age 55 have type II diabetes.[65]

There is also a tremendous economic burden associated with these health conditions. In 1993, 7.3 billion dollars was spent in Canada as a direct cost of cardiovascular disease.[65] If family physicians counsel more patients about exercise, it could potentially reduce the incidence, morbidity, mortality and cost associated with cardiovascular disease and it's related risk factors. If 75 % of the Canadian population has contact with a primary care physician on a yearly basis,[92] then there is potential opportunity to discuss physical activity with many patients. Family physicians see patients throughout the life cycle, so physical activity intervention at one life stage could prevent the development of chronic disease in future life stages.

Quality of family physician exercise counselling is also a concern. When patients are given advice about a particular medical issue, they have the right to expect that the information will be current and accurate as possible. However, this study has shown that family physicians in Canada have clear knowledge deficits in the area of exercise counselling. Only 12.1 % of physicians wrote down acceptable exercise prescriptions in this study. However, 42.4 % thought they were moderately knowledgeable in exercise counselling. Thus, physicians are not aware of their lack of knowledge in exercise counselling. Patients may be receiving an insufficient amount of information with exercise prescriptions from their family physicians. There is also a public health concern

regarding the family physician performance in recognizing special exercise instructions for a health condition such as hypertension.

Family physicians may not make the best role models for the public in the area of exercise and exercise counselling. This study found only 22.4 % of physicians exercised according to ACSM recommendations. This percentage is less than the 33 % of Canadians that are active enough to achieve health benefits from physical activity.[65] Patients are more willing to comply with exercise recommendations if their physician exercises on a regular basis.[32] Family physicians are also not using tools to encourage patients to exercise such as written exercise prescriptions and follow-up visits. Patients are more willing to comply with exercise recommendations if their physician uses these tools.[32]

It may be appropriate for patients to look for alternative role models for exercise counselling. Currently, the problem for the general public is that no clear role model exists in this area. Fitness professionals are one source the public can turn to for exercise advice. The Canadian Society for Exercise Physiology has created certifications for fitness consultants that require professionals to have a degree in physical education even before they commence a certification program. These professionals provide an important public health service for healthy individuals that want to exercise. However, fitness professionals do not have the medical knowledge of a physician that will be required for patients with health conditions or patients at risk for health conditions. A partnership would be necessary between these two professional groups to ensure proper exercise counselling for such individuals.

There is also a cost issue with exercise counselling for the general public. Under a FFS system, a fee code established by provincial departments of health is required for physicians to be paid for a service they deliver. Currently, provincial governments will not pay physicians to counsel patients about exercise. Therefore, when exercise counselling does take place, it is billed as part of a general check-up or under a different health problem fee code. The FFS system does not provide any incentives to family physicians to do exercise counselling. However, family physicians can charge the public directly for exercise counselling just as fitness professionals already do. This cost means some Canadians may not be able to afford professional exercise advice no matter which source they choose.

Family physicians in this study have identified deficits in exercise education in medical training as barriers to exercise counselling. This finding is a public health concern since physicians are declaring to the public that they are not being trained to exercise counsel. The physiology of exercise and exercise prescription/counselling are not currently part of medical school curricula in Canada. If physicians are going to be an exercise resource for the public, then patients should expect physicians to receive training and future continuing education in this area.

6.16 Future Recommendations

In summary, there are several recommendations that can be made on the basis of this study:

1) There is a clear need to educate family physicians regarding exercise prescription content and guidelines. This requires an approach that includes physicians in training; not only continuing education opportunities for practising physicians. A set of practice guidelines should be developed to outline to physicians the type of care required and the part(s) they can realistically provide.
2) Future research should be conducted to determine the reasons for lack of physician confidence in exercise counselling. In particular, it should be determined if lack of confidence is due to a belief that patients are not willing to change versus a lack of physician self-efficacy in exercise counselling. It is also important to discover why physicians do not feel knowledgeable or qualified to do exercise counselling.
3) Family physicians should be surveyed to determine when they think exercise counselling is appropriate. Specifically, the type of patient visit (check-up, brief visit) and whether the patient is the one that requests exercise advice should be explored. Physicians should also be asked why exercise counselling is not for all patients. It is important to determine which professional(s) family physicians think the public should consult regarding exercise information throughout the life cycle.

4) Future studies should be attempted to examine exercise counselling for different health conditions in more detail by considering issues such as severity of the condition, referral rates and which professionals are sent referral patients.

5) Gender of patients needs to be evaluated for a relationship to physician exercise counselling. This issue was not evaluated in this study.

6) Family physicians need to be consulted regarding the feasibility of using counselling tools such as pre-prepared exercise prescription scripts.

7) Physician organizations should promote and encourage their members to exercise on a regular basis, adhering to the same guidelines they recommend to their patients. Family physicians should be asked the key reasons why they do not exercise enough so physician organizations can target these problem issues.

8) Since physicians in this study identified barriers to exercise counselling, the next appropriate step would be to ask physicians what aids/ health system changes would assist them to do more exercise counselling.

9) Future research should be conducted to establish whether the results of this study are true for other provinces. These studies could include a French questionnaire for Quebec that would take into account language and cultural issues for that province.

10) More direct, objective assessments of exercise counselling should be done by surveying actual or standard patients after physician encounters. Ideally, this should involve a random selection of patients and physicians.

11) The odds ratios from this study need to undergo further testing as part of a multivariate logistic regression model that controls for confounding and interaction. The goal of this would be to establish a model that clearly predicts which variables are associated with those physicians who counsel > 50 % of their patients.

6.17 Conclusion

This project accomplished its major objectives: developing and pre-testing an exercise counselling questionnaire, conducting a national study of family physicians using the new instrument and answering specific questions about family physicians and exercise counselling. This was the first comprehensive, national Canadian study to address exercise counselling by family physicians. It was also the first exercise counselling survey to use objective assessment of physician exercise prescription. Hopefully, this work will serve as a foundation for more research questions and studies in the field of primary care physician exercise counselling.

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APPENDIX A

FINAL STUDY QUESTIONNAIRE

Check off the answer(s) that apply to you. For this study exercise = continuous physical activity

General Information

1. Please indicate your primary care training

- ☐ 1 year intern training (general practitioner)
- ☐ 2 year family medicine residency (CCFP)
- ☐ CCFP via practice eligible route
- ☐ CASM diploma in sports medicine

2. At least 75% of your practice consists of:

- ☐ General family medicine
- ☐ Obstetrics
- ☐ Geriatrics
- ☐ Sport medicine
- ☐ Other: _____

3. Number of years in practice

- ☐ < 5 years
- ☐ 6-10 years
- ☐ 11-19 years
- ☐ ≥ 20 years

4. Your Gender

☐ Male ☐ Female

5. Your age

- ☐ 20-30 years
- ☐ 31-40 years
- ☐ 41-50 years
- ☐ 51-60 years
- ☐ 61+ years

6. Your body mass index (BMI). Use attached table.

☐ < 20 ☐ 20-25 ☐ > 25

7. Practice setting

- ☐ Urban (> 30,000 population size)
- ☐ Rural

8. Type of practice

☐ Fee for service ☐ Salary

9. Approximate number of patients seen per hour

- ☐ ≤ 4
- ☐ 5-7
- ☐ ≥ 8

10. Approximate number of patients seen per week

- ☐ ≤ 150
- ☐ 151-300
- ☐ ≥ 301

11. Have you completed a course or special training in exercise science or exercise counselling?

☐ Yes ☐ No

Section 1: Exercise Counselling

Where **exercise counselling is defined as** the encounter, where :

- a physical activity history (and medical history if unknown) is taken from the patient
- A physical exam and/or fitness testing is done if necessary
- Exercise prescription is given to the patient

Question 12

What percentage of all your patients are you confident would **start** exercising if you counselled them about exercise?

- ☐ 0-25%
- ☐ 26-50%
- ☐ 51-75%
- ☐ 76-100%

Question 13

What percentage of all your patients are you confident would **continue** exercising if you counselled them about exercise with follow-up visit(s)?

- ☐ 0-25%
- ☐ 26-50%
- ☐ 51-75%
- ☐ 76-100%

Question 14

How knowledgeable are you in the area of exercise counselling?

- ☐ 1 Not knowledgeable
- ☐ 2
- ☐ 3 Moderately knowledgeable
- ☐ 4
- ☐ 5 Extremely knowledgeable

Question 15

Do you believe you are qualified to do exercise counselling?

- ☐ 1 Not qualified
- ☐ 2
- ☐ 3 Moderately qualified
- ☐ 4
- ☐ 5 Extremely qualified

Question 16

What percentage of all your patients do you think you should be counselling about exercise?

- ☐ 0-25%
- ☐ 26-50%
- ☐ 51-75%
- ☐ 76-100%

Check off the answer(s) that apply to you. For this study exercise = continuous physical activity

Question 17

What percentage of your patients do you currently counsel about exercise?

- ☐ 0-25%
- ☐ 26-50%
- ☐ 51-75%
- ☐ 76-100%

For questions 18-21 refer to the following list.

1. Not important
2. Slightly important
3. Moderately important
4. Very important
5. Extremely important

Where applicable:

6 Exercise counselling should be done by another health/fitness professional

Question 18

For the following age categories, rate how important exercise is.

		1	2	3	4	5
Age	< 20	☐	☐	☐	☐	☐
	21-40	☐	☐	☐	☐	☐
	41-60	☐	☐	☐	☐	☐
	61-75	☐	☐	☐	☐	☐
	75+	☐	☐	☐	☐	☐

Question 19

For the following age categories rate how important exercise counselling by a family physician is.

		1	2	3	4	5	6
Age	< 20	☐	☐	☐	☐	☐	☐
	21-40	☐	☐	☐	☐	☐	☐
	41-60	☐	☐	☐	☐	☐	☐
	61-75	☐	☐	☐	☐	☐	☐
	75+	☐	☐	☐	☐	☐	☐

Question 20

For the following health conditions rate how important exercise is

Condition	1	2	3	4	5
Ischemic heart disease	☐	☐	☐	☐	☐
Pregnancy	☐	☐	☐	☐	☐
Osteoarthritis	☐	☐	☐	☐	☐
Obesity	☐	☐	☐	☐	☐
Depression	☐	☐	☐	☐	☐
Sedentary	☐	☐	☐	☐	☐
Cigarette smoker	☐	☐	☐	☐	☐
Stress	☐	☐	☐	☐	☐
Elevated cholesterol	☐	☐	☐	☐	☐
Type 2 diabetes	☐	☐	☐	☐	☐

Question 21

For the following health conditions rate how important exercise counselling by a family physician is.

Condition	1	2	3	4	5	6
Ischemic heart disease	☐	☐	☐	☐	☐	☐
Pregnancy	☐	☐	☐	☐	☐	☐
Osteoarthritis	☐	☐	☐	☐	☐	☐
Obesity	☐	☐	☐	☐	☐	☐
Depression	☐	☐	☐	☐	☐	☐
Sedentary	☐	☐	☐	☐	☐	☐
Cigarette smoker	☐	☐	☐	☐	☐	☐
Stress	☐	☐	☐	☐	☐	☐
Elevated cholesterol	☐	☐	☐	☐	☐	☐
Type 2 diabetes	☐	☐	☐	☐	☐	☐

Question 22

How frequently do you exercise counsel patients with the following conditions:

Condition	Never	Seldom	Often	Usually	Always
Ischemic heart disease	☐	☐	☐	☐	☐
Pregnancy	☐	☐	☐	☐	☐
Osteoarthritis	☐	☐	☐	☐	☐
Obesity	☐	☐	☐	☐	☐
Depression	☐	☐	☐	☐	☐
Sedentary	☐	☐	☐	☐	☐
Cigarette smoker	☐	☐	☐	☐	☐
Stress	☐	☐	☐	☐	☐
Elevated cholesterol	☐	☐	☐	☐	☐
Type 2 diabetes	☐	☐	☐	☐	☐

Please complete the following questions without referring to a reference source. If you do not know the answer, print: Don't know.

Question 23

A 40 year old male, non-smoker, BMI=28, total cholesterol = 5.2 mmol/L, otherwise healthy comes into your office for exercise counseling. He does not feel stress is a problem in his life. No family history of heart disease.

His current physical activity: Walks 10 minutes with the dog 3 times per week.

Briefly print in point form, an exercise prescription for this patient.

_____

_____

_____

_____

_____

_____

_____

Check off the answer(s) that apply to you. For this study exercise = continuous physical activity

Question 24

The above patient has confirmed essential hypertension (150/100), and is on an ACE inhibitor. Print below any changes you would make to the prescription you gave in question 23.

_____

_____

_____

_____

_____

_____

_____

Question 25

When you exercise counsel, how much time do you spend counselling with a patient?

- ☐ ≤ 2 minutes
- ☐ > 2 minutes

Question 26

When you counsel patients about exercise do you ... (check the appropriate answer below)

	never	seldom	often	usually	always
Give out education materials	☐	☐	☐	☐	☐
Specify frequency	☐	☐	☐	☐	☐
Write down the prescription for the patient to take home	☐	☐	☐	☐	☐
Specify type/mode	☐	☐	☐	☐	☐
Evaluate if patients know how to find their target heart range	☐	☐	☐	☐	☐
Specify duration	☐	☐	☐	☐	☐
Record patient's BMI	☐	☐	☐	☐	☐
Make a follow-up plan	☐	☐	☐	☐	☐
Specify intensity	☐	☐	☐	☐	☐

Question 26 Continued

	Never	seldom	often	usually	always
Record patient's exercise habits	☐	☐	☐	☐	☐
Recommend resistance training	☐	☐	☐	☐	☐
Specify warm up and cool down	☐	☐	☐	☐	☐
Ask about barriers to exercising	☐	☐	☐	☐	☐

Section 2: Physician Exercise (II-c)

Question 27

What is your resting heart rate (in bpm = beats per minute)

- ☐ ≤ 60 bpm
- ☐ 61-80 bpm
- ☐ > 80 bpm

Question 28

Are you on a beta blocker medication?

- ☐ Yes
- ☐ No

Question 29

How much do you enjoy aerobic exercise?

- ☐ Do not enjoy
- ☐ Enjoy slightly
- ☐ Enjoy moderately
- ☐ Enjoy
- ☐ Enjoy very much

Question 30

How often do you do aerobic exercise ?

- ☐ Don't do any
- ☐ 1-2 times/week
- ☐ 3-4 times/week
- ☐ ≥ 5 times/week
- ☐ > 1 session/day

Check off the answer(s) that apply to you. For this study exercise = continuous physical activity

Question 31

What is the duration of your aerobic exercise?

- ☐ Do not exercise
- ☐ 1-10 minutes
- ☐ 11-20 minutes
- ☐ 21-30 minutes
- ☐ > 30 minutes

Question 32

List the type(s) of activity you do for exercise:

1. _____
2. _____
3. _____

Question 33

What is the intensity of your exercise?

- ☐ Don't monitor intensity
- ☐ Reach my target heart rate
- ☐ Other method: _____

Question 34

Do you do weight/resistance training exercise?

- ☐ Don't do weight/resistance exercise
- ☐ Do weight/resistance exercise 1-2 times/week
- ☐ Do weight/resistance exercise 3-4 times/week
- ☐ Do weight/resistance exercise ≥ 5 times/week

Question 35

Do you believe you are exercising enough?

- ☐ Yes
- ☐ No

Section 3: Barriers to Exercise Counselling (II-d)

Question 36

Rate how important the following exercise counselling barriers are to you.

	Not Important	Somewhat important	Important	Very Important	Extremely Important
Not enough time to counsel about exercise	☐	☐	☐	☐	☐
Counselling will not lead to a change in patient's behavior	☐	☐	☐	☐	☐
Patients are not interested in exercise	☐	☐	☐	☐	☐
Insufficient evidence of the benefits of physical activity	☐	☐	☐	☐	☐
Counselling about other lifestyle changes is more important	☐	☐	☐	☐	☐
Financial reimbursement is not sufficient for time spent counselling	☐	☐	☐	☐	☐
Lack of personal knowledge re: exercise prescription/exercise science	☐	☐	☐	☐	☐
Insufficient exercise education during medical school	☐	☐	☐	☐	☐
Insufficient exercise education during GP/CCFP training	☐	☐	☐	☐	☐
Lack of continuing education offered in this subject area	☐	☐	☐	☐	☐
Patients prefer treatment with drugs	☐	☐	☐	☐	☐
Lack of clear guidelines on exercise counselling	☐	☐	☐	☐	☐

APPENDIX B

FINAL COVER LETTER

EXERCISE COUNSELLING BY FAMILY PHYSICIANS IN CANADA

Investigators:

M.K.Sandilands MD, CCFP, (MSc. Candidate)
W.Meeuwisse MD PhD, Dip. Sport Med.(Supervisor)

February 18,1998

Dear Family Doctor,

I am a family physician completing a fellowship in sport medicine at The University of Calgary . As part of a Masters degree in Kinesiology, I am conducting this survey to help advance the field of preventative medicine. A comprehensive study on exercise counselling has never been done before in Canada. This project has been found to be of sufficient importance to have received funding from The College of Family Physicians of Canada. Your name has been drawn from a randomly generated list of Canadian Family Physicians.

We appreciate your busy schedule and hope you can complete the attached questionnaire which takes **only ten minutes to complete.** The **success of this project depends on a high response rate.** Only a one time completion of this questionnaire is required.

All responses are strictly confidential. The questionnaires are identified by a number only, no names are used. The returned questionnaires are available only to members of the research team and will be destroyed at the completion of the study. The computer data file will contain no identifying information. Data will be reported in aggregate form only. Results will be used to help improve continuing education for family physicians in the area of exercise counselling. Your return of a completed questionnaire indicates that you have understood to your satisfaction the information regarding your voluntary participation in this research project.

If you have any questions concerning this project, please contact Dr. M.K. Sandilands at (403) 220-8956 or Dr. W.H. Meeuwisse (403) 220-8518. If you have any questions concerning your rights as a possible participant in this research, please contact the Office of Medical Bioethics, Faculty of Medicine, University of Calgary, at (403) 220-7990.

Please return the questionnaire in the envelope provided by March 12, 1998.

Thank you for your help.

Sincerely,

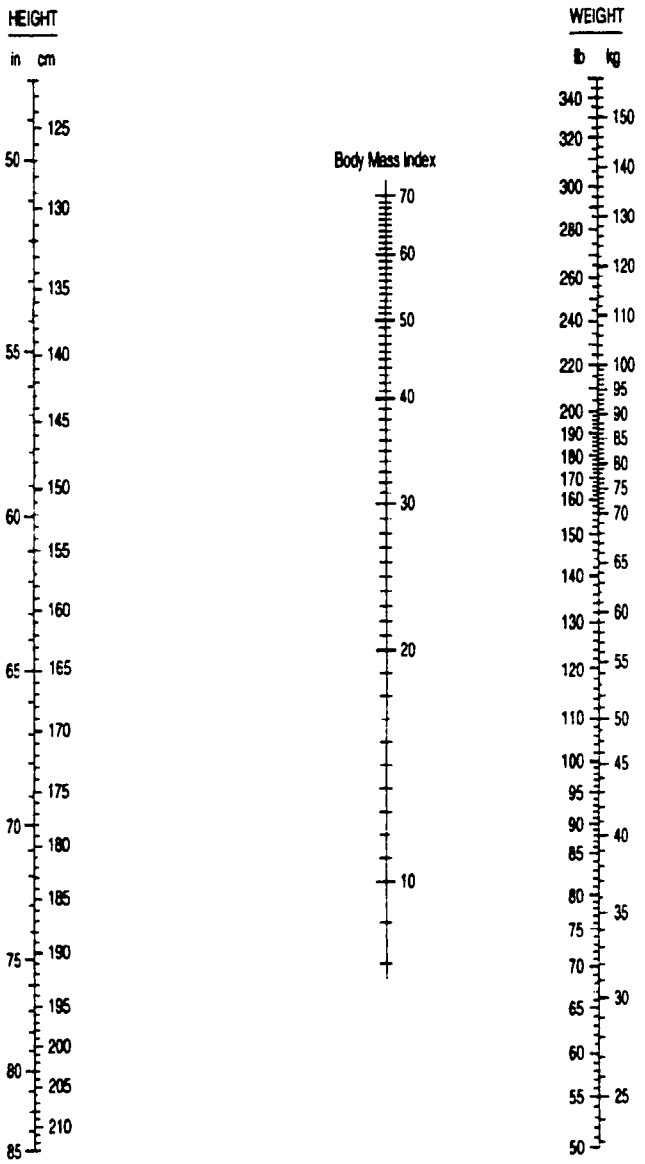
Maureen F.K. Sandilands MD CCFP
Sport Medicine Fellow
University of Calgary

W.H.Meeuwisse MD PhD, Dip. Sport Med.
Associate Professor
University of Calgary

APPENDIX C

BMI CHART

Find your height and weight and connect a line between the two to find your BMI.



APPENDIX D

PRE-TEST QUESTIONNAIRE

Check off the answer(s) that apply to you. For this study exercise = continuous physical activity

General Information (II-a)

1. Please indicate your primary care training

- ☐ 1 year intern training (general practitioner)
- ☐ 2 year family medicine residency (CCFP)
- ☐ CCFP via practice eligible route
- ☐ CASM diploma in sports medicine

2. Number of years in practice

- ☐ < 5 years
- ☐ 6-10 years
- ☐ 11-19 years
- ☐ ≥ 20 years

3 Your Gender

- ☐ Male
- ☐ Female

4. Your age

- ☐ 20-30 years
- ☐ 31-40 years
- ☐ 41-50 years
- ☐ 51-60 years
- ☐ 61+ years

5 Your body mass index (BMI)

- ☐ < 20
- ☐ 20-25
- ☐ > 25

6. Practice setting

- ☐ Urban (> 30,000 population size)
- ☐ Rural

7 Type of practice

- ☐ Fee for service
- ☐ Salary

8 Approximate number of patients seen per hour

- ☐ ≤ 5
- ☐ 6-10
- ☐ ≥ 11

9 Approximate number of patients seen per week

- ☐ ≤ 150
- ☐ 151-300
- ☐ ≥ 301

10. Have you completed a course or special training or focused reading in exercise science or exercise counseling?

- ☐ Yes
- ☐ No

Section 1: Exercise Counseling (II-b)

Where exercise counseling is defined as the encounter a physician has with a patient where a physical activity history with or without a physical exam or fitness testing, is done on the patient and the physician then provides an appropriate exercise prescription.

Question 1

What percentage of all your patients are you confident would **start** exercising if you counseled them about exercise?

- ☐ 0-25%
- ☐ 26-50%
- ☐ 51-75%
- ☐ 76-100%

Question 2

What percentage of all your patients are you confident would **continue** exercising if you counseled them about exercise with follow-up visit(s)?

- ☐ 0-25%
- ☐ 26-50%
- ☐ 51-75%
- ☐ 76-100%

Question 3

How knowledgeable are you in the area of exercise counseling?

- ☐ 1 Not knowledgeable
- ☐ 2
- ☐ 3 Moderately knowledgeable
- ☐ 4
- ☐ 5 Extremely knowledgeable

Question 4

Do you believe you are qualified to do exercise counseling?

- ☐ 1 Not qualified
- ☐ 2
- ☐ 3 Moderately qualified
- ☐ 4
- ☐ 5 Extremely qualified

Question 5

What percentage of all your patients do you think you should be counseling about exercise?

- ☐ 0-25%
- ☐ 26-50%
- ☐ 51-75%
- ☐ 76-100%

Check off the answer(s) that apply to you. For this study exercise = continuous physical activity

Question 6

What percentage of your patients do you currently counsel about exercise?

- ☐ 0-25%
- ☐ 26-50%
- ☐ 51-75%
- ☐ 76-100%

For questions 7-10 refer to the following list.

1. Not important
2. Slightly important
3. Moderately important
4. Very important
5. Extremely important
6. Exercise counseling should be done by another health/fitness professional

Question 7

For the following age categories, rate how important exercise is.

		1	2	3	4	5
Age	< 20	☐	☐	☐	☐	☐
	21-40	☐	☐	☐	☐	☐
	41-60	☐	☐	☐	☐	☐
	61-75	☐	☐	☐	☐	☐
	75+	☐	☐	☐	☐	☐

Question 8

For the following age categories rate how important exercise counseling by a family physician is.

		1	2	3	4	5	6
Age	< 20	☐	☐	☐	☐	☐	☐
	21-40	☐	☐	☐	☐	☐	☐
	41-60	☐	☐	☐	☐	☐	☐
	61-75	☐	☐	☐	☐	☐	☐
	75+	☐	☐	☐	☐	☐	☐

Question 9

For the following health conditions rate how important exercise is.

Condition	1	2	3	4	5
Ischemic heart disease	☐	☐	☐	☐	☐
Pregnancy	☐	☐	☐	☐	☐
Osteoarthritis	☐	☐	☐	☐	☐
Obesity	☐	☐	☐	☐	☐
Depression	☐	☐	☐	☐	☐
Sedentary	☐	☐	☐	☐	☐
Cigarette smoker	☐	☐	☐	☐	☐
Stress	☐	☐	☐	☐	☐
Elevated cholesterol	☐	☐	☐	☐	☐

Question 10

For the following health conditions rate how important exercise counseling by a family physician is.

Condition	1	2	3	4	5	6
Ischemic heart disease	☐	☐	☐	☐	☐	☐
Pregnancy	☐	☐	☐	☐	☐	☐
Osteoarthritis	☐	☐	☐	☐	☐	☐
Obesity	☐	☐	☐	☐	☐	☐
Depression	☐	☐	☐	☐	☐	☐
Sedentary	☐	☐	☐	☐	☐	☐
Cigarette smoker	☐	☐	☐	☐	☐	☐
Stress	☐	☐	☐	☐	☐	☐
Elevated cholesterol	☐	☐	☐	☐	☐	☐

Question 11

How frequently do you exercise counsel patients with the following conditions:

Condition	Never	Seldom	Often	Usually	Always
Ischemic heart disease	☐	☐	☐	☐	☐
Pregnancy	☐	☐	☐	☐	☐
Osteoarthritis	☐	☐	☐	☐	☐
Obesity	☐	☐	☐	☐	☐
Depression	☐	☐	☐	☐	☐
Sedentary	☐	☐	☐	☐	☐
Cigarette smoker	☐	☐	☐	☐	☐
Stress	☐	☐	☐	☐	☐
Elevated cholesterol	☐	☐	☐	☐	☐

Please complete the following questions without referring to a reference source. If you do not know the answer, print: Don't know.

Question 12

A 40 year old male, non-smoker, borderline BMI, total cholesterol = 5.2 mmol/L, otherwise healthy comes into your office for exercise counseling. He does not feel stress is a problem in his life. No family history of heart disease.

His current physical activity: Walks 10 minutes with the dog 3 times per week.

Briefly print in point form, an exercise prescription for this patient.

_____

_____

_____

_____

_____

_____

_____

Check off the answer(s) that apply to you. For this study exercise = continuous physical activity

Question 13

The above patient has confirmed essential hypertension (150/100), and is on an ACE inhibitor. Print below any changes you would make to the prescription you gave in question 9.

_____

_____

_____

_____

_____

_____

Question 14

Define and give an example of moderate physical activity.

_____

_____

_____

_____

_____

_____

Question 15

How much time do you spend exercise counseling?

- ☐ ≤ 2 minutes
- ☐ > 2 minutes

Question 16

When you counsel patients about exercise do you ... (check the appropriate answer below)

	never	seldom	often	usually	always
Give out education materials	☐	☐	☐	☐	☐
Specify frequency	☐	☐	☐	☐	☐
Write down the prescription for the patient to take home	☐	☐	☐	☐	☐
Specify type/mode	☐	☐	☐	☐	☐
Evaluate if patients know how to find their target heart range	☐	☐	☐	☐	☐

Question 15 Continued

	Never	seldom	often	usually	always
Specify duration	☐	☐	☐	☐	☐
Record patient's BMI	☐	☐	☐	☐	☐
Make a follow-up plan	☐	☐	☐	☐	☐
Specify intensity	☐	☐	☐	☐	☐
Record patient's exercise habits	☐	☐	☐	☐	☐
Recommend resistance training	☐	☐	☐	☐	☐
Specify warm up and cool down	☐	☐	☐	☐	☐
Ask about barriers to exercising	☐	☐	☐	☐	☐

Section 2: Physician Exercise (II-c)

Question 17

What is your resting heart rate (in bpm = beats per minute)

- ☐ ≤ 60 bpm
- ☐ 61-80 bpm
- ☐ > 80 bpm

Question 18

Are you on a beta blocker medication?

- ☐ Yes
- ☐ No

Question 19

How much do you enjoy aerobic exercise?

- ☐ Do not enjoy
- ☐ Enjoy slightly
- ☐ Enjoy moderately
- ☐ Enjoy
- ☐ Enjoy very much

Question 20

How often do you do aerobic exercise

- ☐ Don't do any
- ☐ 1-2 times/week
- ☐ 3-4 times/week
- ☐ ≥ 5 times/week
- ☐ > 1 session/day

Check off the answer(s) that apply to you. For this study exercise = continuous physical activity

Question 21

What is the duration of your aerobic exercise?

- ☐ Do not exercise
- ☐ 1-10 minutes
- ☐ 11-20 minutes
- ☐ 20-30 minutes
- ☐ > 30 minutes

Question 22

List the type(s) of activity you do for exercise:

1 _____
2 _____
3. _____

Question 23

What is the intensity of you exercise?

- ☐ Don't monitor intensity
- ☐ Reach my target heart rate
- ☐ Other method: _____

Question 24

Do you do weight/resistance training exercise?

- ☐ Don't do weight/resistance exercise
- ☐ Do weight/resistance exercise 1-2 times/week
- ☐ Do weight/resistance exercise 3-4 times/week
- ☐ Do weight/resistance exercise ≥ 5 times/week

Question 25

Do you believe you are exercising enough?

- ☐ Yes
- ☐ No

Section 3: Barriers to Exercise Counseling (II-d)

Question 24

How important are the following barriers as they apply to you and your ability to do exercise counseling?

	Not Important	Somewhat Important	Important	Very Important
Not enough time to counsel about exercise	☐	☐	☐	☐
Counseling will not lead to a change in patient's behavior	☐	☐	☐	☐
Patients are not interested in exercise	☐	☐	☐	☐
Insufficient evidence of the benefits of physical activity	☐	☐	☐	☐
Counseling about other lifestyle changes is more important	☐	☐	☐	☐
Financial reimbursement is not sufficient for time spent counseling	☐	☐	☐	☐
Lack of personal knowledge re. exercise prescription/exercise science	☐	☐	☐	☐
Insufficient exercise education during medical school	☐	☐	☐	☐
Insufficient exercise education during GP/CCFP training	☐	☐	☐	☐
Lack of continuing education offered in this subject area	☐	☐	☐	☐
Patients prefer treatment with drugs	☐	☐	☐	☐
Lack of clear guidelines on exercise counseling	☐	☐	☐	☐

APPENDIX E

PRE-TEST COVER LETTER

EXERCISE COUNSELING BY FAMILY PHYSICIANS IN CANADA
Investigators:

M.K.Sandilands MD, CCFP, (MSc. Candidate)
W.Meeuwisse MD PhD, Dip. Sport Med.(Supervisor)

December 1,1997

Dear Family Doctor,

I am a family physician completing a fellowship in sport medicine at The University of Calgary . As part of a Masters degree in Kinesiology, I am conducting this survey to help advance the field of preventative sport medicine. A comprehensive study on exercise counseling has never been done before in Canada. This project has been found to be of sufficient importance to have received funding from The College of Family Physicians of Canada. Your name has been drawn from a randomly generated list of Canadian Family Physicians.

We appreciate your busy schedule and hope you can complete the attached questionnaire which takes **only five minutes to complete.** The **success of this project depends on a high response rate.** Only a one time completion of this questionnaire is required. If you are not a family physician or general practitioner or you are not currently practising family medicine, please return the questionnaire to us so we do not bother you with subsequent mailings.

All responses are strictly confidential. The questionnaires are identified by a number only, no names are used. The returned questionnaires (identified by number only) are available only to members of the research team and will be destroyed at the completion of the study. The computer data file will contain no identifying information. Data will be reported in aggregate form only. Results will be used to help improve continuing education for family physicians in the area of exercise counseling.
Your return of a completed questionnaire indicates that you have understood to your satisfaction the information regarding your voluntary participation in this research project.

If you have any questions concerning this project, please contact Dr. M.K. Sandilands at (403) 220-8956 or Dr. W.H. Meeuwisse (403) 220-8518. If you have any questions concerning your rights as a possible participant in this research, please contact the Office of Medical Bioethics, Faculty of Medicine, University of Calgary, at (403) 220-7990.

Please return the questionnaire in the envelope provided by December 8, 1998.

Thank you for your help.

Sincerely,

Maureen F.K. Sandilands MD CCFP
Sport Medicine Fellow
University of Calgary

W.H.Meeuwisse MD PhD, Dip. Sport Med.
Associate Professor
University of Calgary

APPENDIX F

PRE-TEST INSTRUCTION LETTER

Dear Dr.,

Thank you for volunteering your time to evaluate our questionnaire. The goal of this study is to obtain baseline information on current exercise counseling by family physicians in Canada. The study is funded by The College of Family Physicians of Canada and is a required thesis project for my MSc. In Kinesiology.
This evaluation is being done to assess the presentation, structure, content and reliability of the questionnaire. The questionnaire starts with a cover letter that explains the study followed by 2 double sided (or 4 single side pages) pages with questions for you to answer. I have also enclosed a sheet that is not part of the questionnaire but is to aid you in the evaluation. It lists the goals under the different section headings so you can assess if the questions are appropriate for the information we are trying to obtain. You will be asked to complete this questionnaire again in 10-14 days in order to test for reliability. You do not need to provide your feedback for this second completion. Please print or write neatly below your comments under the specified headings. I f you have suggestions for improvement please include this. Feel free to print comments on the questionnaire itself regarding specific questions. If you have any questions, contact me, Dr. Maureen Sandilands, at 239-8080 or 220-8956. Thanks again for your help.

PLEASE FAX ALL PAGES BACK TO (403) 282-6170 BY MONDAY, DECEMBER 8,1997.

1. What is your opinion regarding the overall look/ presentation and organization of this questionnaire?

2. Are there questions under different sections that are not appropriate to the heading and goal(s) for that section?

APPENDIX G

PRE-TEST SECTION HEADINGS / GOALS SHEET

SECTION HEADINGS and GOALS

1. PAGE 1- Section 1:GENERAL INFORMATION, GOAL: To obtain demographic information.

2. PAGE 1- Section 1: EXERCISE COUNSELING : Questions 1-4, GOAL: Assess physician confidence in their ability to do and succeed at exercise counseling

3. PAGE 1-2- Section 1: EXERCISE COUNSELING: Questions 5-6, GOAL: Assess desired and current exercise counseling frequency

4. PAGE 2- Section 1: EXERCISE COUNSELING: Questions 7-11, GOALS: a) Assess physician's perception of importance of exercise for different age groups and different health conditions, b) Assess physician's view on their role in counseling the groups in a) and c) Assess frequency of exercise counseling by physicians for different health conditions.

5. PAGE 2-3- Section 1: EXERCISE COUNSELING: Questions 12-14, GOALS: a) Assess physician exercise prescription for an average patient and then for a patient with hypertension. b) Assess physician knowledge of moderate physical activity

6. PAGE 3- Section 1: EXERCISE COUNSELING : Questions 15-16, GOAL: Assess current counseling content and methods used.

7. PAGE 3-4- Section 2: PHYSICIAN EXERCISE HABITS: Questions 17-25, GOAL: Assess physician exercise habits.

8. PAGE 4-Section 3: BARRIERS TO EXERCISE COUNSELING: Question 24, GOAL: Assess which barriers physicians consider to be important.

Any further comments on the questionnaire:

APPENDIX H

PRE-TEST SECOND COMPLETION INSTRUCTION LETTER

December 18, 1997

Dear Dr.,

Thank you for completing the first copy of our questionnaire on exercise counselling by family physicians. Your participation has been extremely helpful regarding the evaluation of the design of the questionnaire. As previously discussed, we would greatly appreciate you filling out this second copy so we can test for the reliability of the questionnaire. No feedback is required this time.
Thanks again

Maureen K. Sandilands MD CCFP

PLEASE FAX BACK THE QUESTIONNAIRE PAGES TO 282-6170 AS SOON AS POSSIBLE.

APPENDIX I

PRE-TEST QUESTION 12-14 ANSWER KEY

SCORING SYSTEM FOR QUESTIONS 12-14

Question 12
Total possible score=6/6

1) Mentions type or mode of activity specifically
(see attached list of common choices, if activity recommended not on list, it must be continuous physical activity using major muscle groups)

Total possible points: 1

2) Specifies frequency of the activity
Acceptable answers include: a) 3-5 times per week OR b) daily in one session or multiple sessions

Total possible points: 1

3) Specifies duration of activity
Acceptable answers include: a) 20-60 minutes/session OR b) Multiple sessions in one day that total 30 minutes. In this case scenario, starting off with 15 min sessions is acceptable as long as they state the patient should work their way up to at least 20 mins.

Total possible points: 1

4) Specifies intensity
Acceptable answers include: 60-90% of maximum heart rate, OR rating of 12-16 on the Borg scale OR 50-85% of VO2 max or HR reserve (40-50% VO2 max or HR reserve is also acceptable in this case) OR enough to expend 200 calories in 30 mins. OR at 3-6 METS OR walking briskly at 3-4 mph (4.8-6.4 km/hr) or another activity expending 4-7 kcal/min. If only one percentage is quoted, ex: 60% of max HR, this is acceptable as long as it falls within the ranges above.

Total possible points : 1

5) Specifies resistance training
Acceptable answers include: at least two days/week, 8-10 separate exercises that train the major muscle groups, one to three sets of 8-12 repetitions

Total possible points: 2 : 1 point for mentioning resistance(or strength) training, an additional point for the correct details listed in 5).

Question 13
Total possible score: 2/2

Acceptable answers include:
a)requires exercise testing (1 point)
b)for resistance training do low resistance, high repetitions (1 point)

Question 14
Total possible score : 2/2

Definition of moderate physical activity:
- bodily movement produced by skeletal muscles that results in energy expenditure of 3 to 6 METS or 4-7 kcal/min or 240-420 kcal/hour (1 point)

Example of moderate physical activity:
- brisk walking at 3-4 mph OR 4.8-6.4 km/hr or another activity on attached list (running or jogging is also acceptable) (1 point , must list activity and the velocity/speed required or amount of kcal required to expend per min. or hour)

APPENDIX J

PHONE STAGE COVER NOTE

Dear Dr.,

As discussed recently with you on the telephone, enclosed is the exercise counselling questionnaire.

Thank you for agreeing to complete this.

Please return it in the stamped envelope provided as soon as possible

APPENDIX K

PHYSICIAN EXERCISE HABIT SCORE KEY

SCORING SYSTEM FOR PHYSICIAN EXERCISE HABITS

Questions 30-34 on the questionnaire were used to compile an exercise habit score for each physician. The score was out of a possible 5 points.

Question 30: if answer was 3-4 times/week or greater (1 point)

Question 31: if answer was 21-30 minutes or greater (1 point)

Question 32: if answer contained an activity that was continuous, using major muscle groups (reference :ACSM [32]) (1 point)

Question 33: if answer contained a method of assessing intensity (e.g., target heart rate range, rating perceived exertion, walking briskly at 3-4 mph) accepted by ACSM [32] (1 point)

Question 34**: if answer was weight/resistance exercise 1-2 times/week or greater (1 point)**