THE EFFECTS OF A SELF-EFFICACY ENHANCING INTERNET

INTERVENTION ON THE DIETARY MANAGEMENT OF CHOLESTEROL

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ABSTRACT

The Effects of a Self-efficacy Enhancing Internet Intervention on the Dietary

Management of Cholesterol

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Cardiovascular disease continues to be the leading cause of morbidity and mortality in the United States. Elevated serum cholesterol is a risk factor for cardiovascular disease. Diets high in saturated fat and cholesterol contribute to elevation in blood cholesterol. The purpose of this study was to develop and test a self-efficacy enhancing Internet intervention for dietary reduction of cholesterol.

Data were analyzed on 38 employees of a community college who participated in an Internet dietary change intervention during the fall semester of 2003. Analysis of covariance (ANCOVA) controlling for baseline self-efficacy did not reveal significant differences in LDL cholesterol, dietary adherence, nutrition knowledge, or self-efficacy as hypothesized. Self- efficacy did not mediate nutrition knowledge or dietary adherence. ANCOVA controlling for baseline LDL cholesterol revealed significantly improved LDL cholesterol in the self-efficacy group ($p = .04$). Website use also differed significantly between groups with the self-efficacy group logging on an average of 119 times compared to 19 times for the education group ($p < .000$). The

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small sample size and healthy baseline habits of the sample possibly affected study results.

LDL cholesterol decreased in the self-efficacy group while increasing in the education group. Both groups had high baseline self-efficacy and nutrition knowledge that remained stable. Improvements in dietary adherence to a cholesterol-lowering diet were noted for both groups.

In summary, the self-efficacy enhancing Internet dietary change intervention did not produce the hypothesized results. The Internet intervention was readily used by participants, especially by the group who received self-efficacy support. Further study of behavioral change interventions using the Internet is recommended.

Preface and Acknowledgements

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To the community college employees who participated in the intervention.

Dedication

This research is dedicated to my parents, Jacqueline and the late John J.

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Chapter I

The Problem

Discussion of the Problem

Cardiovascular disease continues to be the leading cause of morbidity and mortality in the United States (American Heart Association, 2001). There is considerable evidence that therapeutic lifestyle changes (TLC) can significantly reduce cardiovascular morbidity and mortality (Cleeman et al., 2001). Hypercholesterolemia, or elevated blood cholesterol level, is one of the major modifiable risk factors that can be improved through TLC and pharmacological therapy where appropriate. In May 2001, the Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (ATP III) (Cleeman et al., 2001) issued new guidelines that include more stringent standards and increased emphasis on the use of medications and TLC to optimize cholesterol levels and reduce cardiovascular risk. Dietary modification is one of the therapeutic lifestyle changes recommended. The beneficial effects of dietary modification have been well documented (Howell, McNamara, Tosca, Smith, & Gaines, 1997; Yu-Poth et al., 1999).

Theory-based behavioral approaches are useful in lifestyle modification (Bandura, 1977; Glanz, 1997; Herrick, Stone, & Mettler, 1997; Kristal et al., 1995; Roter et al., 1998). Self-efficacy has been a good predictor of health behavior change (AbuSabha & Achterberg, 1997; Bandura, 1998; Brug, Glanz, & Kok, 1997; Herrick et al., 1997; Ling & Horwath, 1999; McCann et al., 1995; Ounpuu, Woolcott, & Rossi, 1999; Richman, Loughnan, Droulers, Steinbeck, & Caterson, 2001; Schwarzer, 1992;

Schwarzer & Renner, 2000) accounting for up to fifty percent of the variance in some models (AbuSabha & Achterberg, 1997). Although the relationship between self-efficacy and behavior change is well established, there is limited empirical evidence to demonstrate that self-efficacy enhancing interventions are effective in assisting people in the adoption of dietary changes for cholesterol reduction. Also, little is known about the effectiveness of use of the Internet for the delivery of a self-efficacy enhancing intervention to assist people in making dietary changes to lower their cholesterol level and subsequent cardiovascular risk. The purpose of this study was to evaluate the effects of a self-efficacy enhancing Internet intervention on the dietary management of cholesterol. The study design incorporated theory-based behavioral change principles, use of technology, and a worksite program, as recommended in the ATP III Guidelines and Healthy People 2010 (Cleeman et al., 2001; U.S. Department of Health and Human Services, 2000).

Prevalence of Hypercholesterolemia

The relationship between hypercholesterolemia and atherosclerosis was identified more than 50 years ago (Gofman et al., 1954; Steinberg & Gotto, 1999). An estimated 106.9 million American adults have total blood cholesterol levels greater than 200 mg/dL, with 37.7 million having levels of 240 mg/dL or above (American Heart Association, 2001). These cholesterol levels place them at increased risk for cardiac, cerebral and peripheral vascular disease. More than 40 percent of Americans age 20 and older have LDL cholesterol levels of 130 mg/dL or above, with between 14 and 20.4 percent of these people, depending on ethnicity, having levels of 160 mg/dL or greater (American Heart Association, 2001). Despite these alarming statistics, only

one-third of Americans can report their cholesterol numbers (AHA, 2001). The majority of individuals remain unaware of their cholesterol level and its associated risk for coronary artery disease morbidity and mortality (Cleeman et al., 2001).

Diet is the major behavioral determinant of blood cholesterol level (Watts et al., 1992). Excessive intake of saturated fat, cholesterol, and calories are the major diet-related factors linked to elevated blood cholesterol levels (Van Horn, 1997). The fast-paced American lifestyle results in heavy use of 'fast foods' and pre-processed foods in which fat comprises a large component of the energy content. Increased consumption of calories from fat sources contributes to both hypercholesterolemia and obesity. An estimated 97 million Americans can be classified as overweight or obese (Kuczmarski, Carroll, Flegal, & Troiano, 1997). Americans have an increased awareness of the relationship between dietary intake, blood cholesterol levels, obesity, and associated health risks and have decreased the proportion of total calories they consume from fat sources over the last 20 years (U.S. Department of Health and Human Services, 2000). However, the decreased proportion of dietary fat intake may be due to an increase in the total caloric and carbohydrate intake, rather than an absolute reduction in fat intake (Anderson, Winett, Wojcik, Winett, & Bowden, 2001). Even if this reduction in fat intake is real, two-thirds of Americans continue to exceed the recommended intake of total energy from fat sources (U.S. Department of Health and Human Services, 2000). Americans fail to apply knowledge of the relationship of dietary intake of fat and cholesterol and increased morbidity and mortality to their personal situation (Cleeman et al., 2001). A recent survey indicated that the majority of Americans remain unaware of recommended dietary guidelines, especially those

relating to fat intake (Keenan, AbuSabha, & Robinson, 2002). These trends demonstrate the need for the development of innovative strategies for dietary modification to decrease blood cholesterol level.

Health Risks Associated with Hypercholesterolemia

The association between a diet high in saturated fat and cholesterol and an increased incidence of cardiovascular events is well established (Anderson, Castelli, & Levy, 1987; Kannel et al., 1986; Multiple Risk Factor Intervention Trial Research Group, 1982; Stamler, Greenland, Van Horn, & Grundy, 1998). There is a growing body of evidence suggesting that ingestion of high fat diets is also associated with an increased risk of cancer, specifically cancers of the breast, colon, rectum, and prostate (Chan et al., 2001; Giovannucci et al., 1993; Giovannucci et al., 1994; Willett, Stampfer, Colditz, Rosner, & Speizer, 1990). Longitudinal data from the Framingham study reveals that blood cholesterol level is inversely associated with life expectancy (Anderson et al., 1987). Data from large prospective studies such as the Framingham and the Nurses' Health Study (Anderson et al., 1987; Stampfer, Hu, Manson, Rimm, & Willett, 2000) demonstrate that controlling lifestyle-related risk factors, including dietary recommendations, is associated with a reduced risk of coronary heart disease.

Benefits of Dietary Modification

Healthy People 2010 objectives focus on strategies to encourage dietary modification to reduce dietary fat intake and increase consumption of fruits and vegetables to promote health and reduce the incidence of cardiovascular disease and certain cancers (U.S. Department of Health & Human Services, 2000). There is also evidence of the benefits of secondary prevention on risk reduction for people with

established coronary heart disease (Ornish et al., 1990; Ornish et al., 2001; Watts et al., 1992). Meyers (1996) calculates that reducing low density lipoprotein cholesterol (LDL-C) decreases cardiovascular events by 42% and mortality by 30%. Oster and Thompson (1996) estimate that reducing saturated fat intake by one to three percentage points would result in a reduction of 32,000 cardiovascular events annually, yielding a multi-billion dollar savings from medical expenditure costs and lost earnings combined. Trials of interventions promoting Step I (< 300mg cholesterol and < 10% saturated fat) and Step II (< 200mg cholesterol and < 7% saturated fat) diets have resulted in reductions in LDL cholesterol of 12% and 16% (Yu-Poth et al., 1999).

Federal guidelines recommend reducing the proportion of calories obtained from saturated fat and cholesterol. This has been the focus of previous dietary change recommendations (Expert Panel, 1994). More recent guidelines recommend increased intake of mono-unsaturated and polyunsaturated fat, and specify intake proportions for fiber, carbohydrates and protein (Cleeman et al., 2001). There are two levels of dietary recommendations: the heart healthy diet for those with normal blood cholesterol levels and absence of CHD or its risk factors, and the therapeutic lifestyle changes (TLC) diet for people with elevated blood cholesterol, CHD, or its risk factors (Cleeman et al., 2001). A comparison of the recommendations of the two diets is shown in Table 1.

Table 1

Comparison of the Healthy Heart Diet and the Therapeutic Lifestyle Changes (TLC)

Diet

Nutrient	Heart Healthy Diet	TLC Diet
Saturated fat (Includes trans fatty acids)	< 10% of total calories	< 7% of total calories
Polyunsaturated fat	No recommendation	Up to 10% of total calories
Monounsaturated fat	No recommendation	Up to 20% of total calories
Total fat	30% or < of total calories	25% - 35% of total calories
Carbohydrate (complex carbohydrates including whole grains, fruits, and vegetables should predominate)	No recommendation No recommendation	50 – 60% of total calories
Fiber		20 – 30 Grams/day
Protein	No recommendation	Approximately 15% of total calories
Cholesterol	< 300 mg/day	< 200 mg/day
Total calories	To maintain desirable body weight	

(Cleeman et al., 2001)

The Adult Treatment Panel III guidelines focus on primary prevention of coronary

heart disease in persons with multiple risk factors while continuing efforts at

secondary prevention of participants with CHD (Cleeman et al., 2001). Americans

demonstrate poor understanding of recommended dietary guidelines for intake of fat and fiber (Keenan et al., 2002; Keenan, AbuSabha, Sigman-Grant, Achterberg, & Ruffing, 1999). Behavioral interventions that increase understanding and encourage adoption of recommended dietary guidelines need to be empirically evaluated.

Strategies to encourage people to adopt and maintain a healthy diet range from telling experimental participants their cholesterol level (Aubin, Godin, Vezina, Maziade, & Desharnais, 1998) or the amount of fat intake as a percentage of total caloric intake they should consume (Armitage & Conner, 2001), to intensive interventions that include a residential component (Ornish et al., 1990). Worksite programs promoting dietary modification, or multiple risk factor modification have generally resulted in small, but statistically significant, improvements in dietary intake (Angotti & Levine, 1994; Clark et al., 1997; Hartman, McCarthy, & Himes, 1993). A survey study (Keenan, Achterberg, Kris-Etherton, Abusabha, & VonEye, 1996) employing qualitative and quantitative methods identified six fat-reduction strategies that resulted in significant reduction of fat intake. These include decreased use of fat flavorings, decreased 'recreational foods', decreased cooking fat, replacing meat, changing breakfast, and using fat-modified foods. Interventions that facilitate use of these strategies need to be empirically evaluated. Research is needed to evaluate behavioral interventions that increase awareness of dietary guidelines for reduction of cholesterol level and provide strategies for adoption of these strategies into daily eating patterns.

Communication techniques used in previous worksite interventions for cholesterol reduction include individual and group face-to-face counseling, as well as

telephone and mail contact (Clark et al., 1997; Hartman, Himes, McCarthy, & Kushi, 1995; Kristal, Curry, Shattuck, Feng, & Li, 2000). Computer developed tailored feedback delivered by mail was a component in some interventions (Clark et al., 1997; Kristal et al., 2000). These studies support the role of computer technology in promoting behavior change. However, written feedback to participants was delivered through the mail. Recent advances in the use of the Internet (Brennan et al., 2001; Cassell, Jackson, & Cheuvront, 1998; Ferguson, 1997; Fox & Rainie, 2000; Tate, Wing, & Winett, 2001) suggest its usefulness as a medium for delivering a self-efficacy dietary change intervention.

The Internet has the capability for individual and group communication, as well as synchronous or asynchronous communication, along with print, visual, and audio media. These capabilities provide a broader range of communication modalities than the more traditional communication approaches including telephone, and mailed information (Cassell et al., 1998). Evaluation of the effectiveness of the Internet for the delivery of a self-efficacy enhancing intervention for the dietary reduction of cholesterol is necessary.

There is limited empirical evidence regarding behavioral interventions utilizing the Internet as a communication medium to promote dietary change. A study on use of a website for delivery of a weight loss program (Tate et al., 2001) provided preliminary support for the structured use of the Internet for the delivery of behavioral dietary change interventions. In this study participants were randomized to receive either online education regarding weight loss, or online education and a behavioral intervention. Tate and colleagues' found that the behavioral intervention that included

self-monitoring, log maintenance, use of a participant bulletin board for social support, and weekly email individualized feedback from a therapist produced significantly greater weight loss than did the educational intervention that was also delivered via the Internet.

Interventions that use the Internet for behavioral dietary modification strategies in the worksite setting may be useful in providing information, assisting participants in setting short-term goals, and engaging participants in skill building strategies to incorporate dietary changes into their everyday lives. Self-regulatory strategies based on self-efficacy theory (Bandura, 1997) may be a useful theoretical approach. All people have self-regulatory mechanisms that allow them to initiate self-directed changes in their behavior. The accuracy and consistency of self-observation and self-monitoring directly affect action and behavior (Pajares, 1997).

Bandura and others (Bandura, 1977, 1998, 2001; Pajares, 1997; Schwarzer, 1992, 2001; Schwarzer & Renner, 2000) have emphasized the importance of self-efficacy for successful adoption of health behavior change. People will persevere in activities and behaviors that they believe they are capable of achieving. They will avoid activities and behaviors where confidence in their ability to succeed is lacking. Self-efficacy based interventions are designed to increase peoples' confidence in their ability to succeed by building on prior experiences and successes. The purpose of this self-efficacy enhancing study was to provide participants the opportunity to self-evaluate their current behavior according to the latest dietary recommendations for cholesterol control through use of an interactive website. The intervention provided

self-efficacy support through the provision for performance accomplishments, modeling and social persuasion.

Statement of the Problem

This study addressed the effects of an Internet-based dietary intervention for cholesterol management. The research questions were:

1. What are the effects of a self-efficacy enhancing Internet dietary intervention on LDL cholesterol?

2. What are the effects of a self-efficacy enhancing Internet dietary intervention on adherence to a cholesterol-lowering diet?

3. What are the effects of a self-efficacy enhancing Internet dietary intervention on dietary knowledge?

4. What are the effects of a self-efficacy enhancing Internet dietary intervention on dietary self-efficacy?

5. Does self-efficacy mediate the effects of a self-efficacy enhancing Internet dietary intervention on adherence to a cholesterol-lowering diet and knowledge of a cholesterol-lowering diet?

Definition of Terms

Hypercholesterolemia. Hypercholesterolemia is defined as a blood cholesterol level that exceeds the recommendations of the Expert Panel in the National Cholesterol Education Program Guidelines (Cleeman et al., 2001). Risk for coronary heart disease is the determining factor in the establishment of the LDL cholesterol level that is diagnostic of hypercholesterolemia. Table 2 shows the cut points for hypercholesterolemia based on risk profile. Hypercholesterolemia is operationally

defined in this study by the results of a fasting lipid profile obtained according to the

guidelines of the National Cholesterol Education Panel (Cleeman et al., 2001) and the

cardiac risk profile determined by the Baseline Profile.

Table 2

Criteria for Hypercholesterolemia Based on Cardiac Risk Profile

CHD Risk Profile	LDL-C Level
CHD and CHD risk equivalents	≥ 100 mg/dL
2+ risk factors	≥ 130 mg/dL
0-1 risk factors	≥ 160mg/dL

Self-efficacy. Self-efficacy is conceptually defined as the confidence a person

has in his/her ability to successfully perform a specific behavior (Bandura, 1986). In

this study, the behavior of interest is maintaining a cholesterol lowering diet. Dietary

self-efficacy was operationally defined in this study using the Cholesterol Lowering

Diet Self-Efficacy Scale (CLDSES) (Burke, 1997).

Adherence. Dietary adherence is conceptually defined as maintenance of a

cholesterol-lowering diet. Dietary adherence was operationally defined in this study

using the carbohydrate and cholesterol-saturated fat subscales of the Diet Habit Survey

(Connor et al., 1992) to assess dietary adherence.

Diet. Diet is conceptually defined as the eating behavior or pattern including

all consumption of food products both solid and liquid. Diet was operationally defined

using the Diet Habit Survey (DHS) (Connor et al., 1992). The Diet Habit Survey was

used to identify baseline dietary consumption of participants. Post-intervention, the DHS was used to quantify dietary change.

Nutrition Knowledge. Nutrition knowledge is conceptually defined as an awareness of what comprises a cholesterol-lowering diet with regard to food selection and preparation. In this study nutrition knowledge was operationally defined using the Nutrition Knowledge and Attitude Questionnaire (NKQ) (Burke, 1997).

Delimitations

The sample for this study was limited to employees of a community college in New Jersey who responded to recruitment efforts with an interest in participating in a study on dietary interventions for cholesterol reduction. Exclusion criteria included pregnancy and uncontrolled chronic illness.

Significance

Excessive consumption of calories, saturated fat and cholesterol is identified as a contributing factor to high blood cholesterol levels and associated diseases. Healthy People 2010 advocates increased worksite screenings and interventions and the use of technology to assist people in adopting lifestyle changes that will reduce consumption of these nutrients. Self-efficacy has been identified as an important behavioral factor in health behavior change (AbuSabha & Achterberg, 1997; Bandura, 1997; Schwarzer, 1992, 2001). Also, the Internet may be a valuable communication medium for promoting behavioral change. However, there is little empirical support for the mediating role of self-efficacy or the effects of a self-efficacy enhancing intervention delivered via the Internet. This study evaluated the effectiveness of a self-efficacy enhancing Internet intervention for adoption of a cholesterol-lowering diet in

employees of a community college. It was hypothesized that the intervention would result in adoption and maintenance of a cholesterol-lowering diet with a corresponding reduction in LDL-C. Identification of factors predictive of successful participation in an Internet-based behavioral dietary intervention may assist nurses, nutritionists, and other health care providers in the development of future Internet-based behavioral interventions. In general, findings from this study provide preliminary data for future studies that address the use of self-efficacy based Internet interventions for dietary change.

Chapter II

Review of the Literature

This chapter presents a review of the theoretical and empirical literature relevant to the effects of a self-efficacy enhancing Internet intervention to promote dietary change for the reduction of LDL cholesterol in people with hypercholesterolemia. Literature supportive of this proposal includes: (a) self-efficacy theory, (b) empirical support for self-efficacy and dietary behavior change, and (c) use of the Internet as a tool to promote adherence to a cholesterol-lowering diet.

Self-efficacy Theory

Self-efficacy is the confidence a person has in his/her ability to successfully perform a specific behavior (Bandura, 1977, 1986). Self-efficacy is a major construct of Social Learning Theory (Bandura, 1977), later known as Social Cognitive Theory (SCT) (Bandura, 1986, 1997). SCT depicts human functioning in terms of personal, behavioral and environmental factors. Self-efficacy theory emphasizes the interactivity of these three factors. Individual behavior both informs and alters environmental and personal factors; and in turn personal factors and environment alter and inform subsequent behavior. Individuals are agents, proactively engaged in their development, who make things happen as a result of their actions (Pajares, 1997). Self-efficacy, the belief in the ability to exercise control over one's thoughts, feelings and actions, is key to this sense of agency (Bandura, 2001). Figure 1 shows the framework for Social Cognitive Theory.

BEHAVIOR

PERSONAL
FACTORS
(Cognitive, affective,
and biological events)

ENVIRONMENTAL
FACTORS
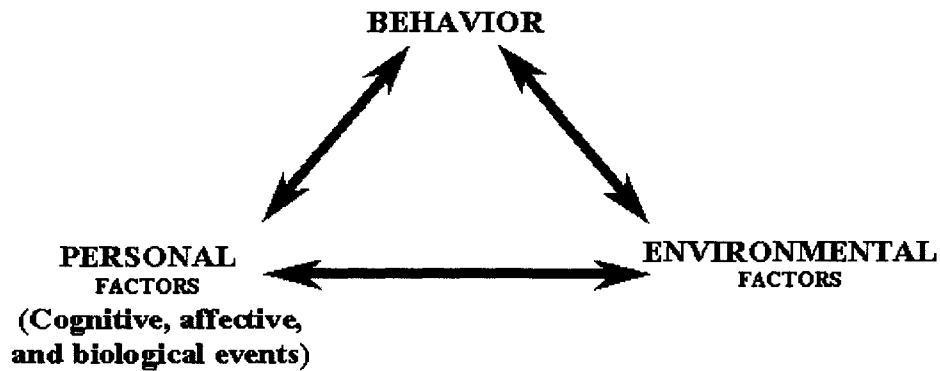
Sources of Information for Self-Efficacy Enhancement

| Performance accomplishments |
| Modeling |
| Social persuasion |
| Physiological state |

| Dietary Self-efficacy |

| Adoption of a Cholesterol-lowering diet |

| Reduction in LDL Cholesterol |
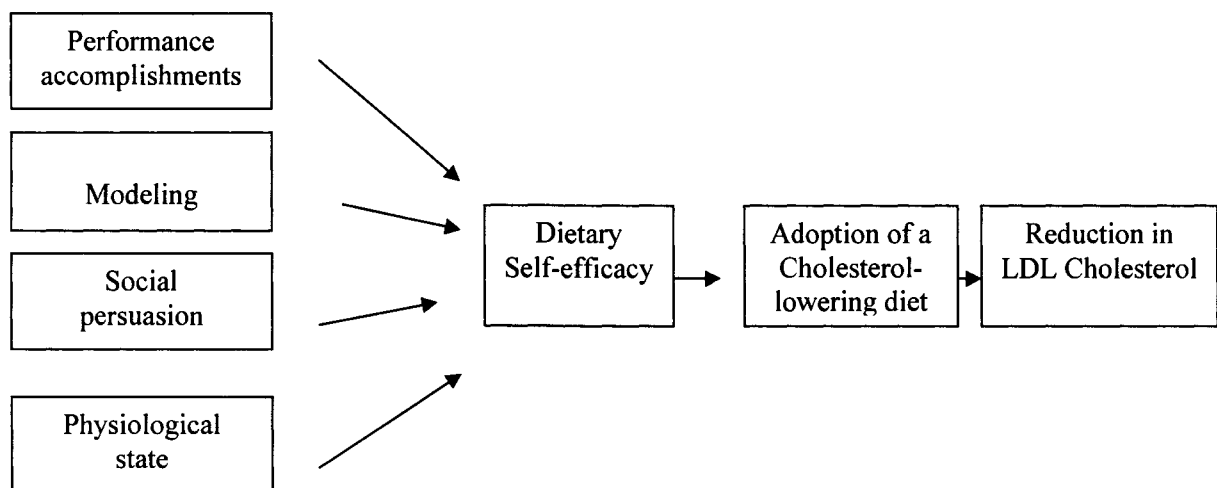
Figure 1. Framework for Social Cognitive Theory and sources of efficacy information.

Note. From "Current Directions in Self-efficacy Research" in Advances in Motivation and

Achievement, Vol. 10 (p. 1-49) by F. Pajares. M. Maehr & P.R. Pintrich Eds. 1997, Greenwich, CT.

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Positive efficacy beliefs can enhance behavior change, whereas negative efficacy beliefs can undermine change. Efficacy beliefs influence a person's strength of intention to change, as well as the amount of effort and persistence they exert toward goal attainment (Schwarzer & Fuchs, 1996). There are four major sources of self-efficacy expectations: performance accomplishments, modeling, social persuasion, and physiological state (Bandura, 1977). Each source of self-efficacy, in order of presumed influence (Bandura, 1997) is detailed below.

Performance accomplishments, also referred to as enactive mastery experiences, are the successful prior experiences a person has had with a particular behavior (Bandura, 1986). Through performance accomplishments, individuals strengthen skills and positive outcome expectations (Skinner CS & Kreuter, 1997). Performance accomplishments provide the most powerful source of efficacy beliefs and exert the greatest influence on behavior change (Bandura, 1997). Self-efficacy enhancing interventions may provide organized mastery experiences that promote the building of skills. Initially these interventions are targeted at specific situations, and then progress in complexity as efficacy increases to promote transferability of newly acquired skills to more general situations and circumstances (Bandura, 1997; Schwarzer, 1992). Past successful attainment encourages people in their belief that they have the ability to succeed in increasingly complex situations.

Modeling is learning through exposure to the performance of others. Modeling is particularly effective in areas of skill deficits (Bandura, 1997). Verbal discourse and observation can both be sources of modeling behavior. Successful performance is not requisite for self-efficacy enhancement via modeling. Coping with difficult situations

is an area where modeling is particularly effective in enhancing self-efficacy. Models must be perceived as competent in order to command attention and generate instructional influence (Bandura, 1997; Schwarzer, 1992).

Social persuasion is the expression of others' confidence in a person's ability to accomplish a behavior. People who are persuaded by others that they possess the capability to successfully perform a task are more likely to generate and sustain sufficient effort for accomplishment of said task (Bandura, 1986). Sources of social persuasion must be perceived as credible and knowledgeable in order to exert influence. A successful social persuader would structure activities to promote opportunities for success while minimizing the potential for failure.

Physiological state is the fourth and final source of efficacy enhancement (Bandura, 1977). It is the physiological response, or heightened awareness of somatic sensations such as breathing or heartbeat, to affective or emotional information that cues the individual to anticipate success or failure, thus influencing self-efficacy. Enhancing physical status through reduction of stress levels and negative emotional reactions will increase self-efficacy. People have varying degrees of awareness of physiological cues and may perceive arousal cues as either motivating or inhibitory. To promote perceived self-efficacy, motivating physiological arousal should be enhanced and that which is inhibitory minimized. Physiological state was not measured in this study.

Empirical Support for Self-efficacy and Dietary Behavior Change

There is evidence that self-efficacy based interventions lead to adherence to cholesterol-lowering diets and reduction in LDL-C (Angotti, Chan, Sample, & Levine,

2000; Angotti & Levine, 1994; Burke, 1997; Clark et al., 1997; Debusk et al., 1994). Although past studies resulted in significant reductions in cholesterol, only Burke's 1997 study (described below) actually measured self-efficacy. Therefore, the extent to which self-efficacy mediates the effects of the intervention is not known (Baranowski, Lin, Wetter, Resnicow, & Hearn, 1997).

Several studies have shown support for a positive relationship between self-efficacy and dietary change. Cross-sectional studies demonstrate that dietary self-efficacy was associated with adherence to cholesterol-lowering or low-fat diets (Brug et al., 1997; Herrick et al., 1997; Ounpuu et al., 1999). Dutch adults who consumed daily recommended quantities of fruits and vegetables (Brug et al., 1997), municipal government workers (Herrick, et al., 1997), and Canadian women (Ounpuu et al., 1999) who adhered to a low-fat diet had significantly higher self-efficacy than those who did not. The cross-sectional nature of these studies leaves unanswered the question: Does enhancing dietary self-efficacy improve adherence to a cholesterol-lowering diet with a subsequent reduction in blood cholesterol?

Several experimental studies tested the effects of self-efficacy interventions on blood cholesterol level. These studies included an evaluation of the effectiveness of a case-management system for participants following myocardial infarction (DeBusk et al., 1994), a telephone delivered self-efficacy intervention for participants with hyperlipidemia (Burke, 1997), the National Aeronautics and Space Administration (NASA) Occupational Health Program (Angotti & Levine, 1994), and an intervention that used a computer-based system (Clark et al., 1997). Each of these interventions resulted in a statistically significant reduction in blood cholesterol level. With the

exception of Burke's study (1997), self-efficacy was not measured. Therefore, the conclusion that the behavioral mechanism for these interventions was increased self-efficacy may not be justified.

DeBusk and colleagues (1994) randomized half of a sample of 585 participants who were within one-year post myocardial infarction to receive a self-efficacy based intervention for cardiac risk factor reduction, including elevated blood cholesterol. Participants, who received a nurse-managed, home-based, case-management intervention that began prior to hospital discharge and continued for 12 months, were compared to a control group that received usual medical care. Performance accomplishment strategies included goal setting, self-monitoring, and use of a nutrition workbook and food frequency questionnaires. Verbal persuasion was provided via nurse-initiated telephone contacts and mailed computer-generated progress reports, one of which detailed strategies for maintenance of dietary change. There was no evidence of modeling in the intervention.

At post-testing, participants in the DeBusk study (1994) who received the intervention had reduced cholesterol and saturated fat intake. High baseline food frequency scores ($M = 322$, $SD = 206$) reflect consumption of a typical American diet, with more than 30 percent of calories consumed from fat sources. Lower post-intervention scores reflect a reduction in fat consumption equivalent to that of a Step 2 diet, where 10 percent or less of total caloric consumption is from fat sources. LDL cholesterol levels decreased to a greater extent in participants receiving the intervention than in the usual care group ($M = 107$ mg/dL, $SD = 30$ mg/dL) vs. ($M = 132$ mg/dL, $SD = 30$ mg/dL), $p < .001$. However, interpretation of LDL levels is

confounded by the fact that intervention participants were much more likely to have been placed on lipid lowering medications than were usual care participants, (90% versus 21%). Another study limitation is failure to measure self-efficacy. The specialized nature of the post myocardial infarction participants also precludes the generalizability of findings to the general population.

Subsequent studies had similar findings. In a study of 65 participants who self-reported non-adherence to a cholesterol lowering diet, Burke and colleagues' (1997, 1998) used bi-weekly nurse-delivered telephone calls as strategies to support performance accomplishment and social persuasion. Performance accomplishment techniques included monitoring of the behavior targeted for change, setting short-term goals to direct action and provide motivation, and establishing incentives and social supports to encourage sustainment of efforts. The intervener provided social persuasion via telephone contact with participants. Baseline self-efficacy data were used to individualize feedback and persuasion to participants. Participants used booklets for self-monitoring and goal evaluation.

Self-efficacy was measured pre- and post-intervention with 33 statements related to eating behavior. Participants were asked to rate on a scale of $0 - 100$ their level of confidence in their ability to perform specific eating behaviors. There were no differences between groups in self-efficacy pre- and post-intervention. There were significant differences between the treatment group and the control group on adherence and LDL cholesterol. Change scores for saturated fat adherence were ($M = -22.2$, $SD = 48.7$) for the treatment group and ($M = +2.74$, $SD = 47.2$) for the control group, $z = 2.00$, p $< .001$. LDL-C change score means were ($M = -18.4$, $SD = 35$) for

the treatment group vs. (M = +.25, SD = 26) for the control group, z = 2.226, p = .016). Repeated measures MANOVA revealed significant change in LDL-C for time by group assignment F (1, 63) = 5.95, p < .05. There were no significant differences in cholesterol medication use between the two groups. This suggests that the difference in LDL-C between groups was due to dietary changes secondary to the intervention. In a post-intervention follow up survey of the treatment group, participants rated goal setting as the most important component of the intervention, followed by telephone contact and self-monitoring, respectively. This supports Bandura's (1997) contention that performance accomplishment is the most powerful source of self-efficacy.

Limitations in Burke's study (1997) include the limited power (< 25%), to detect changes in self-efficacy and the use of change scores. Change scores are usually less reliable than the pre- and post-treatment scores upon which they are based and their use is not recommended (Maas, Buckwalter, Reed, & Pringle Specht, 1998). However, findings suggest the importance of future intervention studies that provide performance accomplishment and social persuasion.

The NASA Occupational Health Program combined dietary and exercise interventions for cholesterol reduction in a worksite program (Angotti & Levine, 1994). The National Cholesterol Education Program (Expert Panel, 1994) dietary recommendations were used as the basis for dietary instruction. Sources of self-efficacy enhancement for dietary change included performance accomplishment and social persuasion. These were provided through use of weekly dietary records and twice monthly face-to-face meetings with a nutritionist at the worksite. Self-monitoring of performance was also encouraged. After eight weeks average total

serum cholesterol decreased from 6.58 *mmol/L* (255 *mg/dL*) to 5.67 *mmol/L* (219 *mg/dL*), a 14% reduction. LDL cholesterol changes were not reported, as measurement of LDL-C was not recommended at the time of the intervention. The inclusion of only NASA employees, the lack of a control group, and the intensive nature of the individual contact, limits generalizability of findings. Failure to measure self-efficacy pre- and post-intervention leaves unanswered the question of the effect of its mediator role.

In a series of studies directed toward the development of a computer-based system for the dietary management of hypercholesterolemia, Clark and colleagues' (1997) used communication techniques to enhance self-efficacy for dietary change for cholesterol reduction. Earlier studies in the series used more traditional face-to-face communication that was reduced as the development of the computer-based system progressed. Performance accomplishment and social persuasion were the self-efficacy processes addressed. Performance accomplishment was enhanced through the use of self-monitoring and goal setting. Social persuasion was provided with individualized feedback, initially delivered in individualized counseling sessions that transitioned to computerized assessment and feedback.

The computer-based system that was developed, the Computer-Assisted Learning System (CALS) (Clark et al., 1997), is comprised of two major components: an informational component and a self-regulatory component based on self-efficacy theory. These components are linked to provide the user with the personal skills necessary to enact personal dietary change. Through the use of self-monitoring, goal setting, and feedback, individuals apply dietary guidelines to their personal diets to

achieve reduction in the intake of foods high in saturated fat and cholesterol. A series

of five studies guided the development of CALS. Initial studies employed face-to-face

meetings and individual counseling, which gradually decreased with the development

of the computer program. In the final study the computer program, CALS, was tested

as a stand-alone intervention. Table 3 outlines the progression of the five studies.

Table 3

Summary of Clark et al. (1997) Computer Assisted Learning System Studies

Study	Purpose	Design	Sample	Cholesterol Screening	Intervention	Result (change in cholesterol)
1	Develop dietary questionnaire	Worksite Randomized	T= 428 C= 447	Non-fasting venous	Face-to-face counseling x 6 & bi-monthly computer feedback reports	T > C 5% vs. 1% reduction $p < .005$
2	Refine dietary questionnaire	Worksite Randomized	T= 114 C= 115	Fingerstick Average of 2 samples	Face-to-face counseling x 1 Handwritten feedback at baseline & weeks 6, 12 & 18	T > C 6.5% vs. 1% reduction $p < .002$
3	Computerize questionnaire	Worksite Randomized	T= 59 C=51	Fingerstick Average of 2 samples	Face-to-face counseling x 1 & 4 monthly mailed computer generated feedback reports	T > C 5% vs. 1% reduction $p < .01$

table continues

Table 3 continued
Summary of Clark et al (1997) Computer Assisted Learning System Studies

Study	Purpose	Design	Sample	Cholesterol Screening	Intervention	Result (change in cholesterol)
4	Quantitate dietary intake with questionnaire using CSI*	Outpatient clinic Non-randomized	T=150	Not reported	Small group orientation & 3 monthly mailed computer generated feedback reports	7% reduction group 10% ↑ CSI 2% ↓ CSI
5	Test program as stand-alone intervention	Outpatient clinic Non-randomized	T=305	Not reported	3 monthly mailed computer generated feedback reports	No change group

Note. This series of five studies was reported in Clark et al. (1997). T = treatment group; C = control group; CSI = cholesterol-saturated fat index.

Studies 1 through 4 resulted in statistically significant reductions in blood cholesterol

levels. Study 5 participants had no significant change in blood cholesterol levels for

the total group. This was the only group that did not have any personal interaction; the

only feedback in this step was the three mailed computer-generated feedback reports

in which the feedback was generated by the computer program in response to the

information provided on the previous set of questionnaires submitted for analysis. This

raises the possibility that a stand-alone computer program may not enhance self-

efficacy sufficiently to promote dietary change in the majority of individuals.

Although the series of studies by Clark and colleagues' (1997) provide support

for use of a self-efficacy enhancing computer-based intervention for dietary reduction

of cholesterol, there are several limitations to this series of studies. Limitations include

the decreasing sample sizes in the progression of the randomized trials and the lack of

a control group in the final two studies. Another limitation is the variation in method

of cholesterol measurement. Despite these limitations, the work of Clark and

colleagues' (1997) provided beginning support for the use of a computer-based self-

efficacy enhancing intervention to promote dietary change for cholesterol reduction.

Based on these findings, it appears that computer technology may have a role in self-

efficacy enhancement but that human interactive communication is important in

supporting performance accomplishments and providing social persuasion, essential

components of a self-efficacy enhancing dietary intervention.

Studies that provide performance accomplishment and verbal persuasion

through the use of self-monitoring, goal setting, and feedback have employed

communication modalities such as face-to-face meetings, telephone follow up, mailed

feedback, and computer-generated reports that are mailed to participants. Constraints

of these communication modalities include cost, the inconvenience of face-to-face

meetings, the need for synchronous telephone communication, and the time lag in mail

communication (Cassell et al., 1998). The Internet, a multimedia communication

platform, has the potential to overcome the constraints affecting other communication

modalities. Additionally, the Internet, through the use of email, and discussion forums,

has the capability for the provision of modeling, another important self-efficacy

component (Baer, 1993; Bandura, 1998, 2001). Use of the Internet as a

communication modality for dietary behavior change for cholesterol reduction using

self-efficacy enhancing techniques has yet to be evaluated. Interactive computer

programs may be particularly effective in promoting performance accomplishments

and providing modeling and social persuasion with information, skill-building, and the

sharing of success stories with other similar users (Skinner & Kreuter, 1997).

The Internet and Health Behavior Change

The Internet has become an important source for healthcare information. In

1995 more than 50 percent of websites provided health or medical information

(Ferguson, 1997). A survey conducted in 2000 by the Pew Internet and American Life

Project indicated that fifty-two million American adults have used the Internet to

obtain healthcare information (Fox & Rainie, 2000). A follow up survey in 2004

showed that eighty percent of American adults, 95 million people, used the Internet to

find health information (Fox, 2005). The interactive capabilities of the Internet make it

well-suited to enhance self-efficacy for behavior change (Cassell et al., 1998).

The Internet has been classified as a hybrid form of communication (Cassell et al., 1998) because of its capability to provide both interpersonal and mass communication using a variety of techniques. Through use of these varied communication techniques, information on health and other topics is disseminated by millions of websites using print, audio, video, and photographic material (Cassell et al., 1998; Tate et al., 2001). Internet technology facilitates the dissemination of current information where standards are reviewed and revised based on the latest empirical evidence. An example of this is the rapid dissemination of the findings of the National Cholesterol Expert Panel ATP III (Cleeman et al., 2001) recommendations. Websites maintained by the American Heart Association and the National Institutes of Health expediently incorporated these guidelines into the on-line information provided for cholesterol management.

The Internet also affords the opportunity for direct communication and social support through the use of e-mail, bulletin boards, and chat rooms (Cassell et al., 1998; Tate et al., 2001). This communication can be synchronous (all participants on-line simultaneously), or asynchronous (participants post messages to be reviewed and/or responded to at a later time).

A review of websites listed by the National Institutes of Health, (http://health.nih.gov/result.asp?disease_id=139&category_id=10) under the heading of cholesterol, revealed that the information necessary for implementation of the recommended dietary changes for cholesterol reduction is available on the Internet. However, the websites lack the structure and professional contact found in successful behavioral change intervention programs that used face-to-face contact (Tate et al.,

2001). No controlled studies have evaluated structured use of the Internet to deliver a self-efficacy enhancing intervention for adoption of a cholesterol-lowering diet. Research on the use of the Internet in a related area, weight reduction, provided preliminary support for this strategy (Tate et al., 2001).

Tate and colleagues' (2001) used the Internet to deliver a six-month structured behavioral weight loss program. Participants were randomly assigned to one of two treatment groups: Internet education or Internet behavior therapy (and education). Both groups received the same online information comprised of selected Internet resources. This included information related to diet, exercise, self-monitoring, social support, stimulus control, and stress management. An introductory face-to-face session was held for both groups during which a one-hour lesson was given on behavioral weight control strategies.

The experimental group received behavior therapy to support performance accomplishments, modeling, and social persuasion. Strategies included weekly lessons, self-monitoring, feedback, weekly interaction with a weight loss specialist, and the opportunity for social support among group members. Individualized feedback was provided weekly via email. Participants' questions were answered and support and encouragement were provided. Participants who had not recently logged on to the intervention website were sent an email reminder.

There were significant differences between the groups in weight loss at three months, t (65) = 3.4, p = .001 that were maintained at six months, t (65) = 2.1, p = .04. Participants in the behavioral therapy group lost an average of 4 kilograms at three months that was maintained at six months. The education group had an average weight

loss of 2.7 kilograms at three months but this declined to a loss of 1.6 kilograms by six months. Similar differences between groups were noted for waist circumference at both three months ($p = .001$) and six months ($p = .009$).

The behavior therapy group used the website more frequently. They logged on an average of 19 ($SD = 10.9$) times in the first three months compared to 8.5 ($SD = 10.4$) times for the education group ($p < .001$). Login frequency was significantly correlated with weight loss in the behavior group ($r = -.43$, $p = .003$), and ($r = -.33$, $p = .03$) in the education group.

There was a significant time effect for both groups, but no treatment by time interaction for either diet or physical activity. This indicated that both groups changed both dietary intake and physical activity during the time span of the study, but there was no statistically significant difference in change over time between the two groups. In attempting to explain the discrepancy between the weight loss differences between groups and the lack of differences in self reported dietary and physical activity behaviors, the researchers theorized that the behavioral intervention group may have been more accurate in the reporting of actual dietary intake and physical activity level. The increased accuracy by the behavioral intervention group is attributed to the provision of information on portion size and the focus on the use of self-monitoring that were components of the behavioral therapy intervention.

Data from Tate and colleagues' (2001) indicated that the Internet may be a valuable intervention tool when information is combined with individualized self-efficacy enhancing activities. Self-monitoring and email communication appear to be the key components of the intervention with the bulletin board being used by only

28% of the behavior therapy group participants. The increased login frequency, weight loss, and waist circumference decrease in the behavior therapy group supported the role of self-efficacy in interventions for dietary change. A limitation of this study was the lack of measurement of self-efficacy.

Theoretical Rationale

Perceived self-efficacy appears to be a major influence in the adoption and maintenance of a cholesterol-lowering diet. Self-efficacy enhancing interventions using the traditional communication modalities of telephone and mail have been effective in promoting and maintaining dietary change (Burke, 1997; Ounpuu et al., 1999). The Internet may be a more feasible and acceptable communication medium for self-efficacy enhancement because of its flexibility and multifaceted approach. The Internet offers several advantages over traditional communication mediums. They include: 1) access and utilization of the Internet from virtually anywhere worldwide, 2) multimedia capability including print, pictures, animation, and audio, and 3) interactive capabilities to support a behavioral intervention. Use of informational websites and interaction through email and online instruction appear to be feasible methods of providing performance accomplishments, modeling, and social persuasion to enhance self-efficacy and promote dietary change for cholesterol reduction. Therefore, the purpose of this study was to examine the effects of a self-efficacy based Internet intervention on the dietary management of cholesterol.

Hypotheses

1.   There will be a significant reduction in LDL cholesterol in the self-efficacy group when compared to the education group upon completion of a two month self-efficacy enhancing Internet dietary intervention.

2.   There will be a significant increase in adherence to a cholesterol-lowering diet in the self-efficacy group when compared to the education group upon completion of a two month self-efficacy enhancing Internet dietary intervention.

3.   There will be a significant increase in knowledge of a cholesterol-lowering diet in the self-efficacy group when compared to the education group upon completion of a two month self-efficacy enhancing Internet dietary intervention.

4.   There will be a significant increase in self-efficacy for following a cholesterol-lowering diet in the self-efficacy group when compared to the education group upon completion of a two month self-efficacy enhancing Internet dietary intervention.

5.   Self-efficacy will mediate the effects of a two month self-efficacy enhancing Internet dietary intervention on knowledge of and adherence to a cholesterol-lowering diet.

Chapter III

Methods

This chapter describes the research methods for this study, a randomized controlled trial. The setting, development of the intervention website, preliminary study, design, sample, sampling method, instruments and psychometric properties, human subjects' protection, and procedure are discussed.

Setting

The primary site for the intervention was the campus of a community college located in a suburban area of New Jersey. The college is a two-year public institution that offers associate degree and certificate programs. The intervention was Internet-based and allowed participants' access to the intervention from any computer with Internet access.

Development of the Dietary Management of Cholesterol Website

The following strategies were used to develop the Dietary Management of Cholesterol Website (DMCW): 1) review of the literature on social cognitive theory based interventions for dietary change, 2) review of Internet based interventions for dietary change, 3) evaluation of relevant web resources on cardiovascular risk factors, including diets high in saturated fats, cholesterol and calories (e.g., American Heart Association, National Heart Lung and Blood Institute), 4) investigator preparation in website development, 5) review of the website by content and format experts, and 6) a pilot study of use of the website. The review of the literature is discussed in Chapter 2. Using the keywords cholesterol reduction, diet, cardiac risk, and patient education in Yahoo and Google search engines, the investigator reviewed information on the web

related to elevated cholesterol, its risk factors, and non-pharmacologic reduction methods. Three sources for current, credible information were identified and included as links in the intervention website. These sources were the American Heart Association, the National Institutes for Health, and the Mayo Clinic. Websites were evaluated based on recommended criteria for selecting credible health information on the Internet (Jadad & Gagliardi, 1998; Oermann, 2003).

Links to websites from these sources were organized into six sessions, providing incremental information combined with self-efficacy enhancing activities. The six sessions were designed to provide participants with the information and self-efficacy needed to evaluate their cardiovascular risk status, select the appropriate diet, and implement dietary changes with regard to shopping, cooking and eating out. Many of the information links are interactive, allowing participants to receive individualized feedback specific to their cardiac risk profile. In addition to the information links, the website provided other self-efficacy enhancing activities related to the session topic. These included goal setting, self-monitoring, experience-sharing, and giving and receiving positive reinforcement. Use of the communication capabilities of the website including email, forums, and threaded discussion, comprised a major component of the intervention. A copy of the Intervention Protocol is shown in Appendix A.

The investigator developed the Dietary Management of Cholesterol Website (DMCW) while participating in a technology seminar on website development. Website experts were consulted throughout the development process. WebCT is the platform for the intervention. WebCT is a course management system for the provision of on-line education. The virtual classroom environment allows participants

to access the information on the website twenty-four hours a day from any site with Internet access. The WebCT program tracks the frequency of participants' access to the website.

The DMCW was designed with a homepage from which all other website activities are accessible. Other components of the website included: 1) an electronic copy of the consent form, 2) a help page with pictorial navigation assistance, 3) the research instruments, 4) email, 5) threaded discussion, and 6) links to the six intervention sessions.

Dietary information was posted for each session via hyperlinks to information on cholesterol and diet. This information was consistent with the NCEP 2001 guidelines (Cleeman et al., 2001) and incorporated strategies recommended for successful dietary change (Keenan et al., 1996) and self-efficacy enhancement for health behavior change (Bandura, 1998, 2001; Schwarzer, 1992, 2001). Links used in the website included information posted by the Mayo Clinic, http://www.Mayoclinic.coM/invoke.cfM?id=DS00178, the American Heart Association (AHA), http://www.aMericanheart.org/presenter.jhtMl?identifier=1516, and the National Heart, Lung and Blood Institute (NHLBI) of the National Institutes of Health (NIH), http://www.nhlbi.nih.gov/chd/.

Six sessions were presented over a 2-month period. A new session was posted every 10 days during the intervention period. Previously posted sessions remained accessible to participants for the duration of the intervention. The session focus, web page titles, and website links for each session are shown in Appendix B.

Seven experts in self-efficacy, nutrition, cardiac risk factors and online education critiqued the website. The investigator revised the website based on this expert feedback.

Preliminary Study

Once the intervention website was developed, and IRB approval obtained, a pilot study was conducted to identify potential technical and communication difficulties including accessing the website, signing on with a user identification and password, and using the components of the website. The purpose of the pilot study was to identify technical and communication problems with the intervention website. A convenience sample was recruited via email from the population of employees of a community hospital in northwest New Jersey. Eighteen people volunteered to participate and 15 participated in the pilot study. Lack of time was the reason given by the three people who chose not to participate. The majority of participants were female (n = 14) and registered nurses (n = 13).

The investigator emailed pilot participants a link to the intervention website and a user name and password to maintain anonymity. Participants completed the research questionnaires online and submitted them by email to the investigator. They then participated in the six sessions of the intervention for a two-week period. The components of the intervention included the online research instruments, cholesterol information hyperlinks, threaded discussion, and goal-setting and self-monitoring activities. Upon completion of the two-week pilot study, participants completed a written evaluation of the Website and attended one of three 60-minute focus groups to discuss the experience. The investigator moderated the focus groups

and used a semi-structured format (Morrison-Beedy, Arsenault, & Feinstein, 2001). A research assistant assisted in recording the comments of participants. An overview of the pilot study, a copy of the written evaluation, and a copy of the focus group guide are shown in Appendix C.

Two participants had difficulty accessing the website. One problem was the participant was using a web browser that was not compatible with WebCT. The other participant experienced difficulty navigating the discussion component of the website. These difficulties were quickly resolved following email and telephone communication with the investigator. Focus group discussions revealed other participants also experienced some navigation difficulties. A pictorial navigation guide was added to the homepage of the website to alleviate these difficulties.

Questionnaires took an average of 60 minutes to complete. The majority stated that they were understandable but one participant stated that the forced-choice format did not always provide "a completely applicable choice."

Participants reported that the information links were "easy to understand, logically sequenced, and covered all aspects." Goal setting and email feedback were identified as the most valuable components. A technical problem identified and corrected was the ability to submit the research questionnaires without completing the identification number. As mentioned above participants found the threaded discussion difficult to use. Only two participants participated in the threaded discussion. Focus group discussion revealed that reasons for lack of participation were either voluntary, "I don't participate in any online chat" or involuntary, "I couldn't figure out how to use that feature" or "I just didn't have the time." Methods to improve this component

of the website for the intervention study included providing detailed pictorial instructions for use of this feature, as well as simplifying the link.

A limitation of the pilot study was the abbreviated timeframe. Comments by focus group participants revealed that time constraints limited their ability to review six sessions in two weeks.

Design

The initial plan for the study was to use a two-group experimental design to test the effects of a two month self-efficacy enhancing Internet dietary intervention for cholesterol reduction in people non-adherent to a low-fat, low-cholesterol diet. Two factors led to a revision of the eligibility requirements. Eligibility screening revealed that a number of people interested in participating in the intervention were already following a traditional, low-fat, low-cholesterol diet. Recent research findings indicated that the Portfolio Diet (Jenkins et al., 2003), an eating plan that incorporates soy, nuts, fiber, and plant sterols, was effective in reducing cholesterol levels at a rate equivalent to beginning doses of statin medications. As use of these foods was included in the intervention, the investigator petitioned the dissertation committee and the IRB for a change in eligibility criteria so that all employees interested in participating in the intervention were eligible.

Minimization (Zeller, Good, Anderson, & Zeller, 1997) was used for randomization of participants. Minimization is a method in which a computer program is used to randomly assign participants to comparable groups in which levels of selected potentially confounding covariates are evenly distributed. Covariates for this study included: 1) baseline LDL cholesterol level, 2) use of lipid-lowering

medications, 3) gender, and 4) cardiac risk profile. Physiological dependent variables studied pre- and post-intervention were: blood cholesterol level (LDL-cholesterol measured by a fasting lipid profile) and body mass index. Behavioral dependent variables of interest related to adherence to a cholesterol-lowering diet studied were dietary intake, self-efficacy, dietary adherence, and dietary knowledge.

Sample

The sample was recruited from the population of employees of a community college in New Jersey. This academic institution employs approximately 510 people, 85% of whom are full-time employees. The ages of employees range from 20 years to 75 years. Seventy-six percent of employees are age 35 or older. Based on the age recommendation for initiation of cholesterol screening (Cleeman et al., 2001) employees age 20 and above were recruited and screened for entry into the randomized trial.

A required sample size of 48 was calculated as necessary to fulfill the power requirement based upon statistical power .80, alpha .05, and an effect size (Cohen's d) of .84 was derived from a study of a behavioral dietary intervention for weight reduction in hospital employees (Tate et al., 2001). Despite extensive recruitment efforts (described below) the present study did not achieve the required sample size.

Sampling method. Employees were recruited via email and inter-office mail with letters from the investigator and the college president inviting participation. An announcement was placed in the employee newsletter. A copy of the email, letter from the president, and announcement are shown in Appendix D.

Fifty-two individuals signed consent forms to participate in the study. Forty-one were randomized into the study and began the intervention. Three people who signed consents said they did not have time to participate. Another cited a fear of needles. No reason was given by seven others for not continuing in the study. Of the 41 people who began the intervention 38 (93%) completed post-intervention. One participant lost to attrition developed a serious medical condition unrelated to the intervention, a second reported insufficient time, and the third gave no reason.

Instruments and Psychometric Properties

Four instruments were used to collect data on the behavioral dependent variables of interest in this study. Physiological data included the fasting lipid profile and height and weight measurement for calculation of body mass index. A summary of the study concepts, variables, and their corresponding measures is presented in Table 4.

Table 4

Study Concepts and Variables with Corresponding Measure

Pre-intervention	
Concept or Variable	Measure
Demographic Data	Baseline Profile
Cardiac Risk Profile	Baseline Profile
Dietary Assessment & Adherence	Diet Habit Survey

Pre-intervention

Concept or Variable	Measure
LDL Cholesterol Level	Fasting Lipid Profile
Body Mass Index	Height and Weight
Dietary Self-Efficacy	Cholesterol-Lowering Diet Self-Efficacy Scale
Dietary Knowledge	Nutrition Knowledge and Attitude Questionnaire

Post-intervention

Concept or Variable	Measure
Dietary Assessment & Adherence	Connor Diet Habit Survey
LDL Cholesterol Level	Fasting Lipid Profile
Body Mass Index	Height and Weight
Dietary Self-Efficacy	Cholesterol-Lowering Diet Self-Efficacy Scale

Post-intervention	
Concept or Variable	Measure
Dietary Knowledge	Nutrition Knowledge and Attitude Questionnaire
Frequency of Web site use	WebCT Tracking

Baseline Profile. The Baseline Profile is a 39-item demographic questionnaire developed by Burke (1997) and revised for this study to include information to calculate cardiac risk profile. The items include demographic data, information on illnesses and medication, and general dietary information. The participant's cardiac risk profile was determined from information provided in the baseline profile. A copy of the Baseline Profile is presented in Appendix E.

The Diet Habit Survey (DHS). The DHS (Connor et al., 1992) was used to assess dietary intake and adherence to a cholesterol-lowering diet. The DHS is a 39-item eating behavior questionnaire comprised of 5 subscales: (1) cholesterol-saturated fat, (2) carbohydrate, (3) beverage, (4) salt, and (5) restaurant and recipes. It was developed for use in a five-year dietary intervention project, the Family Heart Study. Questions were designed to elicit information regarding dietary intake of cholesterol, saturated fat, complex carbohydrates (including fiber), and salt. The time frame of interest for measurement was the month immediately preceding the assessment.

Each DHS question asked the participant to select the response or responses (more than one answer can be given) that best describe their eating habits during the last month. Questions were designed to elicit the types or amount of food items consumed. Points were assigned to each choice, with a higher point value given to choices that are consistent with a cholesterol-lowering diet. An overall score was computed, as were subscale scores for cholesterol-saturated fat, and carbohydrates. Subscale scores from the cholesterol-saturated fat and carbohydrate scales were used to categorize each participant's diet based on fat content into one of five categories: 37% fat (the present U.S. diet), 30% fat, 25% fat, 20% fat, or 10% fat. Lower scores indicated non-adherence to a cholesterol-lowering diet. Scores were based on a 2000-calorie diet for women and a 2800-calorie diet for men. For the present study, the cholesterol-saturated fat and carbohydrate scales (Connor et al., 1992) were used to measure adherence. For women, scores less than 61.0 for cholesterol-saturated fat, or scores less than 45.0 for carbohydrates indicated non adherence to a cholesterol-lowering diet. A score less than 59.0 for cholesterol-saturated fat, or a score less than 70.0 for carbohydrates indicated non adherence for men. Internal consistency (Cronbach's alpha) was .95 for the cholesterol-saturated fat scale and .88 for the carbohydrate scale. Validity of the DHS was determined in samples of adults by correlation with a 24-hour dietary recall (Connor et al., 1992; Davidson, Hunninghake, Maki, Kwiterovich, & Kafonek, 1999), changes in blood cholesterol levels (Burke, Dunbar-Jacob, Sereika, & Ewert, 2003; Connor et al., 1992; Davidson et al., 1999) and correlation with related subscales of a 3-Day Food Record (Burke, 1997). Pearson product-moment correlations between the food record sub-scales for total fat, saturated

fat, and cholesterol and the Cholesterol-Saturated Fat sub-scale of the DHS were $r = -.514, -.549$, and $-.508$, respectively, ($p < .001$). Reported test-retest reliability for the total scale was .80, with subscale reliabilities ranging from .73-.92. A copy of the DHS and information on scoring is shown in Appendix F.

Nutrition Knowledge and Attitude Questionnaire (NKQ). The Nutrition Knowledge and Attitude Questionnaire (NKQ) (Burke, 1997) is a 42-item forced choice questionnaire designed to measure the individual's level of nutrition knowledge and skills relevant to following a cholesterol lowering diet (38-items) and the individual' s attitude concerning the efficacy and cost of said diet (4 items). Scoring of the NKQ was done separately for knowledge and attitude. The knowledge score, used in this study, was the percentage of questions answered correctly. Scores can range from zero to 100 percent. Items were developed from the Adult Treatment Panel II (Expert Panel, 1994) dietary recommendations and reviewed by diet and cholesterol experts to establish content validity (Burke, 1997). The instrument was pilot tested with a convenience sample of 44 cardiac rehabilitation participants. Internal consistency was .83. One-to-two week test-retest reliability in a subgroup of 34 participants was .58 ($p = .001$). A copy of the NKQ is in Appendix G.

The Cholesterol-Lowering Diet Self-Efficacy Scale (CLDSES). Burke (1997) developed the CLDSES after a review of existing dietary self-efficacy scales revealed inconsistency with Bandura's (1986) conceptualization of self-efficacy. The scale consisted of 33 statements with a common stem followed by a list of activities of varying level of difficulty. Participants rated their level of confidence for each statement using a scale of zero to 100. The mean self-efficacy score was computed by

averaging the scores of the 33 statements in the CLDES. The CLDSES was pilot-tested with a convenience sample of 44 cardiac rehabilitation participants then used in a behavioral intervention study. Internal consistency ranged from (Cronbach's alpha) .93 to .97. Test-retest reliability was .86 over two weeks. Validity was demonstrated by the relationship between the self-efficacy score and the amount of calories derived from fat that individuals consumed. Self-efficacy scores were increasingly higher for each category as the diet became more restrictive in fat calories ($p < .001$). Additionally, participants who reported perceived self-efficacy scores above 82% were more than 99% adherent to the dietary plan as measured by the Cholesterol Saturated Fat Sub-score of the Diet Habit Survey. A copy of the CLDSES is shown in Appendix H.

Fasting Lipid Profile. Venous blood samples for a fasting lipid profile consisting of total cholesterol, LDL cholesterol, high-density lipoprotein (HDL) cholesterol, and triglyceride were obtained from all participants by a certified phlebotomist. Adult Treatment Panel III guidelines (Cleeman et al., 2001) were followed for specimen collection and analysis. Quest Diagnostics Incorporated, a New Jersey licensed laboratory that meets the Center for Disease Control Standards, analyzed the venous blood samples for the Fasting Lipid Profile. Direct enzymatic assays were used to assess HDL-cholesterol and LDL-cholesterol. Total cholesterol was measured using an Olympus AU5200 analyzer that employs a series of coupled enzymatic reactions. Triglycerides were analyzed with a two-reagent system method. The above analysis methods complied with CDC guidelines, New Jersey state regulations, and the recommendations of the National Cholesterol Expert Panel.

Fasting lipid profile specimens were stored in a cooler and transported to the nearest

Quest Diagnostics Laboratory in Randolph, New Jersey. The costs of the fasting lipid

profiles, $19.00 per sample, were covered by a dissertation grant from Rutgers, The

State University of New Jersey.

Participants were instructed to fast for a minimum of eight hours prior to

specimen collection. The first fasting lipid profile was collected prior to randomization

of study participants. A second fasting lipid profile was obtained from all participants

following completion of the two-month intervention. The investigator provided all

participants the results of their fasting lipid profiles both pre and post-intervention.

Participants were encouraged to share these results with their primary care provider.

Body Mass Index (BMI). The BMI is the calculated ratio of weight in

kilograms to height in meters squared, in accordance with the guidelines from the

Executive Summary of the Clinical Guidelines on the Identification, Evaluation, and

Treatment of Overweight and Obesity in Adults (Expert Panel, 1998). Weight and

height measurements were obtained by the investigator using the same balance beam

scale with non-detachable weights. The scale was zero-balanced prior to each

measurement. Participants were weighed in a fasting state in light clothing with their

shoes removed and standing facing the scale. Height was then measured, pre-

intervention only, with the participant standing with their back facing the scale,

standing erect and looking forward (Expert Panel, 1998).

Human Subjects' Protection

The investigator assumed responsibility for the protection of rights of human

subjects throughout the duration of the study. Institutional Review Board (IRB)

approval, IRB# 02-479M, was obtained from Rutgers, the State University of New Jersey as was written permission from the administration of the community college where the research was conducted. In September 2000, the investigator completed the National Institutes of Health certification program for human subjects' research.

In accordance with the Belmont Report (U.S. Department of Health, Education, & Welfare, 1979) all participants were informed of the purpose of the study, entry criteria, procedures, risks and benefits. The voluntary nature of participation was clearly stated, as was the participant's right to withdraw from the study at any time. Informed consent was obtained from all participants. A copy of the consent form with IRB approval is shown in Appendix I.

Confidentiality of all data were maintained. All data were identified through numerical codes. The website was password protected and participants were identified on the website by their assigned user name that had no association with their true identity. The investigator maintains the participant list and the raw data in a locked file off site. These will be kept for a period of five years.

There was minimal risk associated with participation in the self-efficacy based Internet dietary intervention. Potential benefits included improved dietary self-efficacy, increased dietary knowledge, improved dietary practices, and decreased LDL cholesterol.

Procedure

Approval for the study was granted by the Rutgers University Institutional Review Board and the administration of the participating community college prior to conducting the study. Detailed information about the study was sent via email and

interoffice mail to potential participants. Participants signed an informed consent statement prior to testing. The behavioral questionnaires were completed online via the intervention website. Participants were then scheduled for collection of the physiological data. Both pre- and post-intervention testing took place at the same time of day, using the same research assistant, who worked under the direction of the investigator.

The investigator reviewed the data from the Baseline Profile on participants. Using baseline LDL cholesterol levels and information provided on the Baseline Profile regarding cardiac risk factors, use of lipid lowering medications, and gender, participants were randomized to the education or self-efficacy intervention using the Minimization program (Zeller et al., 1997). The baseline characteristics were entered into the Minimization program to ensure similar distribution of differences in these characteristics between the experimental and control groups. This limited the impact of potentially confounding variables. Baseline LDL cholesterol, use of lipid-lowering medication, gender and, cardiac risk profile were entered as covariates in the Minimization software program.

There were two levels for all of the variables except cardiac risk profile, which had three levels. The levels for LDL cholesterol were elevated or normal. Cardiac risk profile classification was used in determining normality of LDL cholesterol level. The levels for use of lipid-lowering medication were yes and no. The levels for gender were female and male. The levels for cardiac risk profile were 0 – 1 risk factors, 2 or more risk factors, and CHD or equivalent. The Minimization program calculated group placement internally based on a participant's characteristics in relation to data

on the covariate levels and groups. This assured random assignment. To further ensure investigator blindness to group assignment the first few cases entered into the Minimization program were selected using a table of random numbers (Zeller et al., 1997). Following randomization, the investigator notified participants by email and inter-office mail of their group assignment and directed them to the appropriate website to begin session one of the assigned intervention.

Participants were randomly assigned to an educational intervention or an interactive self-efficacy enhancing intervention. The educational intervention was identical in content and format to the educational component of the self-efficacy enhancing intervention. Providing both groups the same educational intervention allowed the investigator to measure the strength of the self-efficacy enhancing intervention.

Self-efficacy group. Access to the self-efficacy enhancing website began immediately following randomization. The six-session intervention was administered over a two-month period. The self-efficacy enhancing intervention was designed to increase participants' sources of self-efficacy by providing opportunities for performance accomplishments, modeling, and social persuasion (Bandura, 1977, 1986, 1997, 1998, 2001).

Self-efficacy was enhanced through the provision of dietary information and the use of techniques designed to support the sources of self-efficacy targeted in this study which were performance accomplishments, modeling, and social persuasion. These techniques included the use of self-monitoring, goal setting, self-reinforcement, and feedback. Email and discussion forums, not available to education group

participants, were the communication mechanisms for providing self-efficacy enhancement.

Performance accomplishment was supported by having participants evaluate their current behavior and identify areas for improvement. Participants then emailed session goals to the intervener who reviewed goals and discussed revision with the individual participant as needed via email. Modeling was provided by the intervener (investigator) posting sample goals and providing examples of how others were successful in achieving change. The discussion forum provided opportunities for modeling by allowing participants the opportunity to post recipes, restaurants that provide low fat-low-cholesterol choices, and other techniques that they had found useful in making and maintaining dietary change. Social persuasion was provided via the discussion forum as well. The elements of the self-efficacy enhancing intervention are summarized in the Intervention Protocol in Appendix A.

Self-efficacy group participants were encouraged with session specific email and discussion activities (not available to the education group) to use the self-efficacy techniques of self-monitoring, goal setting and evaluation, modeling, and social persuasion to apply the general information provided by the website links to their specific diets. Every 10 days self-efficacy group participants were asked to post short-term goals for the current session and evaluate previously posted short-term goals. This was done via the private mail feature of the website. Each participant was asked to send the investigator goals for the new session and a self-evaluation of their progress in meeting the previous session's goals. Goals should have been able to be accomplished within the 10-day timeframe of the session. The investigator reviewed

submitted goals and provided positive feedback. The investigator communicated via email with participants to assist in goal revision if the goals submitted were deemed not measurable, were unrealistic, or unachievable in the specified timeframe. Sample goals were provided in the early sessions to assist participants in identifying and selecting appropriate goals. Additional guidance was provided in the personal communication between the investigator and self-efficacy group participants. In evaluating goals, emphasis was placed on identifying areas of achievement and self-reinforcement of said achievement. Areas needing further improvement were targeted for future goal setting. Goal setting and evaluation was a confidential communication between the participant and the investigator. Only the participant and the investigator had access to the goal setting and evaluation information. The investigator sent email reminders to participants who had not posted or evaluated goals for the previous session.

The discussion section of the website was the platform for self-efficacy group participants to share information, thoughts, and feelings about the process of dietary change. It provided a mechanism for participants to share with others their experiences during the intervention. Participants were encouraged to use social persuasion and modeling to provide support to other members of the experimental group. This was accomplished by communication from the investigator in the discussion forums as well as in the personal emails sent to each participant. Each session, the investigator began a threaded discussion, an ongoing dialogue where participants could respond to a posted statement, and, or, begin a new thread of discussion. Topics for threaded

discussion focused on the sharing of personal experiences that reflected the successes and difficulties experienced in making dietary changes for cholesterol reduction.

Private mail (email) was used for individualized communication between the investigator and self-efficacy group participants. The investigator provided feedback and reinforcement on at least a bi-weekly basis to all participants. Email was also available for participants to communicate and provide support to each other on an individual or group basis. Participants who had not participated in the intervention for more than a week were sent a reminder e-mail via the standard inter-office e-mail system.

Consistent with self-efficacy theory, this intervention used incremental steps to provide information and support in the promotion of dietary change behaviors (Bandura, 1997, 2001). Self-efficacy group participants were encouraged to engage in activities to increase their knowledge of the components of a cholesterol-lowering diet and build their confidence in their ability to adopt and maintain a diet low in saturated fat and cholesterol.

Education group. Participants randomized to the education group were directed to a website that provided links to educational information on dietary management of cholesterol. This information was given in six sessions over a two-month period. A new session was posted every 10 days. The investigator sent education group participants an email when a new session was posted. This was the only intervention-related communication between the investigator and the education group participants during the intervention time period. Appendix B gives the session topics, website titles, and links for the education group intervention. The self-efficacy

group also received this information as a component of the self-efficacy enhancing

intervention.

Chapter IV

Analysis of Data

The purpose of this study was to develop and test a self-efficacy based Internet intervention to achieve reduction in LDL cholesterol through dietary change in employees of a community college in New Jersey. The Internet intervention was conducted using a self-efficacy enhancing website developed by the investigator.

The self-efficacy based Internet intervention was conducted during the fall of 2003.Variables studied included LDL cholesterol, dietary adherence, nutrition knowledge and dietary self-efficacy. LDL cholesterol was measured using a fasting lipid profile. Dietary adherence was measured using the carbohydrate and cholesterol-saturated fat scales of the Diet Habit Survey (DHS)(Connor et al., 1992). Nutrition knowledge was measured using the Nutrition Knowledge and Attitude Questionnaire (NKQ) (Burke, 1997). Self-efficacy was measured using the Cholesterol-Lowering Diet Self-Efficacy Scale (CLDSES) (Burke, 1997; Burke et al., 2003). The results of the analysis of study data are presented in this chapter.

Sample

Fifty-nine employees expressed interest in the study. Fifty-two employees signed consent forms. Of those, forty-one completed pre-testing and were randomized into the self-efficacy (n = 27) and education (n = 14) groups using the Minimization program (Zeller et al., 1997). Three participants, all from the self-efficacy group, dropped out during the intervention phase. One participant reported a serious medical problem unrelated to the intervention. Another said she did not have the time required for participation. The third participant gave no reason for

discontinuation. Results presented are based on the 38 participants (93% of those who pre-tested) who completed the intervention.

The majority of participants in both groups were married, white females with college degrees and family incomes exceeding $64,000.00. Baseline sample characteristics of participants in the education and self-efficacy groups are shown in Table 5. Independent t-tests were performed on demographic data. Despite randomization there were two significant differences between the groups at baseline: the self-efficacy group had a greater proportion of people on cholesterol-lowering medications and the education group had a greater proportion of people from racial/ethnic minority groups.

Table 5

Descriptive Statistics of the Sample (n = 38)

Characteristics	Education		Self-efficacy	
	n	%	n	%
Gender				
Female	11	78.6	19	79.2
Male	3	21.4	5	20.8
Race/Ethnicity				
White	10	71.4	21	87.5
African-American	0	0.0	1	4.2
Asian/Pacific Islander	2	14.3	1	4.2
Hispanic	1	7.1	1	4.2

Characteristics	Education		Self-efficacy	
	n	%	n	%
Native American	1	7.1	0	0.0
Age				
30 – 39	3	21.4	1	4.2
40 – 49	5	35.7	7	29.2
50 – 59	4	28.6	10	41.7
60 – 69	1	7.1	6	25.0
Not indicated	1	7.1	0	0.0
Cholesterol medication				
Yes	1	7.1	6	25.0
No	13	92.9	18	75.0
Self-Reported History of Heart Disease				
Yes	2	14.3	6	25.0
No	12	85.7	18	75.0

Characteristics	Education		Self-efficacy	
	n	%	n	%
Self-Reported Elevated Cholesterol				
Yes	5	35.7	13	54.2
No	9	64.3	11	45.8
CHD Risk Profile				
CHD	3	21.4	6	25.0
2+ Risk Factors	2	14.3	2	8.3
0-1 Risk Factors	9	64.3	16	66.7
Education				
High School	1	7.1	1	4.2
Some College	3	21.4	4	16.7
College Graduate	0	0.0	1	4.2
Graduate School	10	71.4	18	75.0
Marital Status				
Never married	1	7.1	2	8.3
Married	11	78.6	18	75.0
Widowed	1	7.1	0	0.0
Divorced	1	7.1	4	16.7

Characteristics	Education		Self-efficacy	
	n	%	n	%
Income				
< $30,000	0	0.0	1	4.2
$30 - 43,999	2	14.3	2	8.3
$44 - 63,999	1	7.1	2	8.3
$64,000 or >	11	78.6	19	79.2

The findings obtained from analysis of the use of the intervention website are presented in Table 6.

Table 6

Descriptive Statistics of Website Use

Website Participation	Range of logins	Mean # of logins	Median # of logins	Range of postings	Mean # of Postings
Education group	6-31	18.9	21.5	0	0
Self-efficacy group	9-296	117.9	89.0	0-14	3.3

Note. Posting was not available to the control group

Frequency of website access was impacted by group assignment. Education group participants logged on to the website approximately 20 times during the course of the intervention compared to almost 118 times for the self-efficacy group. Posting, a component of the self-efficacy based intervention available only to the self-efficacy

group, was used by the majority of intervention group participants. Seventeen of twenty-four intervention participants used posting.

Psychometric Properties of the Behavioral Instruments

Behavioral instruments used in this study included the carbohydrate and cholesterol-saturated fat scales of the Diet Habit Survey (DHS) (Connor et al., 1992), the Nutrition Knowledge and Attitude Questionnaire (NKQ) (Burke, 1997), and the Cholesterol-Lowering Diet Self-Efficacy Scale (CLDSES) (Burke, 1997). With the exception of the NKQ the behavioral instruments indicate a sufficiently high level of reliability (Nunnally, 1978). The coefficient alphas for these instruments are shown in Table 7.

Table 7

Reliability of Behavioral Instruments

Instrument	Coefficient Alpha
DHS Total	.84
DHS Carb	.92
DHS Chol/sat. fat	.77
NKQ	.52
CLDSES	.97

Data Management

The findings obtained from the descriptive analysis of the variables measured in the study are presented in Table 8. There were no statistically significant differences between the control and intervention group scores on the pre-intervention measures. The investigator worked with an Information Technology specialist to convert the paper form of the instruments into hypertext markup language (html) documents that were uploaded to the intervention website. Participants completed the survey and behavioral instruments online. Submitted instruments were electronically delivered to an email account accessible only by the investigator. Three participants did not complete all components of post-intervention data collection. Pre-intervention values were used for these participants' post-intervention scores.

The investigator and a Data Management Specialist cleaned the pre- and post-intervention data with double data entry using the Statistical Package for the Social Sciences (SPSS) Version 10.0. Visual inspection of normal P-P plots revealed only one outlier on the carbohydrate sub-scale of the DHS. The data were reviewed and the value was determined to be valid and used in data analysis. Residual and QQ plots were examined to investigate model adequacy; no problems were indicated. The results of this analysis are presented below.

Table 8

Descriptive Statistics of the Study Variables (n = 38)

Measures	Group	Mean	SD	Range	P value
Number of website	ED	18.93	8.25	6-31	.000**
Logins	SE	117.92	89.01	9-296	

PRE-INTERVENTION SCORES

LDL Cholesterol	ED	126.57	30.73	76-190	.68
	SE	121.96	33.48	63-178	
Dietary Adherence	ED	52.99	15.57	24-86	.19
Carbohydrate Subscale	SE	60.08	16.02	31-83	
Dietary Adherence	ED	64.25	16.07	40-95	.59
Cholesterol Saturated Fat	SE	67.22	16.10	44-103	
Subscale					

Measures	Group	Mean	*SD*	Range	*P* value
Dietary Knowledge	ED	27.29	3.77	20-34	.17
	SE	29.29	4.53	13-34	
Dietary Self-efficacy	ED	77.40	10.20	59-95	.57
	SE	79.52	11.28	62-96	
Body Mass Index	ED	25.91	4.57	20.3-38.2	.93
	SE	26.09	6.39	17.3-48.6	

POST-INTERVENTION SCORES

LDL Cholesterol	ED	131.21	28.94	80-186	.20
	SE	117.33	33.00	61-171	
Dietary Adherence	ED	59.99	17.68	38-102	.26
Carbohydrate Subscale	SE	67.75	21.19	19-106	
Dietary Adherence	ED	76.34	12.78	57-105	.47

Measures	Group	Mean	SD	Range	P value
Cholesterol Saturated Fat Subscale	SE	74.01	15.37	45-104	
Dietary Knowledge	ED	30.38	2.06	28-35	.71
	SE	30.00	3.37	22-35	
Dietary Self-efficacy+	ED	79.87	13.67	53-100	.82
	SE	80.73	9.90	61-96	
Body Mass Index++	ED	25.83	4.61	20.3-38.5	.87
	SE	26.15	6.43	17.4-48.6	

Note. ED = education group, SE = self-efficacy group. (+ missing dmc 34) (++missing dmc 33, 34, 55) baseline values were used for post-intervention

Hypothesis Testing

Hypotheses 1 through 4 were tested using ANCOVA. The covariate for the

hypotheses testing was pre-test self-efficacy. Hypothesis 5 was to be tested using

hierarchical multiple regression. The significance level for all tests was set at $p < .05$.

Data analyses were performed using the Statistical Package for the Social Sciences

(SPSS) Version 10.0.

Hypothesis 1. There will be a significant reduction in LDL cholesterol in the

self-efficacy group when compared to the education group upon completion of a 12-

week self-efficacy enhancing Internet dietary intervention.

A two-group, one covariate analysis of covariance (ANCOVA) was performed. The

independent variable was group assignment (self-efficacy or education). The

covariate was pre-test self-efficacy. The dependent variable was post-test LDL

cholesterol. The results of the ANCOVA are presented in Table 9.

Table 9

ANCOVA of Post-intervention LDL cholesterol (LDLPO) with Baseline Self-efficacy

as Covariate

Dependent variable: LDLPO

Source	Type III Sum of Squares	df	Mean Square	F	p
Corrected Model	1722.193[a]	2	861.097	.839	.441
Intercept	9668.310	1	9668.310	9.421	.004
SEPREMN	18.489	1	18.489	.018	.894
GROUP	1722.091	1	1722.091	1.678	.204
Error	35919.201	35	1026.263		

Source	Type III Sum of Squares	df	Mean Square	F	p
Total	607389.000	38			
Corrected Total	37641.395	37			

Note. a. R Squared = .046 (Adjusted R Squared = -.009)

Since there were no significant differences in LDL cholesterol Hypothesis 1 was not supported.

Hypothesis 2. There will be a significant increase in adherence to a cholesterol-lowering diet in the self-efficacy group when compared to the education group upon completion of a 12-week self-efficacy enhancing Internet dietary intervention.

A two-group, one covariate analysis of covariance (ANCOVA) was performed. The independent variable was group assignment (self-efficacy or education). The covariate was pre-test self-efficacy. The dependent variable, post-test adherence, was measured by the carbohydrate and cholesterol saturated-fat subscales of the DHS. The results of the ANCOVA are presented in Tables 10 and 11.

Table 10

ANCOVA of Post-intervention Adherence as Measured by the Carbohydrate Subscale of the DHS with Baseline Self-efficacy as Covariate

Dependent variable: CARBPO

Source	Type III Sum of Squares	df	Mean Square	F	p
Corrected Model	1159.288[a]	2	579.644	1.474	.243
Intercept	6005.462	1	6005.462	15.272	.000
SEPREMN	625.677	1	625.677	1.591	.216
GROUP	644.837	1	644.837	1.640	.209

Source	Type III Sum of Squares	df	Mean Square	F	p
Error	13762.760	35	393.222		
Total	174939.490	38			
Corrected Total	14922.048	37			

Note. a. R Squared = .078 (Adjusted R Squared = .025)

Table 11

ANCOVA of Post-intervention Adherence as Measured by the Cholesterol-Saturated Fat Subscale of the DHS with Baseline Self-efficacy as Covariate

Dependent variable: CHOLPO

Source	Type III Sum of Squares	df	Mean Square	F	p
Corrected Model	345.270[a]	2	172.635	.832	.444
Intercept	2022.928	1	2022.928	9.752	.004
SEPREMN	297.456	1	297.456	1.434	.239
GROUP	72.894	1	72.894	.351	.557
Error	7260.629	35	207.447		
Total	220619.035	38			
Corrected Total	7605.899	37			

Note. a. R Squared = .045 (Adjusted R Squared = -.009)

Since there were no significant differences between groups in post-intervention carbohydrate or cholesterol-saturated fat subscale scores Hypothesis 2 was not supported.

Hypothesis 3. There will be a significant increase in knowledge of a cholesterol-lowering diet in the self-efficacy group when compared to the education group upon completion of a 12-week self-efficacy enhancing Internet dietary intervention.

A two-group, one covariate analysis of covariance (ANCOVA) was performed. The independent variable was group assignment (self-efficacy or education). The covariate was pre-test self-efficacy. The dependent variable was post-test knowledge. The results of the ANCOVA are presented in Tables 12.

Table 12

ANCOVA of Post-intervention Knowledge as Measured by the NKQ with Baseline Self-efficacy as Covariate

Dependent variable: NKQPO

Source	Type III Sum of Squares	df	Mean Square	F	p
Corrected Model	8.225[a]	2	4.113	.450	.641
Intercept	480.672	1	480.672	52.611	.000
SEPREMN	8.225	1	8.225	.900	.349
GROUP	7.574	1	7.574	.008	.928
Error	319.775	35	9.136		
Total	34528.000	38			
Corrected Total	328.000	37			

Note. a. R Squared = .025 (Adjusted R Squared = -.031)

Since there were no significant differences between groups in post-intervention NKQ scores Hypothesis 3 was not supported. However, it should be reiterated that the coefficient alpha for the NKQ was .52.

Hypothesis 4. There will be a significant increase in self-efficacy for following a cholesterol-lowering diet in the self-efficacy group when compared to the education group upon completion of a 12-week self-efficacy enhancing Internet dietary

intervention. A two-group, one covariate analysis of covariance (ANCOVA) was performed. The independent variable was group assignment (self-efficacy or education). The covariate was pre-test self-efficacy. The dependent variable was post-test self-efficacy as measured by the CLDSES. The results of the ANCOVA are presented in Tables 13.

Table 13

ANCOVA of Post-intervention Self-efficacy as Measured by the CLDSES with

Baseline Self-efficacy as Covariate

Dependent variable: SEPO

Source	Type III Sum of Squares	df	Mean Square	F	p
Corrected Model	2571.445[a]	2	1285.723	21.264	.000
Intercept	260.331	1	260.331	4.305	.045
SEPREMN	2564.871	1	2564.871	42.419	.000
GROUP	5.324	1	5.324	.088	.768
Error	2116.270	35	60.465		
Total	250429.268	38			
Corrected Total	4687.716	37			

Note. a. R Squared = .549 (Adjusted R Squared = .523)

Since there were no significant differences between groups in post-intervention self-efficacy scores Hypothesis 4 was not supported.

Hypothesis 5. Self-efficacy will mediate the effects of a two month self-efficacy enhancing Internet dietary intervention on knowledge of and adherence to a cholesterol-lowering diet. To test for mediation the outcome variables of dietary knowledge, measured by the post-intervention NKQ, and dietary adherence,

measured by the post-intervention carbohydrate and cholesterol-saturated fat

subscales of the DHS were regressed on the predictor variable, group assignment.

Since these relationships were not significant, further assessment for mediation was

not conducted. The regression summaries for post-intervention NKQ, carbohydrates

and cholesterol-saturated fat are shown below in Tables 14, 15, and 16, respectively.

Therefore, Hypothesis 5 was not supported.

Table 14

Regression of Nutrition Knowledge (NKQ) and Group Assignment

		NKQPO	GROUPREC
Pearson Correlation	NKQPO	1.000	.000
	GROUPREC	.000	1.000
Sig. (1-tailed)	NKQPO		.500
	GROUPREC	.500	
N	NKQPO	38	38
	GROUPREC	38	38

Table 15

Regression of Adherence-Carbohydrate (CARBPO) and Group Assignment

		CARBPO	GROUPREC
Pearson Correlation	CARBPO	1.000	-.189
	GROUPREC	-.189	1.000
Sig. (1-tailed)	CARBPO		.128
	GROUPREC	.128	

		CARBPO	GROUPREC
N	CARBPO	38	38
	GROUPREC	38	38

Table 16

Regression of Adherence-Cholesterol-Saturated Fat (CHOLPO) and Group

Assignment

		CHOLPO	GROUPREC
Pearson Correlation	CHOLPO	1.000	.079
	GROUPREC	.079	1.000
Sig. (1-tailed)	CHOLPO		.318
	GROUPREC	.318	
N	CHOLPO	38	38
	GROUPREC	38	38

Additional Findings

Since the hypotheses were all written with baseline self-efficacy as the covariate it was important to further investigate the relationship between study variables. To accomplish this, ANCOVA was performed on all dependent variables; LDL cholesterol, nutrition knowledge, and dietary adherence, where the covariate was the pre-intervention value of the dependent variable. Results were non-significant with the exception of LDL cholesterol. When controlling for baseline LDL cholesterol there was a significant difference, $(F = 4.52, p = .04)$ in post-intervention LDL

cholesterol. The results of the significant ANCOVA for LDL cholesterol are presented in Table 17.

Table 17

ANCOVA of Post-intervention LDL Cholesterol with Baseline LDL Cholesterol as Covariate

Dependent variable: LDLPO

Source	Type III Sum of Squares	df	Mean Square	F	P
Corrected Model	31063.151[a]	2	15531.576	82.637	.000
Intercept	526.574	1	526.574	2.802	.103
LDLPREMN	29359.447	1	29359.447	156.209	.000
GROUPREC	849.989	1	849.989	4.522	.041
Error	6578.244	35	187.950		
Total	607389.000	38			
Corrected Total	37641.395	37			

Note. a. R Squared = .825 (Adjusted R Squared = .815)

Frequency of use of the website was analyzed using an independent t-test. There were significant differences between the intervention and control groups in frequency of use, ($t = 4.25$, $p = .000$). Ninety-three percent of those who submitted baseline data completed the intervention. Participants who participated in the study were predominately married women over age 35, who were college educated.

Chapter V

Discussion of the Findings

The purpose of this study was to develop and test the effects of a self-efficacy enhancing Internet intervention on the dietary management of cholesterol in employees of a community college. Using a randomized-controlled trial, LDL cholesterol, self-efficacy, nutrition knowledge, and dietary adherence were measured at baseline and post-intervention. This chapter presents the investigator's interpretation of the findings of the data analysis in light of the theoretical framework and past empirical studies from which the hypotheses were derived.

Limitations

Sample size. Due to the absence of prior Internet self-efficacy enhancing studies for dietary reduction of cholesterol, a required sample size of 48 participants was calculated for the present study using power analysis, based upon an effect size (.84) from a randomized controlled trial of a behavioral dietary intervention for weight reduction in hospital employees (Tate, Wing et al. 2001). In this study, a total of 38 participants completed the intervention and post-testing, which represented a smaller than adequate sample size. The inadequate sample size may have contributed to the lack of significant results for the proposed hypotheses. However, despite the small sample size, there was a statistically significant difference in LDL cholesterol between the intervention and control groups ($F = 4.52, p = .04$) when controlling for baseline LDL differences. Because of the small sample size, further testing with larger sample sizes is advised.

Investigator bias. Due to the nature of the study, a dissertation, the investigator both developed the intervention and served as the intervener. The investigator attempted to limit the effects of investigator bias by using a table of random numbers to enter participants into the Minimization randomization program and using only numeric codes for data entry so that the investigator would be blind to the identity of participants.

Variables not assessed. During the course of the study other variables of importance that were not assessed in the present study became apparent. These included measurement of the components of the Portfolio Diet (Jenkins et al., 2003; Kendall & Jenkins, 2004), measurement of physiological state, and having participants assess their level of confidence for meeting the goals submitted each session. Each of these potential variables is discussed briefly below.

During the recruitment phase, with IRB approval, a change was made to the eligibility requirements. Original eligibility requirements stated that participants should be non-adherent to a cholesterol-lowering diet as measured by the carbohydrate and cholesterol-saturated fat subscales of the DHS. During the prescreening phase the investigator discovered that many of the employees interested in participating were currently following a standard cholesterol-lowering diet. The investigator requested a change of eligibility requirements based on the following rationale: 1) as this was a worksite study to promote healthier living all interested employees should be able to participate, and 2) recent studies indicated that a portfolio diet (Jenkins et al., 2003), a diet that incorporates the use of fiber, nuts, soy, and plant sterols was effective in lowering cholesterol at rates equivalent to the

starting dose of cholesterol-lowering medications. As these dietary components were not standard in the traditional American diet and were included at part of the intervention, it was thought that employees who were already following a cholesterol-lowering diet could still benefit from the intervention. The study did not include a mechanism for measuring consumption of the components of the Portfolio Diet. Further research is needed that includes pre- and post-intervention measurement of these components. Additionally, it was thought findings from this study were more conservative than they would be if the sample was taken from the general population that consumes a diet with a higher content of cholesterol, saturated-fat, and calories.

Physiological state, one of the sources of self-efficacy was not addressed in this study. Bandura (1997) noted that heightened physiological arousal can lead to decreased performance. Participants were not asked to assess their physiological state and its effect on their ability to achieve dietary goals. The use of the Internet as the communication medium for the study was the rationale for not including physiological state either as a study measure or a component of the intervention. In retrospect this was likely an important omission. Assisting participants to increase awareness of their physiological state and be able to identify physiological cues that correlate with both low and high perceived self-efficacy may enable them to more readily identify low self-efficacy and seek sources, both internal and external to bolster self-efficacy. Future research should provide a mechanism for assessment of physiological state, possibly through the use of participant journals.

As a technique to support performance accomplishments, participants were asked to submit dietary goals for each session that were then evaluated during the

next session. However, they were not asked to identify a level of confidence (0 –

100%) in their ability to achieve submitted goals. Providing a level of confidence

would be more consistent with self-efficacy theory and would assist the intervener in

focusing self-efficacy enhancement efforts towards those participants with identified

low self-efficacy. During the evaluation of goals participants would also evaluate

whether their level of confidence had changed. Future studies should include a

measure of confidence levels for goals developed to enhance dietary self-efficacy and

dietary change.

Discussion of Hypothesis 1

Hypothesis 1 stated that there would be a significant reduction in LDL

cholesterol in the self-efficacy group upon completion of a two month self-efficacy

enhancing Internet dietary intervention. This hypothesis was derived from synthesis

of previous intervention trials for dietary reduction of cholesterol (Angotti et al.,

2000; Angotti & Levine, 1994; Burke, 1997; Clark et al., 1997; Debusk et al., 1994)

and an Internet-based behavioral weight loss trial (Tate et al., 2001).

In the present study, although post-intervention LDL cholesterol was

increased in the education group and decreased in the self-efficacy group these

differences were not significant when controlling for baseline self-efficacy as

hypothesized. There are several possible explanations for the lack of significance.

These include the study eligibility criteria, the conceptualization and measurement of

self-efficacy, and the small sample size.

The study design allowed participation by all interested employees

irrespective of LDL cholesterol level and current diet. The rationale was that during

the recruitment period several people who were interested in participating expressed disappointment upon being rejected based on original eligibility requirements, non-adherence to a cholesterol-lowering diet as measured by the carbohydrate and cholesterol-saturated fat scales of the DHS. They commented that a worksite study promoting healthier living should be made available to all who expressed interest. Based upon this feedback and low enrollment, the investigator requested a change in eligibility requirements. This change, approved by the Dissertation Committee and the IRB, may have contributed to the lack of a significant change in LDL cholesterol. Eighteen employees interested in participating in the study were already adhering to a low-fat, low-cholesterol diet and the majority, 71%, had baseline cholesterol levels within the accepted range for their cardiac risk profile (see Table 2, page 11). These baseline characteristics of the sample may have limited the margin for improvement in LDL cholesterol change as a result of participating in the intervention.

Self-efficacy, the confidence one has in his or her ability to adhere to a cholesterol-lowering diet, was the theoretical framework for this study. Several studies identify self-efficacy as a good predictor of health behavior change (AbuSabha & Achterberg, 1997; Bandura, 1998; Brug et al., 1997; Herrick et al., 1997; Ling & Horwath, 1999; McCann et al., 1995; Ounpuu et al., 1999; Richman et al., 2001; Schwarzer, 1992; Schwarzer & Renner, 2000) and others have studied interventions based on self-efficacy theory (Angotti et al., 2000; Angotti & Levine, 1994; Burke, 1997; Clark et al., 1997; Debusk et al., 1994). Only Burke (1997) included measurement of self-efficacy as part of the study design. The present study used the CLDSES developed by Burke to measure self-efficacy. Similar to Burke's

findings, the present study showed no significant differences between groups in post-intervention self-efficacy. Although there is abundant theory on dietary self-efficacy, further research is needed on dietary self-efficacy measurement. Thus self-efficacy as a theoretical framework and covariate did not contribute to the study findings. This will be discussed further under Hypothesis 4.

The small sample size is another possible explanation for the lack of significant findings. Further testing with larger sample sizes is advised.

Discussion of Hypothesis 2

Hypothesis 2 stated that there will be a significant increase in adherence to a cholesterol-lowering diet in the experimental group when compared to the control group upon completion of a two month self-efficacy enhancing Internet dietary intervention. This hypothesis is derived from Self-Efficacy Theory, which states that positive efficacy beliefs can enhance behavior change and improve adherence (Pajares, 1997).

In the present study, there was improvement in dietary adherence in both the experimental and control groups as measured by both the carbohydrate and cholesterol-saturated fat subscales of the DHS. There was no significant difference between groups in post-intervention adherence scores. One explanation for the lack of significance is that similar improvements in dietary adherence were seen in both groups. Another explanation would be the small sample size. A third explanation would be the high baseline level of adherence limited the range for improvement.

Discussion of Hypothesis 3

Hypothesis 3 stated that there will be a significant increase in knowledge of a cholesterol-lowering diet in the self-efficacy group when compared to the education group upon completion of a two month self-efficacy enhancing Internet dietary intervention. The premise that individuals are agents proactively engaged in their development (Pajares, 1997) and that the belief in one's ability to exercise control over their thoughts, feelings and actions (Bandura, 2001) is the basis for this hypothesis.

Both the self-efficacy and education groups had increases in post-intervention knowledge scores. There was no significant difference between the groups in post-intervention knowledge. One explanation for this finding is that both groups had high baseline knowledge scores and both groups showed improvement post-intervention. Another explanation would be the small sample size. A third possible explanation could be the poor reliability of the NKQ in the present study. Murray (1998) has noted that values of variables tend to cluster in existing social units such as worksites. This may explain the poor reliability of the NKQ in the present study.

Discussion of Hypothesis 4

Hypothesis 4 stated that there will be a significant increase in dietary self-efficacy in the self-efficacy group when compared to the education group upon completion of a two month self-efficacy enhancing Internet dietary intervention. The intervention was designed to provide self-efficacy enhancement through the provision of performance accomplishments, modeling, and social persuasion (Bandura, 2001; Pajares, 1997) increasing the dietary self-efficacy of the self-efficacy group.

There were no significant differences in post-intervention self-efficacy scores between groups. Both groups had high baseline self-efficacy and showed small improvements post-intervention. This may have contributed to the lack of significant results. Another possibility is difficulty in measuring self-efficacy. The CLDSES measures confidence in various situations. It may be more valuable to measure the sources of self-efficacy: performance accomplishments, modeling, social persuasion, and physiological arousal (Pajares, 1997). Baranowksi and colleagues' (1998) recommended that self-efficacy measures should assess three dimensions: level, strength, and generality. Additionally, psychosocial predictor variables should be measured by more than one technique (Baranowski et al., 1998).

Discussion of Hypothesis 5

Hypothesis 5 stated that self-efficacy will mediate the effects of a two month self-efficacy enhancing Internet dietary intervention on knowledge of and adherence to a cholesterol-lowering diet. This hypothesis was based on Self-Efficacy Theory (Bandura, 1977, 2001) and the conceptualization of mediator variables (Baron & Kenny, 1986; Lindley & Walker, 1993).

The present study did not demonstrate a significant correlation between the independent variable, group assignment, and the dependent variables, nutrition knowledge, and adherence. Therefore the mediating effects of self-efficacy could not be tested and Hypothesis 5 was rejected. Possible explanations for this finding include high baseline scores combined with post-intervention increases in both the education and self-efficacy groups. Other explanations include psychometric limitations, and the small sample size. Psychometric limitations include the low alpha

for the NKQ and the fact that the DHS is a self-report measure. Finally, the small sample size may have impacted findings. Further research is recommended using a three group design, improved measures, and larger sample sizes.

Discussion of Additional Findings

Group differences in LDL cholesterol when controlling for baseline LDL cholesterol. Post hoc analysis of data included ANCOVA of all dependent variables using the baseline value of that variable as the covariate. Group differences in LDL cholesterol were the only significant finding. When controlling for baseline LDL there was a significant difference between groups in post-intervention LDL cholesterol. It should be noted that there was a statistically significant difference in the use of cholesterol-lowering medication between groups. Despite randomization there were more people in the self-efficacy group on medication. Although no participants adjusted their medication during the intervention timeframe, the possible impact of medication cannot be discounted. Nonetheless, the self-efficacy based Internet intervention may have assisted self-efficacy group participants in achieving greater dietary change for cholesterol reduction. Further studies controlling for baseline LDL cholesterol with larger sample sizes are advised.

Group differences in the use of the intervention website. As an additional finding, a significant difference was noted in frequency of logins to the intervention website. Participants in the self-efficacy group logged in to the website on average six times more frequently than did those in the education group. It appears that the role of the intervener and the ability to interact are important components for promoting active participation in an Internet intervention. This difference in website use

provided preliminary support for the importance of self-efficacy enhancing activities to promote participation in an Internet-based intervention.

Identification of factors predictive of successful participation in an Internet-based behavioral dietary intervention. A review of the demographic data of participants indicated that the majority of participants were college educated married females over the age of thirty-five. This is consistent with the findings of the Pew surveys (Fox, 2005; Fox & Rainie, 2000) on the use of the Internet for obtaining health information. This finding provides preliminary support for the use of the Internet for women's' health initiatives. Further research is warranted to identify factors to increase participation in Internet studies and interventions in other groups.

Chapter VI

Summary, Conclusions, Implications, and Recommendations

Summary

The purpose of this study was to develop and test a self-efficacy enhancing

Internet intervention to achieve reduction in LDL cholesterol through dietary change

in employees of a community college in New Jersey. The Internet intervention was

conducted using a self-efficacy enhancing website developed by the investigator.

Elevated blood cholesterol is a major modifiable risk factor for cardiovascular

disease affecting more than 100 million Americans. Cholesterol levels can be

improved through therapeutic lifestyle changes, specifically dietary modification

(Cleeman et al., 2001). Theory-based behavioral approaches have been useful in

lifestyle modification (Bandura, 1977; Glanz, 1997; Herrick et al., 1997; Kristal et al.,

1995; Roter et al., 1998). Self-efficacy has been a good predictor of change in dietary

behavior (AbuSabha & Achterberg, 1997; Bandura, 1998; Brug et al., 1997; Herrick et

al., 1997; Ling & Horwath, 1999; McCann et al., 1995; Ounpuu et al., 1999; Richman

et al., 2001; Schwarzer, 1992; Schwarzer & Renner, 2000).

The Internet, a communication modality with broader communication

capability than the more traditional approaches including telephone and mailed

information, may be an effective means for providing a self-efficacy enhancing

intervention for dietary change (Cassell et al., 1998). The capability for individual and

group communication, as well as synchronous or asynchronous communication, along

with print, visual, and audio mediums provides multiple mechanisms for the provision

of self-efficacy enhancing activities including performance accomplishment through

goal setting and evaluation, social persuasion, and modeling. Little is known about use of the Internet for the delivery of a self-efficacy enhancing dietary change intervention in a worksite study. A purpose of this study was to provide preliminary data on the efficacy of the Internet for the delivery of a self-efficacy enhancing dietary change intervention for cholesterol reduction.

The hypotheses for this study were as follows:

1. There will be a significant reduction in LDL cholesterol in the self-efficacy group when compared to the education group upon completion of a two month self-efficacy enhancing Internet dietary intervention.

2. There will be a significant increase in adherence to a cholesterol-lowering diet in the self-efficacy group when compared to the education group upon completion of a two month self-efficacy enhancing Internet dietary intervention.

3. There will be a significant increase in knowledge of a cholesterol-lowering diet in the self-efficacy group when compared to the education group upon completion of a two month self-efficacy enhancing Internet dietary intervention.

4. There will be a significant increase in self-efficacy for following a cholesterol-lowering diet in the self-efficacy group when compared to the education group upon completion of a two month self-efficacy enhancing Internet dietary intervention.

5. Self-efficacy will mediate the effects of a two month self-efficacy enhancing Internet dietary intervention on knowledge of and adherence to a cholesterol-lowering diet.

A total of 59 employees expressed interest in the study. Of those, 52 provided informed consent to participate in the study. Forty-one participants completed pre-testing and were randomized into the study. Thirty-eight participants (93%) completed the intervention and post-testing. Three participants were lost to attrition: one developed a serious medical condition, another reported a lack of time, and the third gave no reason. Following baseline testing participants were randomized into the self-efficacy or education groups using the Minimization program (Zeller, Good et al., 1997). The investigator notified participants of their group assignment via email and instructed them to login to the website to begin session one. Every 10 days a new session was posted. Post-intervention surveys were completed on the website following completion of the sixth session. Physiological data collection was scheduled two weeks after the sixth session. Despite randomization there were two differences identified in groups at baseline: more participants in the self-efficacy group were taking cholesterol medication (6 versus 1) and there was a higher percentage of people from ethnic minority groups in the education group. However, all participants were on medication prior to the study and did not have changes in their medication during the intervention period. Other characteristics of those in the self-efficacy group were not significantly different from those in the education group.

Dependent variables measured in this study were LDL cholesterol, body mass index, dietary self-efficacy, dietary adherence, dietary knowledge, and website use. LDL cholesterol was measured with a fasting lipid profile; self-efficacy was measured with the CLDSES (Burke, 1997); dietary adherence was measured with the carbohydrate and cholesterol-saturated fat scales of the DHS (Connor et al, 1992);

nutrition knowledge was measured with the NKQ (Burke, 1997); and website usage was measured by login frequency.

Hypotheses 1 through 4 were tested using analysis of covariance (ANCOVA), with baseline self-efficacy as the covariate. Hypothesis 5, a test of the mediating effects of self-efficacy, was tested using regression.

In testing Hypothesis 1, there were no significant differences in LDL cholesterol when controlling for baseline self efficacy ($F = 1.68, p = .20$) among employees in the self-efficacy group as compared with employees in the education group following the self-efficacy enhancing Internet intervention. Therefore, Hypothesis 1 was not supported.

In testing Hypothesis 2, there were no significant differences in dietary adherence as measured by the carbohydrate subscale of the DHS ($F = 1.64, p = .21$), or the cholesterol-saturated fat subscale of the DHS ($F = .35, p = .56$) when controlling for baseline self efficacy among employees in the self-efficacy group as compared with employees in the education group following the self-efficacy enhancing Internet intervention. Therefore, Hypothesis 2 was not supported.

In testing Hypothesis 3, there were no significant differences in dietary knowledge when controlling for baseline self efficacy ($F = .008, p = .93$) among employees in the self-efficacy group as compared with employees in the education group following the self-efficacy enhancing Internet intervention. Therefore, Hypothesis 3 was not supported.

In testing Hypothesis 4, there were no significant differences in dietary self-efficacy when controlling for baseline self efficacy ($F = .088, p = .77$) among

employees in the self-efficacy group as compared with employees in the education group following the self-efficacy enhancing Internet intervention. Therefore, Hypothesis 4 was not supported.

In testing Hypothesis 5, there was no significant correlation between dietary knowledge ($r = .00, p = .50$), or dietary adherence as measured by the carbohydrate subscale of the DHS ($r = -.189, p = .13$), or the cholesterol-saturated fat subscale of the DHS ($r = .079, p = .32$) and group assignment following the self-efficacy enhancing Internet intervention. Therefore, Hypothesis 5 was not supported.

Conclusions

Self-efficacy theory guided this intervention study of the use of the Internet for dietary change for cholesterol reduction. Although the hypotheses of the study were not supported, study findings provide information to guide further research.

Study recruitment attracted a small, approximately 10%, proportion of the population of employees of a community college. It is likely, from baseline data, that the sample recruited for the present study were already following recommended therapeutic lifestyle changes (TLC) as recommended by the NCEP (Cleeman et al., 2001). Further research is needed to identify methods to successfully recruit a more at-risk population for participation in dietary change intervention studies. The healthy lifestyle of the participants of the present study, although commendable, along with the small sample size, limited the response of participants to study measures post-intervention. It remains unknown (though doubtful) whether this sample is representative of employees of the community college that served as the worksite for the intervention.

LDL cholesterol decreased in the self-efficacy group from a mean of 122 mg/dl at baseline to a mean of 117 *mg/dl* post-intervention while increasing in the education group from a mean of 127 *mg/dl* to a mean of 131 *mg/dl*. Although this change was not significant, the small sample size, healthy lifestyle of participants and normal baseline cholesterol values that limited change warrants further study with a larger, more at-risk sample.

Dietary adherence improved in both the self-efficacy and education groups. These improvements although not statistically significant warrant further study. The ceiling effect of high baseline values may have contributed to the lack of significant findings. Education group participants improved their dietary adherence from a mean (with standard deviations in parentheses) carbohydrate adherence score of 53 (15.57) to a post-intervention mean score of 60 (17.68). The mean carbohydrate adherence score of the self-efficacy group was 60 (16.02) at baseline and 68 (21.19) post-intervention. Cholesterol-saturated fat adherence means were 64 (16.07) and 67 (16.10) at baseline for the education and self-efficacy groups respectively, and 76 (12.78) and 74 (15.37) post-intervention. The improvements in the education group were unexpected. These results suggest that a worksite Internet intervention may help to assist employees in improving adherence to a cholesterol-lowering diet. Further study with a larger sample using a three-group design, with the third group receiving no intervention, may be warranted.

Nutrition knowledge did not change significantly. The NKQ (Burke, 1997) had poor reliability, Cronbach's alpha .52, for the present study. As stated previously, one explanation for the poor reliability may be the tendency of variables to cluster in social

units, such as a group of employees (Murray, 1998). As this is a new instrument further study with larger samples, including other worksite studies, is recommended. Also, the NKQ should be revised to measure knowledge of the Portfolio Diet (Jenkins et al., 2003; Kendall & Jenkins, 2004) as well as incorporate the changes recently released in the Dietary Guidelines for America 2005 (USDA, 2005).

Self-efficacy was high at baseline for both the self-efficacy and education groups (Table 7, page 59) and remained relatively the same post-intervention. The ceiling effect of high baseline self-efficacy may have contributed to the lack of significant findings. One possibility is that the sample had high self-efficacy because they were already adhering to a cholesterol-lowering diet. Another explanation is that the CLDSES (Burke, 1997) did not capture the three dimensions of self-efficacy, level, strength, and generality (Bandura, 1997; Baranowski et al., 1998). Failure to address physiological state in this study could have contributed to the lack of increases in self-efficacy. The majority of dietary intervention studies for cholesterol reduction failed to measure dietary self-efficacy (Angotti et al., 2000; Angotti & Levine, 1994; Burke, 1997; Clark et al., 1997; Debusk et al., 1994), and those that did, Burke (1997) and the present study, did not have significant changes in self-efficacy post-intervention. Additional research is needed to further distinguish the measurable characteristics of dietary self-efficacy and to develop psychometric instruments for measurement of same. Physiological state should be addressed in the measurement of self-efficacy as well as in interventions designed to promote self-efficacy.

Finally, a purpose of this study was to determine if the Internet was an effective communication modality for the delivery of a self-efficacy enhancing

intervention for dietary change for cholesterol reduction. The attrition rate was seven

percent of those who completed baseline testing, indicating that participants remained

engaged in the two-month Internet intervention. Login data revealed that all

participants accessed the website a minimum of six times, at least once per session.

There was a significant difference in use of the website between the control and

experimental groups with the control group logging on an average of 19 times

throughout the intervention, whereas the experimental group logged on an average of

118 times. This disparity in use of the website provides preliminary support for the

inclusion of self-efficacy enhancing activities to encourage participation in Internet

dietary change interventions. The increased use of the self-efficacy website also

highlights the importance of the role of the intervener in Internet interventions as

compared to the independent provision of information. However the fact that both

groups received an intervention may have contributed to the lack of significant

differences between groups post-intervention. Further study of Internet-based

behavioral change interventions is warranted. Future studies should employ a three

group design that includes a true control group.

Implications for Knowledge Generation and Practice

There is considerable evidence that adherence to a cholesterol-lowering diet

reduces morbidity and mortality. Healthy People 2010 objectives encourage strategies

that promote the adoption and maintenance of a healthy diet. The present study tested

whether the Internet was an effective communication modality for the delivery of a

self-efficacy enhancing intervention for dietary change to reduce cholesterol. The

findings suggest that the recruitment for the present study attracted a sample of

participants that had high dietary self-efficacy and was already committed to following a traditional low-fat, low cholesterol diet. Self-efficacy group participants may have benefited from the inclusion of information on, and support of, a diet that includes fiber, nuts, soy, and plant sterols as LDL cholesterol was significantly reduced in the self-efficacy group when controlling for baseline LDL cholesterol. Future studies should measure consumption of these food products pre- and post-intervention to quantify their role in cholesterol reduction. Also, nurses and other health practitioners need to develop improved recruitment strategies that will attract a more at-risk population who could benefit more from participation. The findings of the present study provide preliminary support for the use of the Internet for the delivery of a dietary behavioral change intervention. Further study with larger, more diverse samples is recommended.

Using a survey study, Keenan and colleagues' (1999) identified factors that played a role in the initiation and maintenance of a low-fat diet. These factors were divided into two groups: planned and unplanned. Identified unplanned factors for initiating dietary change, defined as life events or occurrences that unintentionally become an impetus for dietary improvement, may provide insight to researchers as to the best time and approach for the initiation of dietary change interventions. The three most frequently cited unplanned factors were, in descending order, new product availability, taste, and media influence.

The South Beach Diet (Agatston, 2003a, 2003b), a popular physician developed Internet-based weight loss program with a behavioral component, seems to address these 'unplanned' factors. The South Beach Diet promotes a new product, its

diet, addresses taste with the South Beach Diet Cookbook, and has enjoyed wide media exposure. Currently, there are no scientific data that evaluates the safety and efficacy of this diet for weight loss and cholesterol reduction (Anonymous, 2003; Schnirring, 2004). Further research to evaluate the safety and efficacy of this diet is needed. The successful recruitment and media coverage methods used by Dr. Agatston in the promotion of this Internet-based dietary program also deserve further exploration.

Elevated cholesterol level was the most frequently mentioned health concern listed as an unplanned factor for dietary change by Keenan and colleagues' (Keenan et al, 1999). Providing entry into dietary change interventions (e.g. the DMC website, South Beach Diet) at the time of notification of elevated cholesterol may increase participation of people non-adherent to cholesterol lowering diets. Another possibility would be to incorporate the DMC website intervention into a cardiac rehabilitation program. This would reach an at-risk group as well as provide the opportunity to simultaneously assess exercise another cardiac rehabilitation component.

Two other important unplanned factors for dietary change identified by Keenan and colleagues' (1999) were family influence, specifically accommodating preferences of a family member for healthful food, and social influence, the influence of friends and co-workers. These factors support the use of interventions that target groups, including family units and worksites, and incorporate the self-efficacy constructs of modeling and social persuasion as components of the intervention.

The survey data by Keenan and colleagues' (1999) and the findings of the present study represent data predominantly from well educated, white females,

limiting generalizability. Efforts need to be made to recruit more diverse, at-risk samples for dietary research studies. It is recommended that recruitment from church-based programs be considered as a strategy to increase participation of at-risk populations in dietary change interventions (Winett et al., 1999).

Dietary research and recommendations are constantly evolving. In January 2005 the United States Department of Agriculture released the Dietary Guidelines for America 2005 (USDA, 2005). Nurse researchers need to be active in the dissemination of these recommendations as well as in designing studies that examine strategies that encourage the adoption and maintenance of said guidelines. The effects of dietary changes on morbidity and mortality must also be studied using longitudinal designs.

A recently reported RCT by Gardner and colleagues' (2005) compared participants who consumed a low-fat, low cholesterol, diet for a four-week period to those that consumed a similar diet plus additional plant foods. The diet for the experimental group contained the same amount of cholesterol and fat as that of the control group, but added additional soy, fiber, garlic, and plant sterols. LDL cholesterol was reduced an additional 6.8 mg/dl in the experimental group providing additional support for the consumption of a diet similar to the Portfolio Diet (Jenkins et al., 2003; Kendall & Jenkins, 2004) to reduce LDL cholesterol with dietary modification beyond that achieved with the traditional low-fat, low-cholesterol diet. All meals and snacks were provided to both groups for the duration of the study leaving unanswered the question: what strategies will encourage people to purchase, prepare and consume a diet that is low in both saturated fat and cholesterol and contains increased amounts of plant foods including soy, fiber, garlic, nuts, and plant

sterols. Longitudinal studies with a behavioral component are needed to address this question.

Metabolic Syndrome, defined as having three or more of the following: increased waist circumference, elevated serum triglycerides, low HDL cholesterol, high LDL cholesterol, hypertension, or impaired fasting glucose, is increasingly recognized as a risk factor for cardiovascular disease, and Type 2 diabetes mellitus (Alexander et al., 2003; Bonora et al., 2003; Cleeman et al., 2001). The Diabetes Prevention Program Randomized Trial (DPP) (Orchard et al., 2005) randomized volunteers with impaired glucose tolerance to three groups to assess the effects of metformin, placebo, or intensive lifestyle intervention on the components of metabolic syndrome. Intensive lifestyle intervention goals were designed to achieve and maintain a 7% weight reduction through a healthy low-calorie, low-fat diet combined with moderate physical activity for at least 150 minutes per week. This longitudinal design study in which patients were followed for an average of 3.2 years, demonstrated the incidence of metabolic syndrome was reduced by 41% in the intensive lifestyle modification group and by 17% in the metformin group compared with placebo. Lifestyle modifications reduced the incidence of all components of metabolic syndrome except HDL cholesterol level. The lifestyle modification group was the only group to show an overall reduction in the incidence of metabolic syndrome at three years. The DPP, a large, multi-center trial, with a 50% enrollment of people from minority groups, demonstrated reduction of multiple risk factors for cardiovascular disease in people with impaired glucose tolerance over a three year period through the adoption of changes in diet and exercise. Future research needs to include an

examination of the behavioral determinants for the adoption and maintenance of lifestyle change interventions for reduction of morbidity and mortality from cardiovascular disease and other chronic illnesses.

Finally, based on the experience of this study it is apparent that further study is needed for the development of psychometric instruments for the measurement of dietary self-efficacy and knowledge. Eligibility criteria should be limited to those with elevated baseline cholesterol levels who are non-adherent to a cholesterol-lowering diet. Measurements of dietary intake need to incorporate intake of newly identified cholesterol-lowering food products including soy, nuts, fiber, and plant sterols.

Recommendations

The theoretical basis and empirical findings of this study point the direction for further research. The recommendations for further study are as follows:

1. Further studies on the operationalization of the construct of dietary self-efficacy.

2. Development of improved measures of dietary intake including:

   a. Revisions to address the Dietary Guidelines for America 2005.

   b. Quantitative measurement of consumption including the components of the Portfolio Diet: soy, nuts, fiber, and plant sterols.

   c. Use of portable electronic devices (PDAs, cell phones) for dietary logs.

   d. Use of multiple methods of measurement, both subjective and objective.

   e. Use of dietary journals to capture qualitative factors that affect dietary adherence including physiological state.

3. Use of recruitment strategies to attract at-risk populations including:

   a. Point of contact referral from primary care providers when elevated cholesterol

is first identified.

b. Use of the DMC website as a component of cardiac rehabilitation programs.

c. Recruitment of participants from church-based groups to increase minority

enrollment.

4. Interventions that target and measure the components of Metabolic Syndrome.

5. Interventions utilizing the Internet that combine dietary and exercise components in

a longitudinal design.

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Appendix A

Behavioral Intervention Protocol

Time frame	Goal	Sources of self-efficacy enhancement	Source of Self Efficacy		
			Performance accomplishment	Modeling	Social persuasion
Pre-intervention	Website orientation	Intervener	Demonstrate use of website.	Share tips on website navigation.	Intervener provides positive feedback and individualized attention.
	A face-to-face meeting will be held to optimize successful use of the intervention	Participants	Practice use of website. Develop comfort level in using website.	Interact with intervener and peer group.	Receive support from intervener. Provide and receive support from peer group of other participants
Session 1	Your blood cholesterol, diet, and health	Website links	Provide information that will assist participants to increase their knowledge of how diet affects cholesterol level and risks of elevated cholesterol. Assist participants in preparing for self-monitoring and goal setting by providing dietary current		Two-part Mayo Clinic quiz allows participants to assess their knowledge about cholesterol and receive non-judgmental feedback.

Time frame	Goal	Sources of self-efficacy enhancement	Source of Self Efficacy		
			Performance accomplishment	Modeling	Social persuasion
			recommendations.		
		Intervener	Email participants their cholesterol levels. Begin discussion on strategies for dietary change.	Interact with participants via email and discussion. Provide participants with sample goals.	Provide feedback to participants on their goals. Interact with participants in discussion on successful strategies. Monitor peer group interaction. Provide questions and comments to stimulate peer group interaction.
		Participants	Visit website links to increase their knowledge of cholesterol and apply to their individual situation. Participants begin self-monitoring. Email goals for session to intervener.	Interact with intervener via email to establish goals. Share Interventioneriences with intervener and peer group in discussion.	Receive positive feedback via email from intervener on submitted goals. Discussion on successful dietary strategies with intervener and peer group will provide social persuasion

Time frame	Goal	Sources of self-efficacy enhancement	Source of Self Efficacy		
			Performance accomplishment	Modeling	Social persuasion
					for current effort and incentive for future goal setting.
Session 2	Choosing the right diet	Website links	Provide information on assessing personal risk, choosing the correct diet, and tips for following diet.	Interactive NHLBI link that allows participants to assess individual risks and select appropriate diet based on risk factors and current LDL level. Receive individualized feedback on recommended daily caloric and fat intake.	
		Intervener	Using email reinforce participants' performance accomplishments from participation in email and discussion in Session 1.	Begin and participate in discussions on how to change current diet to desired one and how to enlist support for efforts from others. Provide examples of strategies used in making dietary changes and enlisting the support of family	Provide feedback and support via email to participants on the previous session's goals. Assist, as needed, in establishing new short-term goals that can be met within session

Time frame	Goal	Sources of self-efficacy enhancement	Source of Self Efficacy		
			Performance accomplishment	Modeling	Social persuasion
				and friends.	timeframe.
		Participants	Visit website links. Use website interactive tools and personal information on their lipid profiles to identify appropriate diet. Evaluate Session 1 goals. Send Session 2 goals to intervener.	Choose the right diet using interactive tool. Share prior experiences with intervener and peer group through participation in discussion.	Provide and receive feedback from intervener and peer group on strategies for change and enlisting support of family and friends using email and discussion.
Session 3	Fats and cholesterol – adjusting your diet	Website links	Provide information on different types of fat, and trans-fatty-acids. Interactive exercise provides practice in reading food labels. Identify fat content of different grades of meat. Calculate serving size, comparing recommended versus actual.		Provide suggestions to assist in meeting dietary goals.
		Intervener	Reinforce performance	Begin discussions on	Provide positive

Time frame	Goal	Sources of self-efficacy enhancement	Source of Self Efficacy		
			Performance accomplishment	Modeling	Social persuasion
			accomplishments from prior sessions. Email feedback on goals and goal evaluation.	portion size and substituting for fats. Provide examples that have been used successfully, i.e. using a smaller plate for portion sizes, using applesauce instead of oil in baking.	reinforcement for participation. Give feedback on goals and goal evaluation. Monitor discussions and interject questions or comments if needed to stimulate interaction.
		Participants	Review feedback from intervener on prior performance accomplishments. Participate in reading food labels and portion activities. Review information on types of fat and substitution. Evaluate Session 2 goals. Email intervener	Share strategies for controlling or monitoring portion sizes in discussion. Discuss methods of reducing fat content in food preparation.	Receive reinforcement from intervener for participation and progress. Provide and receive feedback from peer group through participation in discussions.

Time frame	Goal	Sources of self-efficacy enhancement	Source of Self Efficacy		
			Performance accomplishment	Modeling	Social persuasion
Session 4	<u>Eating Out</u>	Website links	Session 3 goals. Provide information on following diet when eating in restaurants or at social events.		
		Intervener	Reinforce performance accomplishments from prior sessions. Email feedback on goals and goal evaluation.	Suggest restaurants that offer low-fat choices, or allow substitution. Begin discussion on strategies to stick to diet while eating out i.e. ordering appetizer portion, or eating a salad before going out.	Provide positive reinforcement for participation. Give feedback on goals and goal evaluation. Monitor discussions and interject questions or comments if needed to stimulate interaction.
		Participants	Review feedback from intervener on prior performance accomplishments. Evaluate Session 3 goals. Email intervener	Share restaurant recommendations with peer group in discussion. Discuss methods used in maintaining diet while eating out.	Receive reinforcement from intervener for participation and progress. Provide and receive support and

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Time frame	Goal	Sources of self-efficacy enhancement	Source of Self Efficacy		
			Performance accomplishment	Modeling	Social persuasion
			Session 4 goals. Review information on eating out.		encouragement from peer group through participation in discussions.
Session 5	Putting it all together	Website links	Provide interactive resources for dietary planning and evaluation. Gives information on cooking for low cholesterol. Introduces the role of physical activity in cholesterol reduction.		
		Intervener	Reinforce performance accomplishments from prior sessions. Email feedback on goals and goal evaluation. Prepare participants for end of intervention.	Provide assistance to participants' in using the interactive Create a Diet and Interactive Menu Planner. Begin discussions on avoiding feelings of deprivation and rewarding yourself.	Suggest participants may want to share email addresses with each other so they may continue to provide and receive support from peer group after the completion of the intervention.

Time frame	Goal	Sources of self-efficacy enhancement	Source of Self Efficacy		
			Performance accomplishment	Modeling	Social persuasion
		Participants	Review feedback from intervener on prior performance accomplishments. Evaluate Session 4 goals. Email intervener Session 5 goals. Review information dietary planning and evaluation. Apply strategies to lifestyle.	Share strategies for avoiding feelings of deprivation. Respond to strategies suggested by peer group. Discuss methods of self reward for positive dietary changes.	Receive reinforcement from intervener for participation and progress. Provide and receive support and encouragement from peer group through participation in discussions. Provide contact information to peer group for continued support following conclusion of intervention.
Session 6	What about Fiber and Supplements?	Website links	Provide information on the role of fiber in the diet		
		Intervener	Reinforce performance accomplishments from prior sessions. Email feedback on	Share strategies for increasing fruits and vegetables in the diet in discussion.	Provide positive reinforcement for participation. Give feedback on

Time frame	Goal	Sources of self-efficacy enhancement	Source of Self Efficacy		
			Performance accomplishment	Modeling	Social persuasion
			goals and goal evaluation.	Begin discussion on relapse and ways to get back on track.	goals and goal evaluation. Monitor discussions and interject questions or comments if needed to stimulate interaction. Reinforce participants ability to continue dietary changes upon completion of the intervention.
		Participants	Review feedback from intervener on prior performance accomplishments. Evaluate Session 5 goals. Review information dietary planning and evaluation. Apply strategies to lifestyle.	Share strategies for avoiding feelings of deprivation. Respond to strategies suggested by peer group. Discuss methods of self reward for positive dietary changes.	Receive reinforcement from intervener for participation and progress. Provide and receive support and encouragement from peer group through participation in

Time frame	Goal	Sources of self-efficacy enhancement	Source of Self Efficacy		
			Performance accomplishment	Modeling	Social persuasion
					discussions. Provide contact information to peer group for continued support following conclusion of intervention

Appendix B
Web Information Sources
(Control Group Website)

Session	Website Focus	Web Page Title	Web Address
1	Your blood cholesterol, diet, & health	What Makes Your Cholesterol High or Low?	http://rover.nhlbi.nih.gov/chd/why2.htM
		Mayo Clinic Cholesterol Quiz Part 1	http://www.Mayohealth.org/hoMe?id=QZ00046
		Mayo Clinic Cholesterol Quiz Part 2	http://www.Mayoclinic.coM/invoke.cfM?objectid=B722B58C-66B2-4258-9368DFBC3D4718D5
2	Choosing the right diet	Introduction to the Heart Healthy Diet	http://nhlbisupport.coM/cgi-bin/chd1/step1intro.cgi
		Introduction to the TLC Diet	http://rover.nhlbi.nih.gov/cgi-bin/chd/step2intro.cgi
		Checklist for Following a Cholesterol Lowering Diet	http://www.aMericanheart.org/presenter.jhtMl?identifier=108
		Comparing Meats	http://www.Mayohealth.org/hoMe?id=HQ00406&bucket=staged
		Cook for Lower Cholesterol I	http://216.185.112.5/presenter.jhtMl?identifier=516
			http://216.185.112.5/presenter.jhtMl?identifier=1510
3	Fats and Cholesterol – Comparing different types of fat	AHA General Dietary Guidelines for Fat, Saturated Fat, & Cholesterol	http://216.185.112.5/presenter.jhtMl?identifier=4776
		Trans Fatty Acids	http://www.aMericanheart.org/presenter.jhtMl?identifier=532
		Know Your Fats	http://rover.nhlbi.nih.gov/chd/Tipsheets/readthelabel.htM
		Reading Food Labels	http://rover.nhlbi.nih.gov/chd/FoodLabel/foodlabel.htM
		Food Level Activity	http://www.nhlbi.nih.gov/chd/visualreality/visualreality.htM
		Calculating Serving Size	

Session	Website Focus	Web Page Title	Web Address
4	Eating Out	Eating Out on the TLC Diet	http://www.nhlbi.nih.gov/chd/Tipsheets/diningout.htM
		Eating Right at Social Events	http://www.nhlbi.nih.gov/chd/Tipsheets/socialevents.htM
5	Putting it All Together	Interactive Menu Planner	http://hin.nhlbi.nih.gov/Menuplanner/Menu.cgi
		Checklist for Lowering Cholesterol	http://www.aMericanheart.org/presenter.jhtMl?identifier=514
		Cooking for Low Cholesterol	http://www.aMericanheart.org/presenter.jhtMl?identifier=515
6	What About Fiber and Supplements	Fiber	http://216.185.112.5/presenter.jhtMl?identifier=4574
		Eight Steps For Adding Fiber	http://www.Mayoclinic.coM/findinforMation/conditioncenters/invoke.cfM?objectid=07E90B30-4B75-4344-A5BC001808B56D0A
		Food Sources of Soluble Fiber	http://rover.nhlbi.nih.gov/chd/Tipsheets/solfiber.htM
		Fat Substitutes	http://216.185.112.5/presenter.jhtMl?identifier=4633
		Mayo Clinic Overview of Dietary Supplements	http://www.Mayohealth.org/hoMe?id=HB00018

Appendix C

Overview of Pilot Study

1. The investigator will recruit a convenience sample of 12 to 15 participants from the population of CCM employees.

2. The Investigator will explain to the participants that this study is a preliminary study of the questionnaires and website to be used in a future study. Participants will be asked to complete the 4 study questionnaires and to participate in the 6 sessions that comprise the Internet intervention. This will occur over a 2-week period.

3. Participants will then complete a written evaluation of the questionnaires and the website intervention. Questionnaires will be evaluated for understanding and level of difficulty completing and submitting online. Website will be evaluated for content usefulness and ease in navigation.

4. A 60-minute focus group will be conducted with pilot study participants. Using a semi-structured interview the investigator will lead the focus group in a discussion of the strengths and weaknesses of the website.

5. Information from the written evaluation and focus groups will be evaluated. Any areas for change identified will be discussed with the investigator's committee, and implemented following committee approval.

6. Revisions will be incorporated prior to the intervention study.

Appendix C
Website Evaluation

Thank you for participating in the pilot study of a website for dietary management of cholesterol. Please take a few moments to answer the following questions on the use of the website. Your answers will be used to improve the website so that it will be more effective in assisting people in making dietary changes.

1. Describe any difficulties you might have experienced in accessing the website or any of its components.
    a) website

    b) questionnaires

    c) information links

    d) private mail

    e) discussions

2. How helpful did you find the following parts of the website?
    a) information links

    b) interactive parts of the information links
        1. cholesterol quiz

        2. calorie and fat gram calculations

        3. portion size exercise

        4. meal planner

3. What suggestions do you have for improving the website?

4. Other comments, suggestions, questions.

Appendix C

Focus Group Guide

Introduction:

Thank you for participating in the pilot study of the website intervention for dietary change and for coming to this discussion group today. My name is Claire Donaghy and I am a faculty member in the Nursing and Allied Health Department and a doctoral student at Rutgers, The State University of New Jersey. I am interested in talking to you about your Interventionerience in completing the questionnaires and participating in the website intervention during the past two weeks. Your input will assist me in identifying ways to improve the intervention.

With your permission, I would like to tape this discussion. My research assistant will operate the tape recorder so that I can focus my attention on the discussion. You will not be identified on the tape. The information on the tape will be typed and I will use it to identify ways to improve the intervention.

<div align="center">Questions</div>

1. Could you talk about your Interventionerience with logging on to the website. What problems did you encounter?

2. How did you solve these problems?

3. How long did it take you to complete the 4 questionnaires?

4. Were the questionnaires understandable? Easy to complete?

5. What were your Interventioneriences with the different sessions of the website? Let's discuss each session separately beginning with session 1.

    a) Did you have any trouble accessing the session or the links in the session?

    b) Were the information links helpful?

    c) Which link in this session was most helpful? Least helpful?

    d) Could you talk about the goals you set or would set for this session?

    e) Were the discussion topics relevant?

f) Did you find the discussion helpful?

g) Did you encounter any difficulties in using the private mail or discussion sections of the website?

h) Approximately how many times did you access the website?

(The above questions will be repeated for each session).

6. Did you follow other links from the links in the website?

7. Did you encounter any difficulties getting back to the intervention website?

8. What other comments do you have about this website?

Thank you for taking the time to participate in the pilot study and focus group. Your participation will improve the quality of this project.

Appendix D
Employee Letter & Email

Dear Fellow CCM Employee:

My name is Claire Donaghy and I am an Associate Professor of Nursing and Allied Health at CCM. I am also a student at Rutgers, The State University of New Jersey. I am writing to ask your help in a study on the use of the Internet in making dietary changes. This study is an effort to learn whether the Internet is an effective way to assist people in making positive dietary changes.

As a CCM employee you are eligible to participate. I am writing to tell you about this study and to encourage your participation. The administration at CCM has graciously given permission for me to conduct this study with CCM employees. However, your participation is voluntary and your decision on participation will not affect your employment status in any way.

The first part of this study involves completing four questionnaires that ask about you and your current eating habits. Results from the survey will be used to determine eligibility for the second part of the study. The second part of the study will be an Internet intervention. You may be asked to participate in the second part of this study. If so, you will again be contacted. Further information and instructions will be provided at that time.

Results from this study will be used to help nurses, nutritionists and other health care providers to design Internet-based programs to help people follow recommended dietary guidelines. By understanding what activities are helpful in adopting healthy eating habits nurses and other health care providers can do a better job in providing dietary counseling and support.

Approximately 30 minutes are required to complete these questionnaires. All information you give will be submitted directly to me and kept confidential. All results will be reported as summaries for the group of employees as a whole. No individual's answers will be identified. If you choose to participate please read, sign, and return one copy of the enclosed consent in the envelope provided. I will then send you information on completing the questionnaires online.

Please feel free to contact me at ███████████████, or extension ████ should you have any questions or comments about this study. Thank you for reading this and considering participation in the study.

Sincerely,

Claire Donaghy, Ph.D.(c), RN, APN C.
Associate Professor of Nursing, County College of Morris
Doctoral Candidate, Rutgers, The State University of New Jersey

CCM

COUNTY COLLEGE of MORRIS

June 2002

Dear CCM Employee:
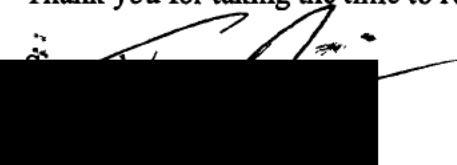
I am writing to inform you about a study on using the Internet to assist in dietary change that will be conducted at County College of Morris by one of your colleagues, Professor Claire Parise. This study is being conducted as part of the requirements for completion of the Doctor of Philosophy degree in Nursing at Rutgers, The State University of New Jersey.

The first part of the study requires about 30 minutes of your time to complete the on-line questionnaires. You are being asked to answer questions about your current eating habits. I would appreciate your completing this survey. All information submitted will be submitted directly to Professor Parise who will maintain the confidentiality of all information submitted.

Some of you may be asked to participate in the second part of the study. The second part tries to find out how we can support people in making dietary changes.

If you are interested in participating in the first part of this study, please read the attached letter from Professor Parise, which provides additional information.

Thank you for taking the time to read this letter and for giving consideration to this study.

Edward J. Yaw, Ed.D.
President

EJY:hb

Attachments

214 Center Grove Road • Randolph, New Jersey 07869-2086 • 973-328-5000
www.ccm.edu

Appendix D
Announcement for CCMemo

Research on Campus

Check your email and interoffice mail for an exciting announcement about a research project Claire Donaghy, an Associate Professor in the department of Nursing and Allied Health, will be conducting right here on campus. The study will be a dietary change project. All CCM employees age 20 and older are eligible to participate in the screening for this study that will use the Internet. Don't miss out! Check your mail or contact Claire at extension ▉▉ or ▉▉▉▉▉▉▉

Appendix E

ID#:

Date:

BASELINE PROFILE

The following questions pertain to food and eating related activities, and your medical history and background. The answers to these questions will provide information to describe the group of participants in this project.

Instructions: Please respond to the following questions by writing in the requested information, or selecting the answer that best describes you.

---

1. WHO **USUALLY** SHOPS FOR THE FOOD YOU EAT AT HOME?

   1. Self
   2. Spouse
   3. Parent
   4. Children
   5. Other household member
   6. Varies among household members _____
   7. Other, please specify

2. WHO **USUALLY** PREPARES THE FOOD YOU EAT AT HOME?

   1. Self
   2. Spouse
   3. Parent
   4. Children
   5. Other household member
   6. Varies among household members

7. ⌒ Other, please specify ⌐_____

3. HAVE YOU EVER TRIED TO MODIFY YOUR EATING HABITS (DIET) BEFORE NOW?

    1. ⌒ Yes

    2. ⌒ No - **If no, skip to question # 8.**

4. IF YOU ANSWERED YES TO # 3, *HOW MANY TIMES* HAVE YOU TRIED TO CHANGE YOUR DIET OR EATING HABITS?

    1. Please write in number. ⌐___

    2. Please give approximate date of most recent time. ⌐___

5. CHANGES IN YOUR EATING WERE MADE TO:

    1. ⌒ Lower cholesterol

    2. ⌒ Reduce weight

    3. ⌒ Reduce cholesterol & weight _____

    4. ⌒ Other, specify ⌐_____

6. YOU MET THE GOALS YOU SET THE LAST TIME YOU TRIED TO CHANGE YOUR EATING HABITS:

    1. ⌒ Not at all/never

    2. ⌒ Partially met/seldom

    3. ⌒ Moderately/sometimes (50% of the goals met, or met 50% of time)

    4. ⌒ Most of them met/over 70% of the time

    5. ⌒ Totally met the goals/always

7. HOW LONG DID THE CHANGE IN YOUR EATING HABITS LAST?

    1. ⌒ Less than 6 months

    2. ⌒ More than 6 months but less than a year

    3. ⌒ Over a year

8. ARE YOU SERIOUSLY CONSIDERING MAKING ANY CHANGES IN YOUR EATING HABITS IN THE NEXT FEW MONTHS?

1. ⌐ Yes - Specify ⌐_____

2. ⌐ No

9. IS ANOTHER MEMBER OF THE HOUSEHOLD ON A RESTRICTED OR SPECIAL DIET?

1. ⌐ Yes - See a and b below
   a. If yes, specify type of diet
   ⌐_____

   b. Please specify whom in household
   ⌐_____

2. ⌐ No

10. FROM WHOM HAVE YOU RECEIVED DIET EDUCATION/COUNSELING PREVIOUSLY? (Select all that apply)

1. ⌐ No one
2. ⌐ Dietitian
3. ⌐ Physician
4. ⌐ Nurse
5. ⌐ Commercial group (Weight Watchers, Jenny Craig)
6. ⌐ Family member

The next set of questions concerns your medical history.

11. HAVE YOU BEEN TOLD YOU HAVE HEART DISEASE?

1. ⌐ Yes - Specify date (year) ⌐_____

2. ⌐ No

12. IF POSSIBLE, SPECIFY THE TYPE OF HEART DISEASE YOU HAVE. (Select **all** that apply.)

1. ⌐ High blood pressure
2. ⌐ Angina

3. ☐ Heart attack

4. ☐ Post coronary bypass graft surgery

5. ☐ Cardiomyopathy (enlarged or weakened heart)

6. ☐ Post heart transplant

7. ☐ Post coronary angioplasty

8. ☐ Peripheral vascular disease

9. ☐ Carotid artery disease

10. ☐ Abdominal aortic aneurysm _____

11. ☐ Other, specify ☐

12. ☐ I have never been told I have heart disease

13. Has a close female relative (mother, sister, daughter) been diagnosed with coronary heart disease before age 65?

1. ○ Yes

2. ○ No

14. Has a close male relative (father, brother, son) been diagnosed with coronary heart disease before age 55?

1. ○ Yes

2. ○ No

15. HAVE YOU BEEN TOLD YOU HAVE ANY OF THE FOLLOWING CONDITIONS?

1. Diabetes

1. ○ Yes - See below

2. ○ No

If yes, age at time of diagnosis ☐

Specify type:

a. ○ Insulin dependent

b. ⌒ Non-insulin dependent

2. Thyroid condition

1. ⌒ Yes - See below
2. ⌒ No

If yes, are you taking medicine?

a. ⌒ Yes - Name of medicine ⌐‾‾‾‾‾‾‾‾‾‾‾‾‾‾
b. ⌒ No

3. Liver disease

1. ⌒ Yes
2. ⌒ No

4. Major surgery and/or illness (within past 6 weeks)

1. ⌒ Yes - See below
2. ⌒ No

If yes, specify type of surgery and/or illness
⌐

Specify approximate date of surgery and/or illness ⌐‾‾‾‾‾‾‾‾‾‾‾‾‾

5. Kidney disease

1. ⌒ Yes
2. ⌒ No

16. HAVE YOU BEEN TOLD YOU HAVE AN ELEVATED BLOOD CHOLESTEROL LEVEL?

1. ⌒ Yes - Specify approximate date when told ⌐‾‾‾‾‾‾‾
2. ⌒ No

17. DO YOU TAKE ANY MEDICINES TO LOWER YOUR CHOLESTEROL
LEVEL?

    1. ⊙   Yes

    2. ⊙   No

18. PLEASE SELECT ANY OF THE MEDICINES ON THE FOLLOWING
LIST THAT YOU CURRENTLY TAKE.

    1. ☐   None **Skip to Question # 23.**

    2. ☐   Questran (cholestyramine)

    3. ☐   Colestid (colestipol)

    4. ☐   Niacin/Nicobid (nicotinic acid)

    5. ☐   Mevacor (ovastatin)

    6. ☐   Pravachol (pravastatin)

    7. ☐   Zocor (simvastatin)

    8. ☐   Lopid (gemfibrozil)

    9. ☐   Fish Oil (omega -3 fatty acids)

    10. ☐   Lipitor (atorvastatin)

    11. ☐   Lescol (fluvastatin) _____

    12. ☐   Other, specify ⌐

19. HOW OFTEN DO YOU FORGET TO TAKE YOUR
CHOLESTEROL MEDICATION?

    1. ⊙   Always

    2. ⊙   Frequently

    3. ⊙   Once in awhile

    4. ⊙   Rarely

    5. ⊙   Never

20. ARE YOU CARELESS AT TIMES ABOUT TAKING
YOUR CHOLESTEROL MEDICATION?

    1. ⊙   Always

    2. ⊙   Frequently

3. ⌒ Once in awhile

4. ⌒ Rarely

5. ⌒ Never

21. WHEN YOU FEEL BETTER, DO YOU SOMETIMES
STOP TAKING YOUR CHOLESTEROL
MEDICATION?

1. ⌒ Always

2. ⌒ Frequently

3. ⌒ Once in awhile

4. ⌒ Rarely

5. ⌒ Never

22. SOMETIMES IF YOU FEEL WORSE WHEN YOU
TAKE YOUR CHOLESTEROL MEDICATION, DO
YOU STOP TAKING IT?

1. ⌒ Always

2. ⌒ Frequently

3. ⌒ Once in awhile

4. ⌒ Rarely

5. ⌒ Never

23. DO YOU USE ANY OVER THE COUNTER PRODUCTS TO LOWER
YOUR CHOLESTEROL LEVEL (such as metamucil, Vitamin B6/niacin)?

1. ⌒ Yes - Specify ⌐￣￣￣￣￣￣￣￣￣￣

2. ⌒ No

24. IF FEMALE, DO YOU TAKE HORMONE REPLACEMENT THERAPY

1. ⌒ Yes

2. ⌒ No - **If no, skip to question # 26.**

3. ⌒ Does not apply (male) - **Skip to question # 26.**

25. IF YOU TAKE HORMONE REPLACEMENT THERAPY, DO YOU TAKE?
(select one)

1. ⌒ estrogen (Premarin)

2. ⌒ estrogen (Premarin) and progesterone (Provera)

26. DO YOU CONSIDER YOURSELF: (select one)

1. ⌒ Sedentary (no regular physical activity)

2. ⌒ Moderately active

3. ⌒ Active (exercise for 30 minutes or more at least 3 times/week)

27. DOES YOUR OCCUPATION PRIMARILY INVOLVE THE FOLLOWING TYPE OF ACTIVITY? (select one)

1. ⌒ Desk type work through most of day (sitting)

2. ⌒ Physical activity through most of day (walking)

3. ⌒ Manual labor (heavy physical work)

28. ARE YOU (select one)

1. ⌒ A current smoker? - **Skip to question # 30.**

2. ⌒ A former smoker?

3. ⌒ Have never smoked. - **Skip to question # 31.**

29. IF YOU ARE A FORMER SMOKER,

1. How many years did you smoke? Specify number

2. On average, how many cigarettes per day? Specify number

3. When did you quit smoking? Specify year

30. IF YOU ARE A CURRENT SMOKER

1. How many cigarettes per day do you smoke? Specify number

2. How many years have you smoked? Specify number

This last set of questions concerns information about your background that will be used to describe the group of participants, not individuals:

31. DATE OF BIRTH

32. GENDER:

1. ◌ Female
2. ◌ Male

33. RACE:

1. ◌ White
2. ◌ African American
3. ◌ Asian/Pacific Islander
4. ◌ Hispanic
5. ◌ Native American _____
6. ◌ Other, specify |

34. MARITAL STATUS:

1. ◌ Never Married
2. ◌ Married
3. ◌ Widowed
4. ◌ Separated
5. ◌ Divorced

35. EMPLOYMENT STATUS:

1. ◌ Working full time
2. ◌ Working part time

36. EDUCATION: (Select the highest year of school you have completed)

Grade School	High School	College	Post Graduate
◌ 1	◌ 09	◌ 1	◌ 1
◌ 2	◌ 10	◌ 2	◌ 2
◌ 3	◌ 11	◌ 3	◌ 3
◌ 4	◌ 12	◌ 4	◌ 4
◌ 5			◌ 5

↰ 6   ↰ 6
↰ 7
↰ 8

37. WHAT IS THE HIGHEST DIPLOMA OR DEGREE YOU HAVE
EARNED? (circle one)

1. ↰ None

2. ↰ H.S. Diploma/GED

3. ↰ Associate Degree or Technical Diploma

4. ↰ Bachelor's Degree

5. ↰ Master's Degree

6. ↰ M.D., PhD, Other Doctoral Degree

7. ↰ Other, specify _____

38. PLEASE CIRCLE THE CATEGORY THAT BEST DESCRIBES YOUR
TOTAL FAMILY INCOME BEFORE TAXES.

1. ↰ Less than $15,999

2. ↰ Between $16,000 and 29,999

3. ↰ Between $30,000 and 43,999

4. ↰ Between $44,000 and 63,999

5. ↰ $64,000 or more

6. ↰ Don't know

39. NUMBER OF PERSONS LIVING IN THE HOUSEHOLD
(Specify the number on the line before each category. If none, write
in "0".)

_____ Spouse/partner/companion

_____ Children

_____ Parents

_____ Other relatives

_____ Non-relatives

Thank you for taking the time to fill in these responses.

Appendix F

DATE: ⌐‾‾‾‾‾

DHS

Several questions follow about your food choices and eating habits. **Please respond to the questions according to what *you have been doing, NOT what you have been told to do*.** This information will be helpful to us in guiding you to make the best food choices and develop food habits good for your health.

Instructions :
Please answer the questions by PLACING AN X IN THE CHECKBOX IN FRONT of the response(s) which best describes what you eat or do. You may place an x in front of more than one item. Please do not skip any questions.

MEAT, FISH AND POULTRY

---

1. Which type of ground beef do you usually eat?

    ☐ Regular hamburger (30% fat)

    ☐ Lean ground beef (25% fat)

    ☐ Extra lean/ground chuck (20% fat)

    ☐ Super lean/ground round (15% fat)

    ☐ Ground sirloin (10% fat)

2. Which best describes your typical lunch?

    ☐ Cheeseburgers, typical cheeses, egg dishes
       (egg salad, quiche, etc.)

☐ Sandwiches (lunch meat, hot dog, hamburger, fried fish, etc.) or entree of meat or chicken (plain or fried)

☐ Tuna sandwich, fish entree (not fried), entree with small bits of chicken or meat in a soup or casserole

☐ Peanut butter sandwich, tuna sandwich with fat-free mayonnaise

☐ Salad, yogurt, cottage cheese, vegetarian dishes (without high-fat cheeses or egg yolk)

3. Place an X in the checkboxes of all of the choices that reflect the entree at your main meal.

☐ Cheese (cheddar, Jack, etc.) eggs, liver, heart, brains *once a week a more*.

☐ Beef, lamb, pork, or ham *once a week or more*

☐ Very lean red meat (top round or flank steak), veal, venison, or elk *once a week or more*

☐ Chicken, turkey, rabbit, crab, lobster or shrimp *twice a week or more*

☐ Fish, scallops, oysters, clams, or meatless dishes containing no egg yolk or high fat cheese *twice a week or more*

4. Estimate the number of ounces of meat, cheese, fish and poultry you eat in a day. *Include all meals and snacks.* To guide you in your estimate:

4 strips of bacon = 1 oz.	**1 chicken thigh**	= **2-3 oz.**
1 small burger patty = *1/2 oz.*	*3-4chicken oz.breast*	= *3 oz.*
meat in most sandwiches = *1 oz.*	*1 average 2-3T-bone oz.steak*	=*8 oz.*
1 slice cheese = 1 oz.	*1-inch cube cheese*	= *1 oz.*
fish 3x4 inch = *3 oz.*		

serving

☐ Eleven or more ounces

☐ Nine to 10 ounces a day

☐ Six to 8 ounces a day

☐ Four to 5 ounces a day

☐ Not more than 1 ounce of cheese, or 3 ounces of red meat, poultry, shrimp-crab, or lobster, or not more than 6 ounces of fish, clams, oysters, scallops a day

5. Which of these have you eaten in the past month?

☐ Bacon, sausage, bologna and other meats or pork weiners

☐ Canadian bacon, turkey wieners

☐ Turkey ham and other poultry lunch meats

☐ Soy products (breakfast links)

☐ **None**

DAIRY PRODUCTS AND EGGS

---

6. Which kind of milk do you usually use for drinking or cooking?

☐ Whole milk

☐ Two percent milk

☐ One percent milk, buttermilk

☐ Skim milk, nonfat dry milk or **none**

7. Which toppings do you use?

☐ Sour cream (real or imitation including IMO), whipped cream

☐ Light sour cream

☐ Nondairy toppings (Cool Whip or Dream Whip)

☐ Regular cottage cheese, whole milk yogurt

⌐   Low-fat cottage cheese, nonfat or low-fat yogurt
or **none**

8.   Which frozen desserts are you most likely to eat at
least once a month?

⌐   Ice cream

⌐   Ice milk, most soft ice cream, Tofutti, frozen
yogurt (cream added)

⌐   Sherbet, low-fat frozen yogurt, Lite Tofutti

⌐   Nonfat frozen yogurt, sorbet, ices, popsicles,
or **none**

9.   Which kind of cheese do you use for snacks or
sandwiches?

⌐   Cheddar, Swiss, Jack, Brie, Feta, American,
cream cheese, regular cheese slices or
cheese spreads

⌐   Part-skim mozzarella, Lappi, light cream cheese
or Neufchatel, part-skim Cheddar (Kraft Light,
Green River, Olympia's Low Fat or Heidi Ann
Low-Fat Ched-Style Cheese)

⌐   Low-cholesterol "filled" cheese (Scandic Mini
Choi, Hickory Farms Lyte or imitation mozzarella)

⌐   No cheese, fat-free cheese, Lite part-skim
mozzarella, low-fat ricotta, reduced calories
Laughing Cow, Dorman's Light Weight Watchers or
the Lite-line series of cheeses

10.   Which kind of cheese do you use in cooking (casseroles,
vegetables, etc.)?

⌐   Cheddar, Swiss, Jack, Brie, Feta, American,
cream cheese, processed cheese

⌐   Part-skim mozzarella, Lappi, light cream
cheese, part-skim Cheddar (Green River,
Olympia's Low Fat, Kraft Light or Heidi
Ann Low-Fat Ched-Style Cheese)

⌐   Low-cholesterol "filled"cheese (Scandic
Mini Chol, Hickory Farms Lyte or imitation
mozzarella)

┌ No cheese, fat-free cheese, lite part-skim mozzarella, low-fat ricotta, Dorman's Light Weight Watchers or the Lite-line series of cheeses

11. Check the checkbox next to the type and number of "visible" eggs you eat. (This means eggs such as scrambled, boiled, not eggs as part of ingredients, like in a cake)

┌ Six or more whole eggs a week

┌ Three to five whole eggs a week

┌ One to two whole eggs a week

┌ One whole egg a month

┌ Egg white, egg substitute such as Egg Beaters, Scramblers, Second Nature, **none**

12. Check the checkbox next to the type of eggs usually used in food prepared at home or bought in grocery stores

┌ Whole eggs or mixes containing whole eggs (complete pancake mix, slice-and-bake cookies, etc.)

┌ Combination of egg white, egg substitute, and whole egg

┌ Egg white, egg substitute or **none**

FATS AND OILS

13. Which kinds of fats are used most often to cook your food (vegetables, meats, etc.)?

┌ Butter, shortening (all brands except Crisco or Fluffo) or lard, bacon grease, chicken fat, or eat in restaurants at least 4 times a week.

┌ Soft shortening (Crisco or Fluffo) or inInterventionensive stick margarine (remains hard at room temperature)

┌ Tub or soft-stick margarine, vegetable oil

(including olive oil)

☐ **None** or use nonstick pan or spray

14. How much of these "added" fats do you eat in the typical day: peanut butter, margarine, mayonnaise, or salad dressing (including those made with olive oil)?

Examples of amounts people often eat:

on toast	-2 tsp. margarine
on salads	-12 tsp. salad dressing (don't include low cal/fat free dressing
on sandwiches	-6 tsp. mayonnaise -6 tsp. peanut butter -2 tsp. margarine
on potatoes, vegetables, pasta, rice	-3 tsp. margarine

☐ Ten teaspoons or more

☐ Eight to 9 teaspoons

☐ Six to 7 teaspoons

☐ Four to 5 teaspoons

☐ Three teaspoons or less

15. How often do you eat potato chips, corn, tortilla chips, fried chicken, fish sticks, french fries, doughnuts, other fried foods, croissants or danish pastries?

☐ Two or more times a day

☐ Once a day

☐ Two to 4 times a week

☐ Once a week

☐ Less than twice a month

16. Which best describes the amount of margarine, peanut butter, mayonnaise, or cream cheese that you put on breads, muffins, bagels, etc.?

⌐ Average (1 teaspoon or more per serving)

⌐ Lightly spread (can see through it)

⌐ "Scrape" (can barely see it)

⌐ None

17. What kind of salad dressings do you use?

⌐ Real mayonnaise

⌐ Miracle Whip, Ranch, French, Roquefort, Blue Cheese, and vingear and oil dressings

⌐ Light mayonnaise, Miracle Whip Light, Thousand Island dressing

⌐ Russian and Italian dressings, Ranch salad dressing made with buttermilk and light mayonnaise or Miracle Whip Light

⌐ Fat-free (mayonnaise, Miracle Whip or salad dressing), low-calorie dressing, vinegar, lemon juice, Ranch salad dressing made with buttermilk an low-fat yogurt or use no salad dressing

SWEETS AND SNACKS

18. How often do you eat dessert or baked goods (sweet rolls, doughnuts, cookies, cakes, etc.)?

⌐ Three or more times a day

⌐ Two times a day

⌐ Once a day

⌐ Four to 6 times a week

⌐ Three or 4 times a week or less

19. Which of the following are you most likely to select as a dessert choice?

⌐ Croissants, pies, cheesecake, carrot cake

⌐ Typical cakes, cupcakes, cookies

⌐ Low-fat muffins, dessert from low-fat cookbooks

⌐ Fruits, low-fat cookies (fig bars and ginger snaps), angel food cake or **none**

20. Which snack items are you most likely to eat in an average month?

⌐ Chocolate

⌐ Potato chips, corn or tortilla chips, nuts, party/snack crackers, doughnuts, French fries, peanut butter, cookies

⌐ Lightly buttered popcorn (1 tsp. for 3 cups), pretzels, low-fat crackers (soda, graham), "home" baked corn chips, low-fat cookies (gingersnaps, fig bars)

⌐ Fruit, vegetables, very low-fat snacks, or **none**

GRAINS, BEANS, FRUITS AND VEGETABLES

For questions # 21 through 25, write in the number of pieces, cups or servings per day.

21. How many pieces of fruit or cups of fruit juice do you consume a day (not "fruit-flavored" drinks)?

⌐ pieces of fruit/day

⌐ cups of juice/day

22. How many cups of vegetables do you eat a day (tossed salad, cooked vegetables, etc)?

A typical serving size for tossed salad is 1 to 1 1/2 cups.

⌐ cups/day

23. How many cups of legumes do you eat a week (refried beans, split peas, navy beans, lentils, chili, etc.)?

☐ cups/week

24. How many servings of cereal, bread, crackers and popcorn do you eat each *week*? A typical cereal bowl holds 1 1/2 to 2 cups and people typically eat 9 to 12 cups of popcorn. In the right column, list the number of servings you eat per *week*.

In TEXTBOX, place the number of servings eaten per WEEK

cooked cereal	☐	half-cups/week
ready-to-eat cereal	☐	cups/week
slice of bread or toast	☐	slices/week
English muffin	☐	halves/week
four-inch pancake	☐	pancakes/week
hamburger bun	☐	halves/week
Pita or pocket bread	☐	halves/week
six-inch tortilla	☐	tortillas/week
dinner or hard roll	☐	rolls/week
slices of French bread	☐	slices/week
small piece of cornbread	☐	pieces/week
bagel	☐	halves/week
muffin	☐	muffins/week

low-fat crackers (5 per serving)   ⌐‾ servings/week

plain popcorn (3 cups per serving)   ⌐‾ servings/week

pretzels   ⌐‾ cups/week

                              Total ⌐‾ servings/week

25. How many servings of grains and potatoes do you eat each *week*?

In TEXTBOX, place the number of servings eaten per WEEK

macaroni, spaghetti and other pasta   ⌐‾ cups/week

mashed potato   ⌐‾ cups/week

baked potato   ⌐‾ large potato/week

rice, corn,bulgur, barley and other grains ⌐‾ cups/week

BEVERAGES

26. Which of the following reflects your habits regarding alcoholic beverages?

1
drink = 12 ounces beer
         1 1/2 ounces
     whiskey, gin, rum, etc.
         4 ounces wine
         1 ounces liqueur

○   One or more drinks *a day*

○   Four to 6 drinks *a week*

○   Three drinks *a week*

○   One to 2 drinks *a week*

○   **None** or less than one *a week*

27. Which of the following reflects your habits regarding soda pop, sweetened seltzers, fruit punch, etc.? (Do not include diet drinks.)

12 ounce can	1 1/2 cups
16 oz. bottle	2 cups
32 oz. bottle	4 cups

- ○ One or more cups a day or 7 cups *a week*
- ○ Four to 6 cups *a week*
- ○ Three cups *a week*
- ○ One to 2 cups *a week*
- ○ None or less than one cup *a week*

28. How much caffeinated coffee do you drink?

- ○ Six or more cups *a day*
- ○ Four to 5 cups *a day*
- ○ One to 3 cups *a day*
- ○ **None** or less than 1 cup *a day*

SALT
---

29. Which type of "salt" do you normally use?

- ○ Regular salt, sea salt, flavoring salts (garlic, onion, celery salt), regular soy sauce
- ○ Combination of regular and reduced sodium salts
- ○ Lite salt, lower-sodium soy sauce, reduced-sodium flavoring salts
- ○ **None** or salt substitute (100% potassium chloride)

30. How often do you add salt to your food at the table?

○ Always

○ Frequently

○ Occasionally

○ Never

31. Which type of salt and how much do you use in cooking potatoes, rice, pasta, vegetables, meat, casseroles and soups?

○ Regular salt (typical amount) or eat in restaurants 4 or more times a week

○ Regular salt (1/2 typical amount) or Lite Salt (typical amount)

○ Lite Salt (1/2 typical amount)

○ None or salt substitute

32. Which type of cereals do you use?

○ Typical dry cereals (sweetened or unsweetened) or cereals cooked with regular salt (typical amount)

○ Combination of typical dry cereals and salt-free cereals (Shredded Wheat, Puffed Wheat, Puffed Rice) or cereals cooked with regular salt (1/2 typical amount) or Lite Salt (typical amount)

○ Salt-free dry cereals or cereals cooked with salt substitute or without salt or do not eat cereal

33. How often do you use typical canned, bottle, or packaged foods: salad dressing, ketchup, cured meats (lunch meat, ham, etc.), vegetables, soups (remember chicken broth), chili, entrees and sauces?

○ More than 15 times a week or eat in restaurant 4 or more times a week

○ Ten to 14 times a week

○ Six to 9 times a week

○ Five times a week or less

RESTAURANTS AND RECIPES

---

34. How often do you eat breakfast at a restaurant?

○ More than twice *a week*

○ Twice *a week*

○ Once *a week*

○ Less than once *a month or never*

35. How often do you eat lunch at a restaurant?

○ Daily

○ Five days *a week*

○ Two to four days *a week*

○ One day *a week*

○ Less than once *a month or never*

36. How often do you eat dinner at a restaurant?

○ More than 3 times a week

○ Two to 3 times a week

○ Once a week

○ Once or twice a month

○ Less than once a month or never

37. Check the choices you make when eating in restaurants.

☐ Select restaurants that offer low-fat choices and order those choices.

☐ Order toast, muffins, cereal, pancakes, waffles for breakfast.

☐ Order soup (not cream), salad or other meatless, cheese-less entrees for lunch.

☐ When ordering pizza choose vegetarian.

⌐ Avoid cheese, eggs, bacon bits on salads and avoid potato & macaroni salads.

⌐ Put garbanzo or kidney beans on salad at the salad bar.

⌐ Use a very small amount of salad dressing.

⌐ Order a fish, shellfish, chicken, or lean red meat entree (but not fried).

⌐ Use no more than 1 pat of margarine at any meal.

⌐ Order fruit, sorbet, sherbet, frozen yogurt or skip dessert.

(0-1 checks = 1; 2-3 checks = 2; 4-5 checks =3; 6-7 checks =4; 8-10 checks, or eat out less than once a month = 5)

38. How often do you eat foods made using low-fat recipes?

○ Once a month or less

○ One to 2 times a week

○ Three to 4 times a week

○ Five to 6 times a week

○ Everyday

39. How satisfied are you with your current diet?
(Please rate your response on a scale of 1-5.)

○ 1 **Least satisfied**

○ 2

○ 3

○ 4

○ 5 **Most satisfied**

Thank you for taking the time to answer the questions and fill in the requested information. Please click on the submit button below. | Submit | | Clear |

SCORING THE DIET HABIT SURVEY FOR RESEARCH STUDIES

Scoring the questions:
The score for questions 1-20, 26-36, 38, 39 and 40 is the number corresponding to the option selected, If more than one option is selected, the score is the <u>average</u> of the options selected.

For example, with respect to question 5, if a patient circled <u>1</u> bacon, sausage and also circled <u>5</u> Garden Sausage, the score is: 1 + 5=6 divided by 2 = 3.0.

The score for questions 21-23 is 5 points per serving <u>per day</u>.

To make it easier for people to answer question 24, we have them estimate for a week and we have divided the foods into two groupings. For the top group, the score is number of servings x 8.5 divided by 7 (number of servings x 1.2). For the bottom group the score is the number of servings x 5 divided by 7 (number of servings x 0.7).

The score for question 25 is 10 per cup of mashed potato, macaroni, spaghetti and other pastas divided by 7 (number of cups x 1.5), and 15 per large baked potato or cup of rice, corn, bulgur, barley and other grains divided by 7 (number of servings x 2).

The scoring for question 37 is provided on that question.

Interventionress each score to one decimal place (3.3, 5.0, etc).

Summary Scores for **THE DIET HABIT SURVEY:**
The questions have been grouped into 6 summary scores: cholesterol-saturated fat score (questions 1-20), carbohydrate score (questions 21-25), beverage score (questions 26-28), salt score (questions 29-33). restaurant and recipe score (questions 34-38). seafood score (questions 39-40) and a total score.

The summary and total scores are categorized into the present U.S. (37% fat) and four lower fat 4iets (30% fat, 25% fat, 20% fat, 10% fat).

The nutrient composition associated with these diets is also provided.

Examples are given for two calorie levels: one for 2000 Calories (women/children) and one for 2800 Calories (men/teens).

One example of using scores from THE DIET HABIT SURVEY In a research study. In the Family Heart Study, the diet of each participant was categorized using THE DIETHABIT SURVEYscores as eating 37% fat (the present US diet) or one of three lower fat diets --30% fat, 25% fat, or 2O% fat using the cholesterol-saturated fat score. The participant's diet was also categorized using the carbohydrate score. If a participant's cholesterol-saturated fat score placed him/her in the 25% fat diet category and the carbohydrate score p/aced him/her in the 30% fat diet category, the participant was classified overall as eating a 30% fat diet The overall score was used in the analyses of the Family Heart Study data reported in the Journal of the Amencan Dietetic Association (92:41-47, 1992).

SCORES FOR 2000 CALORIES (WOMEN/CHILDREN)

Score fat	Present U.S. Diet	Lower-Fat Diets 30% fat	25% fat	20% fat	10%
Cholesterol-Saturated Fat	<61.0	61.0-71.5	71.6-88.0	88.1-110.0	110.1-115.0
Carbohydrate	<45.0	45.0-64.5	64.6-82.5	82.6-105.0	105.1-136.0
Beverages	<9.0	9.0-11.5	11.6-12.5	12.6-16.0	12.6-16.0
Salt	<14.0	14.0-16.5	16.6-21.0	21.1-25.0	21.1-25.0
Restaurants and Recipes	<13.0	13.0-15.5	15.6-19.0	19.1-25.5	25.6-28.0
Seafood	<5.0	5.0-6.0	6.1-7.5	7.6-10.0	7.6-10.0
TOTAL	<147.0	147.0 - 185.8	185.9-230.8	230.9-282.0	282.1-330.0

These total scores above correspond to a diet with the following nutrient composition:

Cholesterol, mg/day	400	<300	<200	<100	<75
Saturated fat, % calories	13	10	8	5	2
051*/day	49	37	28	16	8
Fat % calories	37	30	25	20	10
Carbohydrate, % calories	48	55	60	65	75
Protein, % calories	15	15	15	15	15
Sodium, mg/day	>2875	2875	2300	1725	1725
Potassium, mg/day	<2535	2535	3900	3900	3900

SCORES FOR 2800 CALORIES (MEN/TEENS)

Score	Present U.S. Diet 10%fat	Lower-Fat Diets 30% fat	25% fat	20%fat	
Cholesterol-Saturated Fat	<59.0	59.0-70.0	70.1-86.0	86.1-108.5	108.6-115.0
Carbohydrate	<70.0	70.0-95.5	95.6-126.5	126.6-166.5	166.6-195.0
Beverages	<9.0	9.0-11.5	11.6-12.5	12.6-16.0	12.6-16.0
Salt	<14.0	14.0-16.5	16.6-21.0	21.1-25.0	21.1-25.0
Restaurants and Recipes	<13.0	13.0-15.5	15.6-19.0	19.1-25.5	25.6-28.0

Seafood	<u><5.0</u>	<u>5.0-6.0</u>	<u>6.1-7.5</u>	<u>7.6-10.0</u>	<u>7.6-10.0</u>
TOTAL	**<170.0**	**170.0-215.3**	**215.4-272.8**	**272.9-342.0**	**342.1-389.0**

These total scores above correspond to a diet with the following nutrient composition:

Cholesterol, mg/day	500	<350	<220	<140	<100
Saturated fat, % calories	13	10	8	5	2
CSI*	67	49	36	23	10
Fat, % calories	37	30	25	20	10
Carbohydrate, % calories	48	55	60	65	75
Protein,% calories	15	15	15	15	15
Sodium, mg/day	>4025	4025	3220	2415	2415
Potassium, mg/day	<3549	3549	5460	5460	5460

<means "less than", > means "more than"

* CSI = Cholesterol-Saturated Fat Index (JADA 1989: 89:807-816)

Appendix G

NKQ

The questions that follow are about food habits and activities related to the selection and preparation of various foods.

Instructions: • **PLEASE SELECT THE RADIO BUTTON**
       OPTION NEXT TO THE ANSWER YOU
       SELECT.

       • **SELECT ONLY ONE ANSWER FOR**
         EACH QUESTION.

       • You many not know the answer to all of
         the questions.
         When you think you don't know the answer,
         it is okay to guess.

Sample question:

An eating pattern that includes many fatty foods

 ◯   1. will prevent the occurrence of a heart attack

 ◉   2. may lead to the development of heart disease

 ◯   3. will lead to weight loss

---

1. A cholesterol-lowering diet would:

 ◯   a. exclude all meat products

 ◯   b. limit cholesterol and fat containing foods

 ◯   c. include meat and fish but exclude dairy products

2. The **ingredients** on a food label are listed in:

 ◯   a. alphabetical order

 ◯   b. order of highest to lowest contribution
      to total fat calories

    c. order of their amount by weight with the
       heaviest listed first

3. The salad dressing with the lowest content of saturated
   fat is:

    a. roquefort dressing

    b. Thousand Island dressing

    c. Russian dressing

    d. vinegar and oil (vinaigrette)

4. Increasing the amount of starches eaten, such as whole
   breads, pasta (spaghetti, noodles, rigatoni), or rice, and
   thereby reducing the portion size of meat is one method
   of:

    a. reducing the cholesterol in the diet

    b. reducing the fat in the diet

    c. reducing the total calories

    d. all of the above

5. A lower fat choice at a fast food eating place might be:

    a. a deluxe hamburger and fries

    b. 2 plain hamburgers and a salad with Italian dressing

    c. a cheeseburger and glass of 2% milk

6. Which of the following cheese products would be lowest
   in saturated fat?

    a. brie cheese

    b. roquefort or bleu cheese

    c. swiss cheese

    d. part skim milk mozzarella cheese

7. The food product *lowest* in saturated fat is:

    a. margarine with partially hydrogenated cottonseed

and soybean oils

○ b. margarine with palm oil and partially hydrogenated cottonseed oil

○ c. margarine with liquid safflower oil, partially hydrogenated soy oil

8. The food *highest* in saturated fat is:

○ a. commercially prepared product, such as coffee cake, made with coconut oil or lard

○ b. peanut butter

○ c. plain omelet

9. Identify the food *highest* in polyunsaturated fat:

○ a. stick margarine

○ b. safflower oil

○ c. olive oil

10. Which of the following desserts has the lowest amount of fat?

○ a. a dish of ice cream

○ b. a slice of pound cake with fresh berries

○ c. a slice of angel food cake with a scoop of sherbet

11. A breakfast on a cholesterol-lowering diet might include:

○ a. sausage links, scrambled egg substitute, & fruit

○ b. cereal with 1% milk and fruit

○ c. "bought" bran muffins and yogurt

12. Which method of food preparation would result in the lowest amount of additional fat?

○ a. stir frying meat & vegetables in a wok

○ b. grilling meat on a gas grill

○ c. pan frying meat on the stove

13. A snack that is "heart-healthy" is:

    ○ a. a snack size (1oz) pkg. of tortilla or corn chips

    ○ b. a pkg. of 2 oatmeal raisin cookies

    ○ c. a dish of frozen yogurt

    ○ d. a 3 oz. pkg. of pretzels

14. A dinner acceptable on a cholesterol-lowering diet would include:

    ○ a. lobster tail, rice, salad, and rolls

    ○ b. veal cutlet, potatoes, salad, and rolls

    ○ c. pan frying meat on the stove

15. There are 3 main nutrients or components in our foods: carbohydrates (starches), fat, and proteins. Of these 3, which has the highest concentration of calories?

    ○ a. carbohydrates

    ○ b. fat

    ○ c. protein

16. Which of the following items on a menu would be **better** selections when following a cholesterol-lowering diet?

    ○ a. lasagna made with meat, salad, and garlic bread

    ○ b. a pasta salad made with pesto, salad, and sour dough bread

    ○ c. kielbasa, home fried potatoes, rye bread

    ○ d. grilled sirloin, baked potato, salad, bread

    ○ e. deep fried shrimp, steamed rice, salad

    ○ f. grilled chicken, rice, vegetables, rolls

    ○ g. none of the above

    ○ h. selections d and f

17. The recommendations for egg consumption is:

    ○ a. 3 per week, excluding eggs contained in foods such as

baked goods

○ b. 6 per week as long as they are "low cholesterol"

○ c. 3-4 per week including the eggs contained in other foods, such as cakes or breads

○ d. None of the above

18. Snacks acceptable on a cholesterol-lowering diet would be:

○ a. rye, crisp, melba toast, soda cracker, a bagel or English muffin

○ b. pretzels, air popped popcorn

○ c. granola cereal or bars, peanut butter-cheese snack crackers, Wheat-thins

○ d. All of the above

○ e. a and b

19. The recommended daily allowance of meats (such as beef & pork), poultry, and fish is:

○ a. 12 ounces per day

○ b. unlimited allowance of fish and poultry, with meat only once per week

○ c. 12 ounces per day as long as it is grilled or steamed, just not fried

○ d. 6 ounces per day

20. Eating foods high in fiber, such as bran muffins, or taking bran supplements:

○ a. will allow you to eat one serving per day of a food that otherwise would not be allowed, for example, a pastry or doughnut

○ b. will have no effect on your cholesterol level or dietary allowances

○ c. may lower your blood cholesterol level a small amount

21. Following a moderate exercise program can:

   a. burn calories and help prevent weight gain

   b. may have a positive effect on the blood cholesterol level

   c. both a and b

   d. neither a or b

22. Processed meats such as bologna, salami, sausage or hot dogs no longer contain "hidden fat" (fat not visible).

   a. True

   b. False

23. The skin on poultry should be removed prior to cooking.

   a. True

   b. False

24. Vegetable oils, such as coconut and palm oils, are sources of highly saturated fats.

   a. True

   b. False

25. Organ meats (liver, brain, sweetbread) are rich in cholesterol but may be eaten once per week.

   a. True

   b. False

26. Cutting down on the amount of saturated fat in the diet is a very important step in improving a diet and preventing heart disease.

   a. True

   b. False

27. Cholesterol is found in more than just foods of animal origin, (meat and dairy products).

   a. True

○ b. False

28. The recommended size for a serving of meat, poultry, or fish is approximately 3 ounces (the size of a deck of cards).

   ○ a. True

   ○ b. False

29. When making baked goods at home, it is possible to substitute oil for the egg yolks in a recipe and not affect the taste of the final product.

   ○ a. True

   ○ b. False

30. Some vegetables such as avocados may contain cholesterol.

   ○ a. True

   ○ b. False

31. Cocoa may be used as a low fat substitute for chocolate in recipes.

   ○ a. True

   ○ b. False

32. All vegetable shortenings and oils are acceptable on a cholesterol-lowering diet.

   ○ a. True

   ○ b. False

33. Eating a diet high in saturated fat may lead to the development of heart disease.

   ○ a. True

   ○ b. False

34. Once a person lowers his or her blood cholesterol level by dieting, it is okay to resume past eating patterns.

   ○

○ a. True

○ b. False

35. Following a low cholesterol, low fat diet can lower one's
    blood cholesterol level.

○ a. True

○ b. False

36. Taking a cholesterol-lowering medications allows one
    to eat an unrestricted diet in terms of fats, cholesterol,
    and calories.

○ a. True

○ b. False

37. It is next to impossible to follow a cholesterol-lowering
    diet when eating away from home, such as in restaurants,
    cafeterias, or fast food eating establishments.

○ a. True

○ b. False

38. When considering following a cholesterol-lowering diet for
    the long term, which do you think is correct?

○ a. It is okay to "cheat" on a diet once in awhile.

○ b. It is never okay to "cheat"

Instructions: For the remainder of the statements, please indicate
if you agree(A) or disagree(D) with **each** of the items
that follow the sentence (#39-42).

**Indicate your answer by typing in "A" or "D" in
the textbox in front of *each choice*.**

---

39. A diet that is low in fat and cholesterol (indicate A or D before
    a - d)

    a. is tasteless and boring

    b. requires a great deal of work in preparation

    c. is more Interventionensive to follow than a "regular" diet

    d. requires extra time for shopping

40. I think that following my diet (indicate A or D before a - c)

    a. helps lower my blood cholesterol

    b. helps prevent heart disease

    c. helps my overall health

41. When someone is taking a cholesterol-lowering medication, following the diet is (indicate A or D before a - c)

    a. very important

    b. less important

    c. not required

42. I believe that the cost and effort of following a cholesterol-lowering diet is (indicate A or D before a - d)

    a. generally, not worth the benefits it provides

    b. may be worth it for some individuals

    c. may be of some benefit to me

    d. may be a great benefit to me

Thank you very much for completing the answers to this survey.

Your Email address:

Submit   Clear

Appendix H

ID #: ⌐‾‾‾‾‾

Date: ⌐‾‾‾‾‾‾

CLDSES

Instructions:
Please think about each activity and respond in terms of how confident you are that you could carry out the activity described in each particular situation **IN THE NEXT THREE (3) MONTHS.** Show your level of confidence using a number from the scale of 0 - 100. Place your answer on the line next to each statement.

> **A scale of 0 -100 will be across the top of each of the following pages.**
>
> **A zero (0) means you are certain you could not do the activity (a 0% chance you could do it), and 100 means you are certain you could do the activity (100% chance you could do it). Please take a minute to read these helpful examples.**

EXAMPLE #1: You and your spouse invite friends and family for Thanksgiving dinner. You are reasonably confident that you could follow a low fat diet, if you eat only the foods prepared at home, but you are not confident you can resist a high fat dish brought by visiting family members or friends.

CONFIDENCE

Use a number between 0 & 100

(Let's say you are **70%** certain you would be able to follow a low fat diet for Thanksgiving. Therefore, your answer would be **70**, and **70** would go in the answer box.)

⌐‾‾‾‾‾
 70

EXAMPLE #2: You are going out to lunch with your coworkers to a restaurant with a varied menu. You are very confident that you will be able to make a selection from

the menu that will not jeopardize your
cholesterol-lowering diet.

(Let's say you are **90%** certain you would
be able to select a low fat dish. Therefore,
your answer would be **90**, and **90** would go

in the answer box.)

⌐ 90

EXAMPLE #3: You are having lunch with a
friend at a restaurant that specializes in fish,
even though you never eat fish. You are
absolutely certain you will not order fish for
lunch.

(Let's say you are **100%** certain you would not
order fish. Therefore, your answer would be **0**,

and **0** would go in the answer box.)

⌐ 0

PLEASE DO NOT SKIP ANY STATEMENTS
If a situation absolutely does not apply to you, write N/A
in the space.

0	10	20	30	40	50	60	70	80	90	100
Definitely					Maybe				Definitely	
could NOT do					50/50				could do	

**CONFIDENCE
(0-100)**

1. How confident are you that in the next three months you
   will be able to change your diet or eating habits so that

   you consume less fat and cholesterol?   ⌐

2. How confident are you that you will be able to
   adopt and continue for three months to eat a

   diet with a reduced fat and cholesterol content?   ⌐

3. How confident are you that you could limit
   snacks, desserts, or favorite high calorie or
   fattening foods when.....

   a. you are with friends and these foods are

      readily available?   ⌐

b. you are feeling anxious, stressed, or
under pressure?

c. you are feeling frustrated or tired?

d. you are feeling blue or depressed?

4. How confident are you that you limit the size of a
steak or hamburger to 3-5 ounces (the size of a
deck of cards) when.....

a. you are eating with your family in your home?

b. you are eating in your friend's home?

c. you are eating with friends in a restaurant?

5. How confident are you that you could select
fish from the menu when.....

a. you are eating in a restaurant on an ordinary
evening out for dinner?

b. you are having a workday lunch with
coworkers?

c. it is a special dinner since you are celebrating
a particular occasion?

6. How confident are you that you could resist
ordering a Big Mac or comparable food item
at another fast food restaurant when you
are feeling very hungry and in a hurry?

7. How confident are you that you could order
the grilled chicken sandwich at a fast food
establishment when you are feeling very
hungry?

8. How confident are you that you could resist

ordering french fries at a fast food restaurant
when you are feeling very hungry?

9.   How confident are you that you could order a
salad at a fast food restaurant when you are
feeling very hungry?

10.   How confident are you that you could resist
ordering dessert at a fast food restaurant when
you are feeling very hungry?

11.   You are having dinner at home on a very typical
day and have the food options available that are
listed below. How confident are you that you
could do the following activities in regard to
making selections for dinner...

    a.   select oil/vinegar, a clear Italian style
or vinaigrette dressing for your salad?

    b.   select nonfat, 1/2 % or 1 % milk to drink
with your dinner?

    c.   select sherbet instead of ice cream for

dessert?

12.   It is your day off and you are having a leisurely
breakfast at home. Assuming there are a variety
of foods available, how confident are you that
you could resist having a sweet roll or donut?

13.   You and your family are watching the football game
on television on a Sunday afternoon. Snacks,
including potato chips and pretzels, are brought
out for everyone. How confident are you that.....

    a. you could select pretzels to eat for a snack?

    b. you could resist eating the potato chips?

14. You and your spouse, or a close friend, are watching a Sunday Night Movie at home. You develop a craving for something sweet and the other person suggests ice cream. How confident are you that you could resist eating ice cream?

15. You come home from work feeling quite hungry and find out dinner will be delayed by an hour. You decide to have a snack to tide you over till dinner. You see there are some cheeses and fruit in the refrigerator. How confident are you that you.....

   a. could resist the cheese for a snack?

   b. could select the fruit for a snack?

16. You stopped to visit your parents on the way home from running several errands. You are feeling a little hungry and your mother offers a serving of cream pie or pound cake. How confident are you that you could resist eating the cake or pie?

17. You are attending a neighborhood barbecue and the host offers two selections: charbroiled chicken breast or barbecue spareribs. How confident are you that you could select the chicken breast?

18. You come home from work feeling tired and stressed and looking forward to dinner. You are given the choice of spaghetti and tomato sauce or roast beef and potatoes. How confident are you that you could select the spaghetti dish?

19. You were unable to eat lunch at your usual time and, instead, have to grab a quick lunch at a nearby cafe a couple of hours later. You arrive there feeling hungry and stressed. How confident are you that.....

   a. you could order a turkey sandwich?

   b. you could resist ordering a cheeseburger?

20. You are working late and feeling hungry but do not have time for anything except a quick snack from the vending machines. How confident are you that you could resist the package of cashews?

21. During a typical day for you, how confident are you that you could resist having such condiments or additives to foods as.....

    a. butter for your bread?

    b. butter and/or sour cream for your baked potatoes?

    c. tartar sauce for seafood?

    d. whipped topping on a dessert?

    e. cream in your coffee?

    f. cream cheese on a bagel?

    g. chocolate or candy topping on a frozen yogurt?

22. If you were home alone and needed to prepare the dinner, how confident are you that you could get yourself to select a low fat meal such as broiled chicken or pasta and a salad?

23. You are on a business related trip and are eating dinner, how confident are you that you could select a low fat entree from the menu?

24. You are having dinner in a restaurant with your family. This is not any special occasion, just an opportunity to give the cook a break. How confident are you that you could select a low fat meal, such as broiled chicken or a pasta dish with a light tomato sauce?

25. You and a very close friend are having dinner together in a restaurant. This friend has no regard

for a heart healthy diet and sometimes gives you "flack" about following such a diet. How confident are you that you could select a low fat meal from the menu that evening?

26. It is a typical work day and you are having breakfast at home prior to leaving for work. There are several different food items available. How confident are you that you could select fruit and a cold cereal for breakfast?

27. It is midmorning and you join a few coworkers for a coffee break at the snack bar. You are feeling pretty good this day and not particularly hungry at the time. You have a cup of coffee. How confident are you that you could resist having a donut or sweet roll?

28. Given that you need to carry your lunch to work, how confident are you that you could select a tuna sandwich for your "brown bag" lunch?

29. You are eating lunch in the cafeteria at work today and not feeling particularly hungry. The food line has several options for hot and cold foods. How confident are you that....

   a. you could choose a salad and a roll?

   b. you could resist having a bowl of cream soup?

30. It is a typical day at work and you are having lunch at the cafeteria. How confident are you that.....

   a. you could choose grilled fish and rice from the food line?

   b. you could resist having a barbecued beef on a bun?

31. If you were preparing the food, or had a choice as to how your food was prepared, how confident are you that you could choose the poultry and /or meat

grilled or broiled?

32. You are having a busier than usual day at work (or at home) and feeling pressured by several short term deadlines. You will probably not get to eat lunch until mid or late afternoon. How confident are you that....

    a. you could resist purchasing cheese snack crackers or a similar food from the vending machines (if at work)?

    b. you could select fresh fruit or a plain bagel (if at work)?

    c. you could resist having cheese and crackers or cookies (if at home)?

    d. you could select some raw vegetables or fruit (if at home)?

33. The business of the day continues beyond the usual quitting time. In fact, you will probably need to stay until at least 8:00 P.M. in order to meet the deadlines due the following day. Three other coworkers are working late and the decision is to order a pizza. How confident are you that under these circumstances.....

    a. you could resist ordering a cheese and sausage or pepperoni pizza from a take-out service?

    b. you could order a plain/no extra cheese or plain vegetarian pizza from a take-out service?

Thank you for taking the time to fill in your responses.

Submit   Clear

Appendix I

Consent to Participate in a Research Study

Title of Study: The Effects of a Self-Efficacy Enhancing Internet Intervention on the Dietary Management of Cholesterol

Investigator: Claire P. Donaghy, MS, RN, Doctoral Candidate, Rutgers, The State University of New Jersey College of Nursing, Newark, NJ
Investigator's Address: Rutgers, Rutgers, The State University of New Jersey College of Nursing, 180 University Avenue, Newark, NJ 07102

Research Study: You are invited to participate in a research study (the investigator's doctoral dissertation work) that will examine the effect of use of an Internet website on the dietary habits of employees of the County College of Morris. This information will be used in the development of other Internet-based programs that promote healthy lifestyle habits. In order to decide whether or not you should agree to be a part of this research study, you should understand enough about the risks and benefits of participation to make an informed judgment. This process is known as informed consent.
This consent form gives you detailed information about this research study, and will go over all aspects of this research: its purposes, procedures, and possible risks and benefits of participation. Once you understand the study and you wish to participate, please sign this consent form and keep the copy for your records.
You have been invited to take part in this research because you are an employee of the County College of Morris and have email access.

Purpose: The purpose of this research study is to gather information about the effects of an Internet website intervention on the dietary habits of people in a worksite setting.

Procedures: You are being asked to fill out forms that ask you questions about your diet, health and medication history, and nutrition knowledge. You will complete and submit these forms on-line. The investigator will review this information. You will be notified whether or not you meet the eligibility criteria for continuing in the study.
If you are eligible to continue in the study you will be asked to schedule an appointment so that the investigator or her assistants can obtain the

following: a fasting blood sample for the measurement of cholesterol, and your height and weight. The investigator will review this information and assign participants to one of two groups, an Intervention group and a control group. If you are assigned to the control group you will be asked to continue your current dietary habits for the duration of the study, which will be 12 weeks. If you are assigned to the Intervention group you will be asked to participate in an Internet website intervention. All participants in the intervention part of the study, including those in both the Intervention and control groups, will be asked to fill out forms and make an appointment for collection of post-intervention blood sample and measurement of height and weight.

Duration: The total time for the study including the collection of information before and after the intervention will take 16 weeks. Filling out the forms at the beginning and end of the study will take about 30 to 45 minutes. The intervention will last 12 weeks and includes six sessions. Each session will take you about 30 minutes in total to complete.

Participants: You will be one of approximately 510 employees invited to participate in this study.

Exclusions: You should not participate in this study if you are pregnant, or have a chronic illness such as heart disease, diabetes, thyroid condition, or other such illness that is not currently controlled.

Risks: It is highly unlikely that you will exerience any physical or psychological discomfort as a result of participating in this study with the possible exception of minor pain from the venous blood sampling procedure. You are advised to contact your health care provider should you experience problems.

Benefits: You may not receive any direct benefit from this study. However, the results of this study may benefit others by providing information on the use of the Internet and dietary habits. You may benefit from the study by becoming more aware of ways to improve your diet.

Confidentiality: Care will be taken to make sure confidentiality of the information you give is maintained to the extent permitted by law. Your surveys and data will be numerically coded. Codes will be linked to a

master list that links your code to your identity. All information will be kept in locked file cabinets and a password-restricted computer. Only the investigator will have access to this information. If the findings of this study are published, they will be written in a way that protects your identity. All surveys will be shredded and all computer files of data pertaining to this study will be deleted after five years.

Financial Costs to Participants: There will be no cost to you for participation in this study.

Right to Refuse or Withdraw: Your participation in this study is completely voluntary and you may refuse to participate, or may discontinue your participation at any time, without penalty or loss of benefits to which you are otherwise entitled. Your decision not to participate will not jeopardize your employment at County College of Morris, nor prejudice your further interactions with Rutgers, The State University of New Jersey. The investigator has the right to withdraw you from the study at any time. If you choose to withdraw from the study, the investigator will keep all of the information collected before your withdrawal as part of the permanent files of the research study.

Disclaimer: Rutgers, The State University of New Jersey will not provide compensation or medical treatment in the highly unlikely event of a research-related injury.
Study Results: Information provided, as part of the intervention will be available to all participants upon request following the completion of data analysis. Group results will also be available upon request following the completion of data collection and analysis.

Individuals to Contact: If you need further information regarding this study, you may contact Ms. Claire P. Donaghy by telephoning ▮▮▮▮▮ ▮▮▮▮ by writing to her at Rutgers, The State University of New Jersey College of Nursing: ▮▮▮▮▮▮▮▮▮▮▮, or by email: ▮▮▮▮▮▮▮▮. If you need further information regarding your rights as a research participant, you may contact Mr. Laszlo Szabo, Sponsored Programs Administrator at Rutgers, The State University of New Jersey by telephoning ▮▮▮▮▮▮▮, by writing to her at the Office of Research and Sponsored Programs, Rutgers, The State University of New Jersey, ASB III, 3 Rutgers Plaza, New Brunswick, NJ 08901, or by email: ▮▮▮▮▮▮▮.

Signature of Participant
I have read this entire consent form, received a copy of it, and I understand it completely. I do not have any questions at this time. I agree to participate in this research study.

Participant Name:_____ Signature_____
Date_____

Witness Name: _____ Signature_____
Date_____

Investigator's Name: Claire P. Donaghy
Signature_____ Date_____

Vita
Claire Patrice Donaghy

19■	Born October 16 in Brooklyn, New York
1972	Graduated from Countess Moore High School, Staten Island, New York
1974	RN, Saint Vincent Medical Center of Richmond School of Nursing, Staten Island, New York
1974-1979	Registered Nurse, Saint Vincent Medical Center, Staten Island, New York
1979	BSN, magna cum laude, Long Island University, Brooklyn, New York
1979-1982	RN, Scott and White Medical Center, Temple, Texas
1980	MSN, University of Texas at Austin, Texas
1981	Clinical instructor, University of Mary Hardin-Baylor, Temple, Texas
1983-1984 1985-present	RN, Saint Clares Hospital, Denville, New Jersey
1984-1985 1989-present	Faculty, County College of Morris, Randolph, New Jersey
1997-2002	Advanced Practice Nurse, Mid-Atlantic Cardiology, Morristown, New Jersey
1998	Post-Master's Certificate as an Acute Care Nurse Practitioner, Columbia University, New York, New York
2000-2001	Research Assistant to Dr. Elise Lev, Rutgers, The State University of New Jersey
2002-present	Advanced Practice Nurse, Morris Anesthesia Group, Denville, New Jersey
2002	Dissertation Fellow, Rutgers, The State University of New Jersey
2005	Ph.D. in Nursing, Rutgers, The State University of New Jersey