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The Effectiveness of the Coronary Health Improvement Project
III in Motivating Initially Sedentary Female Participants to
Increase Their Participation in Leisure-Time Physical Activity
Four Months After the Completion of the Program

presented by

Marie - Paule Loisy

has been accepted towards fulfillment
of the requirements for

Masters degree in Nursing

Jean E. Ward, R.N., Ph.D.
Major professor

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**THE EFFECTIVENESS OF THE CORONARY HEALTH
IMPROVEMENT PROJECT III IN MOTIVATING
INITIALLY SEDENTARY FEMALE PARTICIPANTS
TO INCREASE THEIR PARTICIPATION IN
LEISURE-TIME PHYSICAL ACTIVITY FOUR MONTHS
AFTER THE COMPLETION OF THE PROGRAM**

By

Marie-Paule Loisy

A THESIS

**Submitted to
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in partial fulfillment of the requirements
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ABSTRACT

THE EFFECTIVENESS OF THE CORONARY HEALTH IMPROVEMENT PROJECT III IN MOTIVATING INITIALLY SEDENTARY FEMALE PARTICIPANTS TO INCREASE THEIR PARTICIPATION IN LEISURE-TIME PHYSICAL ACTIVITY FOUR MONTHS AFTER THE COMPLETION OF THE PROGRAM

By

Marie-Paule Loisy

Research has established evidence of an independent role of physical activity in the primary prevention of coronary heart disease (CHD). However, 25-60% of U.S. adults are sedentary, and prevalence of inactivity is the highest among women. This study, a secondary analysis of data collected for the Coronary Health Improvement Project III (CHIP III), a community-based educational program, is designed to assess the effectiveness of CHIP III in motivating initially sedentary female participants (n=65) to increase their participation in leisure-time physical activity (LTPA) four months after the completion of the program. Results indicate that 63.0% (n=41) of the sedentary participants increased their LTPA level. A chi-square (df=2) of 10.8, $p < .005$ confirmed the statistical significance of the results. The findings suggest that participation in a community health educational program can enable sedentary women to increase their level of LTPA.

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Introduction

Coronary heart disease (CHD) is one of the nine most prevalent chronic diseases and is the leading cause of mortality in the United States (Hahn, Teutsch, Rothenberg & Marks, 1990). CHD, infrequent in women before the onset of menopause, is the leading cause of death in older women in the U.S. (Eaker et al. , 1993).

Many experts are convinced that the mass prevalence of risk factors is the primary contributor to the CHD epidemic. They also propose that the only way to reduce the burden of heart disease is to modify, on a population-wide basis, the prevalence of risk factors such as smoking, high fat diet, physical inactivity, obesity and hypertension (Lefebvre, Lasater, Carleton & Peterson, 1987).

Epidemiologic, clinical and experimental research has established evidence of an independent role of physical activity in the primary prevention of CHD (Berlin & Goditz, 1990; Blair et al. , 1996; Blair et al. , 1989; Leon, Connet, Jacobs & Rauramaa, 1987). Despite the recognized benefits of exercise, 25-60% of U.S. adults are sedentary. The prevalence of inactivity is higher among older persons and women (Dishman & Buckworth, 1996). Exercise adherence is also a considerable issue since 50% of people who start

an exercise program discontinue it within 6 months (Dishman, 1982).

Recommendations for an appropriate amount and level of physical activity have changed over the years. One of the goals of Healthy People 2000 is to increase to at least 30% the proportion of people 6 years old and older who engage in light to moderate physical activity for at least 30 minutes per day (US Department of Health and Human Services, [DHHS], 1991).

Due to the growing recognition that behavior is greatly influenced by the environment in which people live, there has been an increasing focus on community health promotion. The work of Bandura (1977) on social learning theory has served as the theoretical framework for many health promotion interventions that have been developed over the last decades. Most of these programs have focused on efforts to reduce multiple risk factors related to CHD (Thompson & Kinne, 1990).

Programs that promote preventive health behaviors and increase women's knowledge about their susceptibility for CHD must be encouraged. Advanced Practice Nurses (APNs), because of their strong background and expertise in health promotion, disease prevention, and health education, can play a crucial role in the development and implementation of such programs. However, the effectiveness of intervention programs in changing participants' behavior must be evaluated to justify their development and existence.

Purpose of the Study

The general goal of this study is to examine how effective educational community-based programs are in helping individuals to positively alter their health behaviors. More specifically, the purpose of this study is to assess the effectiveness of the Coronary Health Improvement Project III (CHIP III), a community health education program in Kalamazoo, Michigan.

The question to be answered is: Do initially sedentary female participants of the CHIP III report a significant increase in their participation in leisure-time physical activity (LTPA) four months after the completion of the program, as measured by the Leisure-Time Physical Activity Questionnaire ?

Conceptual Definitions

This section gives a brief description of the primary concepts of this study. Further elaboration of these concepts is included in the literature review.

A Community Health Education Program

Community is defined as a group of people sharing the same values and institutions. Components include loyalty, an interdependent social group, interpersonal relationships and a culture that includes values, norms and attachments. A community health educational program's goal is to educate

groups belonging to the same community about health related issues (Thompson & Kline, 1990).

Leisure-Time Physical Activity

Physical activity is defined by Caspersen, Powell & Christenson (1985) as "any bodily movement produced by skeletal muscles that results in energy expenditure" (p. 129). Leisure-time physical activity is physical activity performed outside work.

Initially Sedentary Participants

The term "sedentary" is not clearly defined in the literature, but consistently refers to individuals who do not participate in leisure-time physical activity. Crespo, Keteyian, Heath & Sempos (1996) include people who participate in physical activity less than three times per week.

Review of Literature

This section (a) reviews the literature related to the social impact of CHD and the importance of physical activity, (b) describes existing community programs for CHD prevention, (c) presents an overview of CHIP III, and (d) describes CHIP in view of social learning theory.

The Social Impact of CHD

Each year, 1.5 million people are newly diagnosed with CHD, which represents approximately \$47 billion in direct and indirect health care costs

("Public Health Focus", 1993). The literature shows a gain in public awareness regarding the risk factors related to CHD (Schucker et al. , 1987). This awareness has been attributed to the 1984 report of the Lipid Research Clinics Coronary Primary Prevention Trial (CPPT) that a reduction in blood cholesterol levels reduces the incidence of CHD. Schucker et al. (1987) present the results of two national probability surveys, conducted in 1983 and 1986, sponsored by the National Heart, Lung, and Blood Institute. These surveys assessed attitudes and knowledge of adults about risk factors for heart disease. Smoking and hypertension were identified by over 82% of the respondents as risk factors for CHD in both surveys. An increased knowledge was observed in 1986, as compared to 1983, regarding high blood cholesterol, high fat diet and high cholesterol diet as compared to 1983. Physical inactivity was identified as a risk factor for CHD by 71% of respondents in both surveys. These surveys suggest that the American population has demonstrated an increased awareness of the link between cholesterol and CHD. This awareness has fostered more accurate food labels and the promotion of lower fat foods. However, more information is needed about the other risk factors, particularly physical inactivity.

The U.S. female population is not aware of the severity of its risk for heart disease. According to Eaker et al. (1993), one woman in nine between

45 and 64 years of age has some form of cardiovascular disease; after 65, the ratio is one in three. Forty percent of all coronary events in women are fatal; sixty seven percent of all sudden deaths in women occur in those without history of coronary artery disease. Stroke is one of the leading cause of severe disability among women. By the year 2025, almost half of all women in the U.S. will be 45 years old or older and a large cohort will be at high risk for CHD and stroke. A significant proportion of American women are misinformed about the relationships of menopause to CHD. They perceive their risk of cancer as much greater than that of heart disease or stroke (Eaker et al. , 1993). Sedentary lifestyle is an important risk factor for CHD in women but women are less likely than men to engage in preventive behavior for CHD such as regular physical activity. Public education and awareness are crucial to women's understanding of their vulnerability to CHD (Andrews, 1995).

Physical Activity

Stephens, Jacobs and White (1985) analyzed data from national surveys conducted in the U.S. and Canada between 1972 and 1983 for evidence of leisure-time physical activity (LTPA) in the population. LTPA refers to any physical activity performed outside work. Stephens et al. (1985) found that : (a) at least 40% of the population was completely inactive,

(b) the percent of the active population declined with age, (c) LTPA and education were positively related, and (d) a positive association between socio-economic status and participation in LTPA was present. Six leisure time physical activities were consistently identified by the largest number of participants. These included walking, swimming, calisthenics, bicycling, jogging, bowling and softball. Gardening and dancing, while not included on most activity lists, ranked high when they did appear. Schoenborn (1986), in a study of seven U.S. health habits known as "the Alameda 7", concluded that LTPA is positively related to education, income and being Caucasian. Schoenborn found that 49% of U.S. men and 62% of U.S. women were sedentary in 1985. These statistics are similar to those by Crespo, Keteyian, Heath and Sempos (1996) who studied the prevalence of no LTPA among the U.S. population as part of the third National Health and Nutrition Examination Survey (NHANES III). Both men and women reported the same prevalence of irregular LTPA habits (one or more time per week but less than 3). Forty nine percent of men and 59% of the women reported no LTPA or LTPA less than 3 times per week. Findings also indicated that ethnic minority individuals were less active than Caucasian individuals. This disparity was more pronounced for women (Crespo et al., 1996).

Physical activity recommendations. Pate et al (1995) believe that

current low participation rates in LTPA are related to the misconception of many people that vigorous continuous exercise is needed for health benefits. This misconception might have originated from the Public Health Service's 1990 objectives, which defined appropriate physical activity as that which produces moderate to high levels of cardiorespiratory fitness. Appropriate physical activity was then characterized by (a) a rhythmic contraction of large muscle groups, (b) an intensity that requires 60% or more of maximal aerobic capacity, and (c) a frequency of 3 or more sessions per week with a duration of 20 minutes or more per session (Powell et al., 1986). These objectives were unrealistically high given the current level of physical activity of the population. More recent scientific evidence suggests that regular moderate intensity physical activity provides substantial health benefits. Consequently, public health recommendations for physical activity have expanded to include gardening, walking, and housework in addition to more vigorous aerobic exercise ("Prevalence of Recommended", 1995).

Public health recommendations are directed toward the most sedentary and unfit stratum of the population and emphasize moderate activity, such as the accumulation of 30 minutes of walking per day or equivalent energy expenditure. The latest recommendation from the Centers for Disease Control and Prevention and the American College of Sports Medicine is

"every adult should accumulate 30 minutes or more of moderate intensity physical activity on most, preferably all, days of the week" (Pate et al. , 1995, p. 404). The type of physical activity does not matter; sports, planned exercise, household or yard work, are all beneficial. The most important factor is total energy expenditure (Blair, Kohl, Gordon & Paffenbarger, 1992).

To obtain the health benefits associated with physical activity, participation must be maintained year around. Magnus, Matroos and Strackee (1979) have observed an inverse relationship between acute coronary events (ACE) and sustained light leisure time physical activity (rate ratio 0.45) such as walking, cycling or gardening (WCG). This negative association was not dependent upon the number of hours a week devoted to the activity and was not enhanced by more vigorous additional exercise. Habitual WCG was defined as participation for more than 8 months per year and seasonal WCG was defined as participation for 4-8 months per year. There was no relationship evident between ACE and seasonal WCG.

Adoption and maintenance of physical activity. Dishman, Sallis and Orenstein (1985) have reviewed the available research on determinants related to adoption and maintenance of physical activity. These determinants were found to fall into the three categories of personal, environmental, and

characteristics of the activity program. Intentions, personal capabilities, behavioral skills, commitment and reinforcement are determinants that appear constant across populations, settings and mode of activity. The decision to become active is not exclusively a reasoned action but is both a socially and self-regulated behavior. Sallis et al. (1986) examined the predictors of change in three measures of physical activity. They found that the adoption of moderate activity by women was predicted by health knowledge and that maintenance was predicted by exercise knowledge and self-efficacy. In a study that examined the predictors of adoption and maintenance of vigorous physical activity over time, Sallis, Hovell and Hofstetter (1992) concluded that adoption of physical activity for sedentary women could be predicted by education, self-efficacy and friends and family support. Godin, Valois, Sheperd and Desharnais (1987) examined the inherent process underlying the regular practice of physical activity and concluded that habit is a strong determinant of exercise behavior. Although the literature fails to identify factors that will consistently predict adherence to exercise programs, Robison and Rogers (1994) suggest that multiple level interventions which focus on barriers to behavioral change (environmental, social and cultural) on a long-term basis are more likely to be successful.

Dishman and Buckworth (1996) conducted a quantitative meta-analysis

of 127 studies that examined the efficacy of interventions for increasing physical activity among 131,000 subjects in community, work site, home and health care settings. Small effects were observed in studies of people who had CHD, who were at high risk for CHD, who had other chronic diseases or who had physical or developmental disabling conditions. Interventions delivered to groups in community settings had larger effects in contrast to those targeting individuals. Effects were larger when physical activity was not supervised, and for active LTPA when compared to an exercise program prescribing strength, aerobic, or aerobic exercise combined with other fitness activities. Interventions focusing on low intensity physical activity were more effective than those focusing on higher intensity physical activity. Effects from a pre- or quasi-experimental design were larger than those of a randomized design. The way the interventions were conducted, such as in a health care setting in contrast to a community setting, contributed to these results.

Community Programs and Prevention of CHD

Currently, three large U.S. community-based projects are examining whether an alteration in risk factors among the entire population is feasible and will result in lower CHD morbidity and mortality. The projects are the Stanford Five City Study, the Minnesota Heart Health Program and the

Pawtucket Heart Health Program (Blackburn, 1983; Lefebvre, Lasater, Carleton & Paterson, 1977). These projects share a common design; each is a large, experimental field study of community health education where an experimental community are compared with a reference population. The effectiveness of these programs is assessed by comparing CHD events of experimental and reference populations and not by direct evaluation of behavior change. The major proportion of their educational efforts is done via media , i.e., television, radio, print media and some via community interpersonal programs (health departments, schools, and health professionals).

A number of other health promotion initiatives are attempting to reduce risk factors for CHD using a community approach. Most of them are referred to as community projects and use different community institutions, organizations, groups and individuals in the delivery of their interventions (Thompson & Kinne, 1990). An example of such a project is the Coronary Health Improvement Project (CHIP), which takes place in Kalamazoo, Michigan . This a small scale program which attempts to promote community change by educating volunteer participants. The use of a small number of participants makes research on behavior change more feasible and practical.

The CHIP program. The CHIP program, designed by the Lifestyle

Medicine Institute in Loma Linda, California, originated in Creston, B.C. , Canada, and was then offered in Vernon, Kalowna, Ottawa and Cornwall, Canada. The Center for Science in the Public Interest , Washington , DC, and Borgess Medical Center, Kalamazoo, MI, a 450 bed tertiary care facility have agreed to co-sponsor CHIP in Kalamazoo since 1995. CHIP is a 40-hour-long educational program aimed at changing health care habits and reducing the levels of coronary risk factors of the participants. The goals of the program are (a) to demonstrate measurable improvement in diet-related coronary risk factors (triglycerides, cholesterol, glucose, weight, and blood pressure) and (b) to encourage exercise enhancement, smoking cessation and the adoption of better stress-coping strategies. In addition CHIP strives to fulfill its commitment to engage in medical research and continuing education for physicians and medical students. CHIP also attempts to create an intelligent health subculture within the community by uniting medical, commercial, service and media sectors in support of good health for the citizens (Williams & Diehl, 1995).

In this program the volunteer participant pays a \$240 fee per person or \$390 per couple to attend 16 two-hour long lectures over a period of four weeks, and to have three heart screenings. The screenings include lipid evaluation, glucose, height, weight, blood pressure, medical history, diet

and exercise review. The first heart screen is performed before the start of the program, the second after its completion at four weeks, and the third as a follow up four months after completion of the program. Scholarships are available for those who cannot afford the cost of the program. Participants also have the option to enroll in two applied workshops and one grocery shopping tour to learn to implement dietary changes at an additional cost.

Hans Diehl, Ph.D., MPH, the CHIP director, is the principal lecture speaker. Many other speakers, local and national, including physicians, nurses, nutritionists, dietitians, exercise specialists, psychologists, clergymen, and past CHIP participants, are asked to share their expertise and personal experience. A question/answer period is allowed at the end of each lecture. CHIP collaborates with the medical, public health and educational communities, as well as the commercial community (sport shoe stores, markets, and restaurants) in order to promote community ownership (Diehl, 1995).

Since 1995, CHIP has conducted three educational programs in Kalamazoo, known as CHIP I (350 participants), CHIP II (578 participants) and CHIP III (501 participants). The typical CHIP population characteristics are: (a) sixty percent women and 40% men, (b) 40 to 70 years of age with a mean age of 54, (c) 50% of participants have incomes higher than \$60,000

and (d) 51% of participants are college graduates (Curran, 1996). Presently CHIP is measuring the predictors of CHD, such as blood pressure, cholesterol levels, triglycerides, glucose, and weight. Although at the end of CHIP II, 98% of participants reported that their participation in CHIP had been the motivating force to exercise, actual physical activity behavior of the participants has not been seriously studied (Curran, 1996).

In view of this investigator's literature review, research on community programs that can motivate women to engage in and maintain regular physical activity is needed. CHIP, which utilizes a multi-dimensional approach to reduce CHD and addresses the specific needs of women, has the potential for meeting this need.

Theoretical Framework

The community approach claims that permanent, large scale behavioral change is best achieved by changing the standards of acceptable behavior in a community. The majority of these projects recognize the need to change the social context of their community, arguing that environment has a significant influence on facilitating or inhibiting the adoption of new behavior (Thompson & Kinne, 1990). Many of these programs have used Bandura's social learning theory as their theoretical framework.

Social learning theory. Social learning theory recognizes that simple

cognitive acquaintance with new material is not sufficient to motivate individual change. According to Bandura (1977), individual behavior is determined by cognitive processes that influence motivation as well as the initiation and persistence of new behavior. A diagram depicting Bandura's social learning theory was developed by this investigator (see Figure 1). Individuals receive information from four sources: (a) skills mastery, (b) modeling, (c) verbal persuasion and (c) reinterpretation of physiological cues (Bandura, 1977). Skills mastery refers to learning through personal experience in which one achieves mastery over a difficult task. Learning through modeling is learning that occurs through seeing other people perform an activity. Verbal persuasion is used to convince people that they have the ability to perform a behavior. People rely on information from their physiological states when judging their capabilities to perform certain tasks or behavior; this is physiological feedback.

The next process, according to Bandura (1977) is cognitive appraisal of the information from the four sources while taking into account the personal, environmental and behavioral factors. Social learning theory emphasizes the mutual influences between these three factors.

Self-efficacy (the confidence in one's ability to perform a specific behavior) depends upon how individuals cognitively appraise the information.

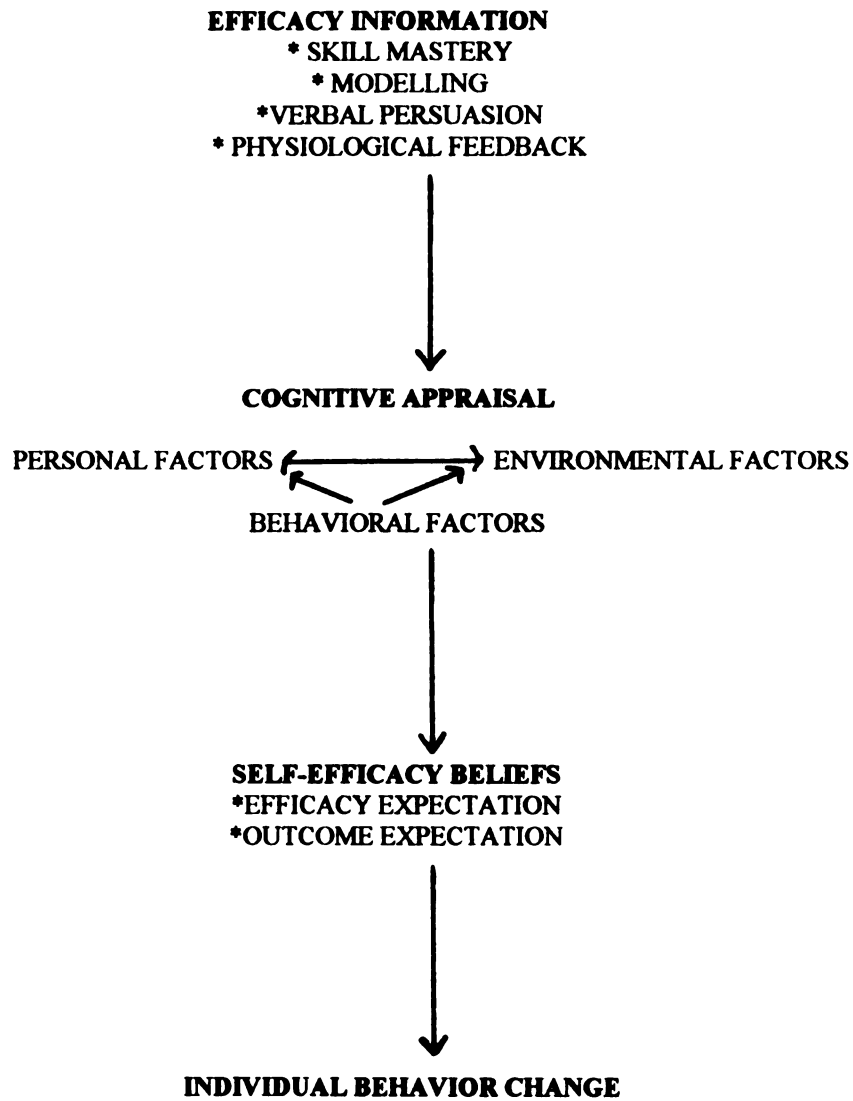


Figure 1. Diagram of Bandura's Social Learning Theory

There are two conceptually independent components that comprise an individual's perception of self-efficacy, i.e., efficacy expectation and outcome expectation. Efficacy expectation refers to an individual's judgements about one's capability to organize and carry out the actions needed to perform a task. Whereas, outcome expectations are an individual's beliefs that consequences may result from engaging in a certain behavior. According to Bandura (1977), following cognitive appraisal of the information, the judgment of self-efficacy leads to the individual behavior change.

Social Learning Theory Applied to CHIP. Social learning theory can be applied to the participants of CHIP (see Figure 2). CHIP intervention efforts focus on promoting individual behavior change by increasing people's belief in their sense of self-efficacy for cardiac health (their ability to perform specific behaviors that will reduce their risk of CHD). This is accomplished at different levels of the cognitive process, including efficacy information, cognitive appraisal and self-efficacy beliefs.

CHIP affects efficacy information by exposing participants to role models (national and community speakers, and participants of previous CHIP), and by verbal persuasion. Verbal persuasion is accomplished by the lectures and written handouts, and also by the heart screens which give direct

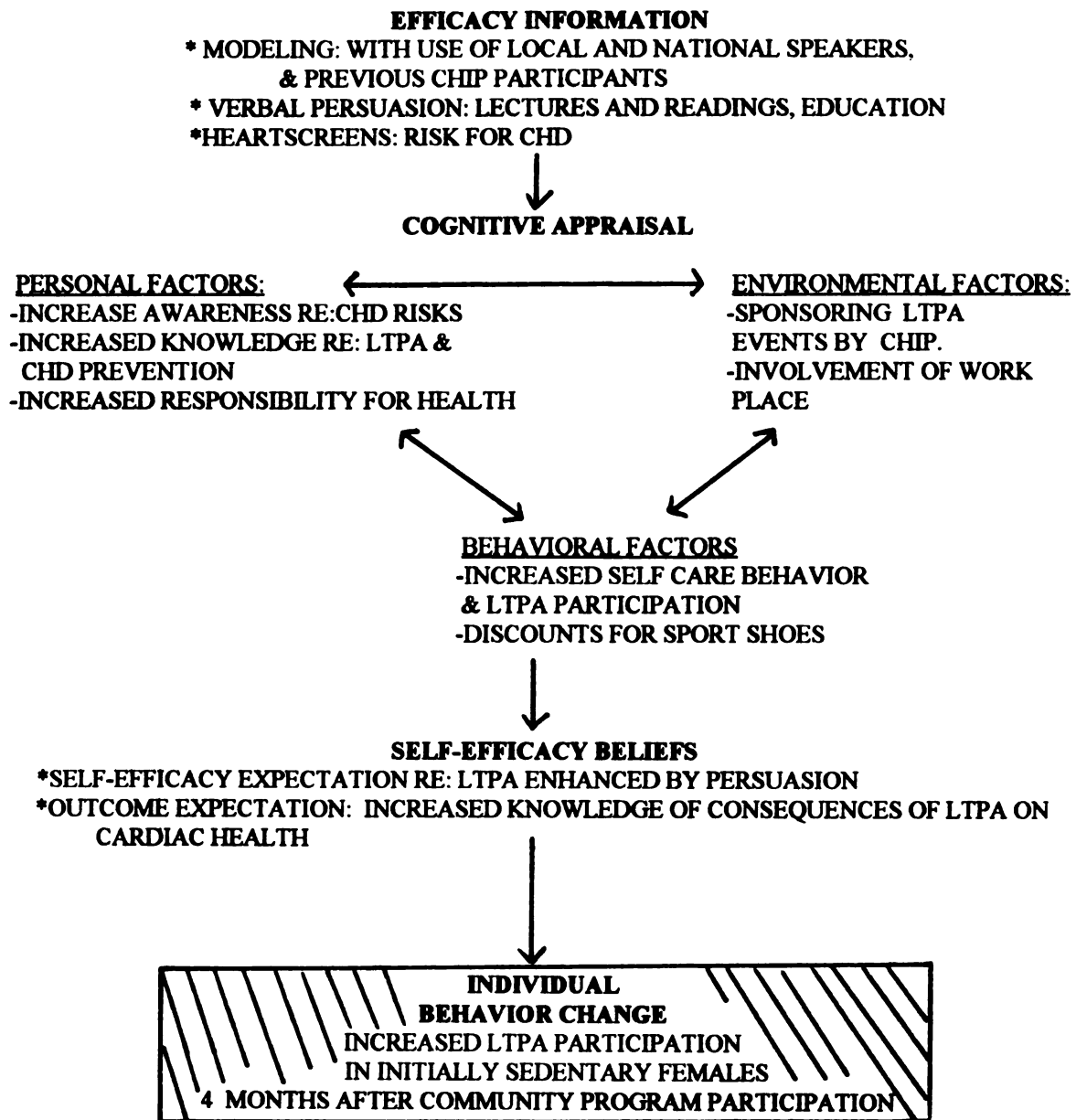


Figure 2. Social Learning Theory applied to CHIP

feedback to the participants about their risk factors for CHD.

CHIP influences cognitive appraisal of the participants, including personal, environmental and behavioral factors. This program triggers personal factors by increasing participant knowledge about risk factors for CHD and the importance of lifestyle modification and by increasing responsibility for personal health. CHIP strategically alters the environment to stimulate, reinforce and encourage the generalization of the desired physical activity behavior, e.g., sponsoring of community events promoting LTPA by CHIP and involvement of the work place. CHIP also uses discounts at sports shoe stores and direct behavior change techniques including lectures aimed at increasing self-care behavior and participation in LTPA.

Another goal of CHIP is to directly trigger self-efficacy beliefs by reinforcing self-efficacy expectation and outcome expectation for LTPA. This is accomplished by supporting participants' beliefs that they are able to commit themselves to regular participation in LTPA and by emphasizing the possible consequences that would result from LTPA participation.

By targeting groups of people who are motivated to change, CHIP hopes to promote what Bandura (1977) calls "collective efficacy", where the group can work to affect change in organizations and the community at large.

This process allows for the blending of both individual and community oriented change in planning for heart health intervention.

Although Bandura's model suggests there are many components that influence self-efficacy beliefs and thus behavior, this study focuses on the behavior change of the female participants of CHIP III, as shown by the shaded area on Figure 2.

Methodology

Operational Definitions

Community Health Education Program refers to CHIP III , based in Kalamazoo, MI. Its goal is to educate volunteer participants about CHD and the appropriate health behaviors to prevent CHD.

Leisure-Time Physical Activity (LTPA) refers to any physical activity performed outside work and measured by the leisure-time physical activity questionnaire (LTPAQ).

Initially Sedentary Participants refers to female participants of CHIP III, who consented to participate in the current study, and reported little or no LTPA, as defined by participation in LTPA two times or less per week for 30 minutes each time or 240 minutes or less per month , as measured by the LTPAQ.

Design

CHIP III is a quasi-experimental, longitudinal, prospective study. This current study is a secondary analysis and compares data from the LTPAQ of the female participants before the beginning of the program and 4 months after completion of the program. There is no control group. Other variables for which data are reviewed include demographic data, i.e., age, marital status, race, education, employment, number of people in the household, and income (Appendix A).

Sample

Criteria for selection of subjects for this study were: (a) women participating in CHIP III and (b) consent to participate. Since the subjects initially participated voluntarily, the original sample and current subsample are non-probability convenience samples.

Data Collection

The initial study was conducted in 1996. The first LTPAQ (Appendix B) was collected on April 18 and 21, the second on September 19 and 22; 306 women agreed to participate in CHIP III, and 187 women completed the LTPAQ. This subsample of 187 women is the focus of this study.

Two consent forms were completed at the beginning of CHIP III. The first was the standard form (Appendix C) used in previous CHIP programs.

The second (Appendix D) was a new form added by the CHIP staff to gather data related to LTPA. This latter information was the data analyzed for this study. A volunteer was present at all times to answer questions regarding the study and the consents. After the consents were signed, the participants completed the LTPAQ and had blood drawn for a lipid profile and fasting blood sugar. Blood pressure, heart rate, height and weight were also measured at that time. Each participant then saw a pharmacist who discussed the dosage and purpose of their medications. A counselor was available to answer questions about the program.

The second heart screen at the completion of the program included the same routine, tests and blood draws. The third heart screen included the same procedures plus the follow up questionnaire. Although the second consent form for data on LTPA mentions three different data collection times, time and scheduling constraints made it impossible for the primary investigators to collect the LTPAQ at four weeks after completion of the program. Thus the follow up data collection was done four months after the completion of the program instead of six months. For each session, volunteers collected the consents and verified that a consent was signed for each participant who returned a questionnaire. Consent forms were kept separate from the questionnaires so people could not be identified by name

but only by a CHIP number on the questionnaire.

LTPA had been evaluated in CHIP I and II using the lifestyle questionnaire which asked participants to classify their exercise level beyond everyday occupations, i.e., none, mild (at least 4 times a week), moderate (at least 4 times a week), or vigorous (at least 4 times a week). Because this is a paper and pencil questionnaire and because of the lack of clarity in the terms used, the primary investigator, Dr. Diehl, implemented a more thorough questionnaire, the LTPAQ, to assess LTPA for CHIP III.

Data Collection Instrument

LTPAQ has been used in the third National Health and Nutrition Examination Survey (NHANES III). This is a self-administered, paper and pencil, 15 item questionnaire that takes approximately 10 minutes to complete. The questionnaire asks participants to specify their frequency of LTPA during the past month for walking, jogging, riding a bike or exercise bike, swimming, aerobic dancing, other dancing, calisthenics or exercises, gardening or yard work, and weight lifting. An open-ended question gives the participants an opportunity to add activities not listed. For each activity, the participant is asked about the frequency of the activity per day, week or month, and to estimate the duration of the activity. Participants are also asked to compare their current levels of physical activity with those of the

past 12 months and those of 10 years ago: They are also asked to compare their levels of physical activity with other people their age and sex. The last two questions ask about their level of satisfaction with their health and with their level of physical activity using Likert scales. In the five months follow up questionnaire, two questions were added. One question asked if participants enrolled in the Alumni association and the second asked about the number of Alumni meetings attended since completion of the program.

For NHANES III, information on duration of physical activity was not collected, but all self-reported physical activity was assigned an intensity code or metabolic equivalent (MET). The intensity of LTPA was classified according to age and sex as no activity, moderate LTPA and vigorous LTPA.

Validity and Reliability. Crespo et al (1996) who reported on the results of NHANES III did not address the issue of reliability and validity of LTPAQ, and no additional information resulted from the review of literature. However, LTPAQ covers the activities that are most commonly reported by people in national surveys of physical activity, including walking, swimming, calisthenics, bicycling, jogging, gardening and dancing (Stephens et al. 1985). Bowling and softball, two other very common activities, are not included but participants had the opportunity to add additional LTPA activity when responding to item number 3, an open-ended question. LTPA does not

include household activities which are currently acknowledged in the most recent public health recommendations as important physical activities ("Prevalence of Recommended", 1995). This questionnaire appears, however, to provide a valid assessment of LTPA. Reliability was assessed as part of this study's data analysis.

Data Analysis

Measurement of LTPA. Three levels were used to measure LTPA based upon the associated literature and the Center for Disease Control and Prevention and the American College of Sports Medicine Summary Statement regarding physical activity (Pate et al. , 1995). Minutes of physical activity per participant and per month were used to create these three LTPA levels and to reflect the latest public recommendation on physical activity. The "sedentary" level was defined as accumulating 240 minutes or less LTPA per month. The "moderately active" level was defined as accumulating 241 through 599 minutes LTPA per month. The "active" level was defined as accumulating 600 minutes or more LTPA per month. All items of the LTPAQ were coded (Appendix E) and each participant's total LTPA minutes per month was calculated and then compared to the defined levels of LTPA.

Statistical Analysis. Polit and Hungler (1995) state that "descriptive statistics are used to describe and synthesize data" (p.371). Frequency

distribution tables were used to analyze the participants' demographic characteristics, levels of LTPA, and activity preferences.

A t-test was the initial approach to test the hypothesis that participation in CHIP increases LTPA among initially sedentary women. However, the data were not normally distributed and thus a Chi-square was used to test the significance of the difference in the relative frequencies of the three activity levels of the LTPA before CHIP and 4 months later. This statistical analysis is appropriate for this study, as indicated by Polit and Hungler (1995) because data and hypotheses concerning proportions of cases fall into various categories.

Reliability. Two researchers coded the questionnaires independently and resolved ambiguities in the coding algorithm by mutual agreement.

Protection of Human Subjects

Borgess Hospital, the owner of all CHIP data, gave this investigator verbal and written approval to conduct secondary data analysis (Appendix F). All consent forms are maintained by the CHIP director, Dr. Diehl; data with no names were used by this investigator as provided by Dr. Diehl.

Two consent forms were obtained; the first consent addressed the potential risk associated with blood draw in CHIP III and the second consent requested agreement to participate in the current study. Anonymity and

confidentiality of the subjects were protected at all times and only numbers were used on LTPAQ forms. The consent forms and list of names and numbers were kept by Dr Diehl in the CHIP office. This investigator agreed to provide Dr. Diehl with the findings of the current study.

Application was made and approval to conduct this study was received from Michigan State University Committee on Research Involving Human Subjects (appendix G).

Results and Findings

The purpose of this study was to assess the effectiveness of CHIP III in motivating initially sedentary female participants to increase their participation in LTPA 4 months after the completion of the program. While 301 women participated in CHIP III only 187 completed the LTPAQ. Demographic data of women was limited to those women who completed LTPAQ.

Demographic characteristics

Table 1 presents the demographic characteristics of the 187 participants. The mean age of the participants was 55.4 (SD= 12.46), with 36.4% of them (n=68) between the age of 51 and 60 . This group was composed predominantly of white, well-educated women, and 50.8% (n=95) of them reported an income of \$40,000 or greater. Minorities were under-

Table 1. Demographic Characteristics of the Participants

	<u>n</u>	<u>Percent</u>
Age		
<30	7	3.7
31-40	12	6.4
41-50	39	20.9
51-60	68	36.4
61-70	41	21.9
71-80	15	8
>80	4	2.1
Missing	1	0.5
Race:		
White	174	93
African-American	7	3.7
American Indian	3	1.6
Missing	3	1.6
Marital Status		
Married	124	66.3
Divorced	25	13.4
Widowed	14	7.5
Single	19	10.2
Missing	5	2.7
Household Composition		
1 person	35	18.7
2 persons	91	48.7
3 persons	20	10.7
4 persons	22	11.8
5 persons	6	3.2
6 persons	3	1.6
155 persons	7	3.7
Missing	3	1.6
Income		
<\$20,000	29	15.5
\$20,001-40,000	49	26.2
\$40,001-60,000	35	18.7
\$60,001-80,000	25	13.4
\$80,001-100,000	11	5.9
>\$100,000	24	12.8
Missing	14	7.5
Employment Status		
Employed full-time	68	36.4
Employed part-time	37	19.8
Not employed	20	10.7
Student	2	1.1
Retired	52	27.8
Disabled	3	1.6
Missing	5	2.7
Education Level		
<High School	7	3.7
Completed High School	48	25.7
1-2 Years of College	38	20.3
>2 Years of College	89	47.6
Technical School	3	1.6
Missing	2	1.1

represented, with only seven African-American and three American Indian participants. This population had a high level of education as demonstrated by 67.9% (n=130) of the participants having had some college education. In addition, 66.3% (n=124) were married, 67.4% (n=126) lived alone or with only one other person, 36.4% (n=68) were employed full-time and 27.8% (n=52) were retired. Seven individuals identified themselves as Sisters of a religious community and reported a household of 155.

LTPA Levels

Table 2 shows that of the 187 participants 34.8% (n=65) of the participants were sedentary, 19.3% (n=36) were moderately active, and 44.4% (n=83) were active. Four months after participation in CHIP III, 20.3% (n=38) were sedentary, 19.8% (n=37) were moderately active, 57.8% were active.

Table 2. Comparison of LTPA Levels of All Participants Initially and 4 Months After Completion of CHIP III.

	<u>Initially</u>		<u>4 months after</u>	
	n	%	n	%
Sedentary	65	34.8	38	20.3
Moderately active	36	19.3	37	19.8
Active	83	44.4	108	57.8
Missing	3	1.6	4	2.1
Total	187	100.0	187	100.0

For the initially 65 sedentary participants, who represent the

population of interest of this study, 36.9% (n=24) remained sedentary, while 33.8% (n=22) became moderately active and 29.2% (n=19) became active 4 months after the completion of CHIP III (Table 3). Thus, 63.0% of the initially sedentary participants increased their participation in LTPA after participation in CHIP III.

Table 3. LTPA Levels of Initially Sedentary Participants (n=65) 4 Months After Completion of CHIP III

	n	%
Sedentary	24	36.9
Moderately Active	22	33.8
Active	19	29.2
Missing	0	0
Total	65	100.0

Descriptive statistics show a decrease in the number of people in the sedentary group 4 months after completion of CHIP III. To ensure that this shift did not occur by chance, a comparison of LTPA levels before the program and 4 months after was done using Chi-square. Chi-square enables the investigator to determine whether the observed distribution is sufficiently different from the expected distribution and if it is unlikely to have occurred by random sampling. This study generated a Chi-square (df=2) of 10.8, $p < .005$, thus suggesting that increased participation in LTPA for the initially sedentary women was indeed a result of CHIP III rather than a chance result.

The major concern related to the LTPAQ was regarding the missing

values, especially in minutes of LTPA. For example, the participants often indicated the miles walked, but omitted the time spent walking. The two reviewing researchers agreed to estimate the walking time when the walked distance was given. An average of four miles per hour was assigned, since this represented the average walking speed of all participants. Missing values also existed about duration of other physical activities. When duration was missing, it was entered as 15 minutes, since this was the least amount of time reported by the participants for all activities. This probably underestimated the true LTPA minutes. However, this did not represent a major problem, since those who completed the LTPAQ the least accurately were primarily the participants who answered "no" to most items, and were consequently inactive. The more active people tended to be more specific in their answers. Open-ended questions posed some problem of interpretation for five participants. However, this did not affect the results since they were in the active or moderately active group.

These described concerns with the LTPAQ posed the problem of the validity of this questionnaire when used to measure LTPA in minutes.

Another concern is that the clinical significance regarding the health benefits due to an increase in LTPA have to be drawn from the literature, since the questionnaire itself did not have guidelines for the interpretation of the clinical

significance of the results.

LTPA Levels and Socio-economic Status

Participation in LTPA has been associated in the literature with higher socio-economic status. A comparison of the 187 subjects as identified by LTPA levels, i.e. , sedentary, moderately active and active groups, by income and education (Table 4) confirms this association.

Table 4. Comparison of the Initially Sedentary, Moderately Active and Active Groups According to Income and Education.

	<u>Sedentary</u>		<u>Moderately Active</u>		<u>Active</u>	
	n	%	n	%	n	%
INCOME						
<\$20,000	17	26.2	5	13.9	7	8.4
20,000-40,001	16	24.6	9	25.0	23	27.7
40,001-60,000	12	18.5	9	25.0	13	15.7
60,001-80,000	5	7.7	5	13.9	15	18.1
80,001-100,000	3	4.6	2	5.6	6	7.2
>100,001	7	10.8	4	11.1	13	15.7
Missing	5	7.7	2	5.6	6	7.2
Total	65	100.0	36	100.0	83	100.0
EDUCATION						
Less than High School	3	4.6	1	1.8	3	3.6
Finished High School	23	35.4	4	11.1	20	24.1
1-2 y College	10	15.4	12	33.3	16	19.3
>2 y College	28	43.1	17	47.2	42	50.6
Technical School	1	1.5	1	2.8	1	1.2
Missing	0	0.0	1	2.8	1	1.2
Total	65	100.0	36	100.0	83	100.0

Table 4 shows that : 50.8% (n=33) of sedentary women, 38.9% (n=14) of moderately active women and 36.1% (n=30) of active women reported an income of \$40,000 or less, while 41.67% (n=27) of the sedentary, 55.6% (n=20) of the moderately active and 56.7% (n=47) of the active reported an income at or greater than \$40,001. For educational level,

40% (n=26) of the sedentary, 12.9% (n=5) of the moderately active and 27.7% (n=23) of the active women reported a high school education or less, while 58.5% (n=38) of the sedentary, 80.5% (n=29) of the moderately active and 69.9% (n=58) of the active women reported some college education.

Type of Activities

The most popular activities amongst the CHIP III participants were walking, gardening/yard work, calisthenics/exercises and biking (Table 4). When given the opportunity to identify activities not mentioned in the questionnaire, participants reported tennis, golf and bowling most frequently. These findings about activity preferences are consistent with those of Crespo et al (1996) who used the same questionnaire. At 4 months post CHIP III, these activity preferences were the same, but the number of people participating in walking, gardening and biking increased.

Table 5. Activity Preferences of the Participants, Initially and at 4 Months.

	<u>Initially</u>		<u>At 4 months</u>		<u>Difference</u>	
	n	%	n	%	n	%
Walking	118	63.0	143	76.5	+25	+13.5
Gardening	66	35.3	94	50.3	+28	+15.0
Calisthenics	54	28.9	50	26.7	-4	-2.2
Biking	42	22.5	59	31.6	+17	+9.1
Aerobics	22	11.8	20	10.7	-2	-1.1
Weight Lifting	22	11.8	20	10.7	-2	-1.1
Others	18	9.6	18	9.6	0	0.0
Swimming	14	7.5	19	10.2	+5	+2.7
Dancing	11	5.9	16	8.6	+5	+2.7
Running	10	5.3	14	7.5	+4	+2.2

Discussion

Findings

The purpose of this study was to assess the impact of participation in a community program on LTPA level for sedentary female participants. Of the 187 participants, 65 were identified as sedentary. This sedentary population was reduced to 24 four months after participation in CHIP III. This study demonstrated that participation in CHIP III significantly increased LTPA participation among initially sedentary female participants 4 months after the completion of the program. This suggests that participation in a community educational program is effective in motivating certain individuals in implementing lifestyle changes.

Social Learning Theory (Bandura, 1977) claims that self-efficacy beliefs are responsible for individual behavior change. Even though CHIP III did not measure self-efficacy beliefs of the participants, its interventions are multi-dimensional and aim at increasing self-efficacy. From the results of this study, it appears that CHIP III may have been effective in increasing initially sedentary female participants' self-efficacy beliefs about LTPA. However, as already mentioned, participants were self-selected and motivated individuals, and thus it is possible that they already had a high self-efficacy before starting the program.

Study Limitations.

There are several limitations to this study. One of these limitations is related to the timing of the study for data collection, since the first questionnaires were collected in April and the second in September. The most popular activities are often performed outdoors, such as walking, biking and mostly gardening, and thus seasonal variation could explain some of the increase in LTPA at 4 months. Other limitations can be related to the design of the study and to the instrument.

Limitations due to design. This study was not a randomized trial. Volunteer participants were self-selected and were highly motivated individuals who invested time and money to participate in CHIP III. Demographic characteristics revealed that they were middle-aged , well-educated, white female, and consequently these findings cannot be generalized to all women. These characteristics seem to be typical of participants in previous CHIP programs in Kalamazoo (Curran, 1996). CHIP appears to attract a very particular group of individuals. This might be explained in part by the cost of the program and the time commitment required to attend the lectures. Both cost and time might deter the participation of less educated and lower socio-economic status individuals.

Selection bias is also an important limitation. Of the 306 participants involved in CHIP III, only 187 agreed to participate in this study. No data were collected about the 119 women who chose not to participate. This research might have attracted participants with the highest level of self-efficacy and intimidated those with a lower level of self-efficacy. The latter individuals may have not believed they could increase their LTPA level or may have been exercise dropouts.

While the follow up study at 4 months suggests that CHIP III was effective in enhancing LTPA participation among sedentary women, the long-term effectiveness of the program remains to be shown. Dishman and Buckworth (1996) found that increased physical activity or fitness as a result of an intervention decreased as time passed after the intervention ended. Research on LTPA shows that 50% of people who initiate an exercise program stop after 6 months (Dishman, 1982). A follow up of this study at one year after the completion of the program would provide valuable information about the long-term effectiveness of CHIP III in increasing LTPA participation.

Limitations due to the instrument. The LTPAQ relies upon self-reported behavior. Self-report may promote positive and socially desirable responses to the questionnaire items. In a quantitative meta-analysis of 127

studies that examined the efficacy of interventions for increasing physical activity among subjects, Dishman and Buckworth (1996) reported that few studies have verified self-reported physical activity behavior by measuring fitness or by using an objective measure of activity. Physical fitness can be quantified by measuring maximal oxygen consumption and/or physical endurance. However, self-report remains the most practical and the least expensive method for measuring physical activity behavior.

This questionnaire may not have captured all participants' methods of LTPA, because several individuals added comments on their questionnaires about physical activities such as household activities and caring for young children. Other participants reported work-related physical activity. This questionnaire is limited to leisure-time physical activity and might have ignored other physical activities not perceived as leisure-time, but that are important to capture.

The coding of LTPAQ, giving a total amount of LTPA in minutes per month allowed for a categorization of participants in one of the three identified activity levels. However, this categorization was not accompanied by an interpretative guide. Therefore, this investigator interpreted the clinical significance of the findings. This approach was justified by the literature which indicates that the amount of activity is more important than the mode,

intensity and/or duration of the activity bouts. Blair et al (1992) state that if the most sedentary population would accumulate 30 minutes of walking per day (or the equivalent energy expenditure in other activities), it would receive clinically significant health benefits, regardless of the type of activity performed. According to Pate et al. (1995), the health benefits of physical activity increase with the total amount of the activity performed, when measured as either caloric expenditure or minutes of physical activity. According to these sources, of the 65 sedentary participants, the 29.2% (n=19) who became active and the 33.8% (n=22) who became moderately active at 4 months are likely to have received some clinical benefits. The most active thus receiving the greatest benefits.

Validity of LTPAQ was determined by authority. Two doctorate-prepared exercise physiologists, Jonathan Robison, Ph.D. and Carlos Crespo, Ph.D. reviewed the LTPAQ and confirmed its validity for measuring LTPA.

Implications

The findings of this study suggest that participation in CHIP III significantly increased LTPA participation in initially sedentary female participants. The general implications of this study are important because the findings further support the existing literature on adoption and maintenance of LTPA, by demonstrating that participation in a community program can affect

LTPA behavior.

However, this study raises the issue of the lack of clarity of the concept of "LTPA". Dimensions of physical activities not performed during leisure time, such as work-related activities, caring for young children or household activities are not included in LTPAQ. This questionnaire is limited to leisure-time physical activities and might have classified some individuals in the sedentary group while they were in fact active in their non-leisure time.

This study raises several questions. The first one is: Do participants who are active in their non-leisure time need to engage in LTPA for health benefits? Since 56.2% (n=105) of CHIP III female participants were employed, an assessment of their level of activity at work in addition to their LTPA would be of interest. The challenge to find or develop an instrument that would measure such a range of activities while remaining practical in its use exists. Another question is : How do the women who agreed to participate in the study and those who did not differ in terms of demographic characteristics and self-efficacy levels?

Implications for Advanced Practice Nurses.

APNs in clinical practice need to counsel their female patients regarding the benefits of LTPA. APNs also need to use their role of assessor to help women identify and utilize available community resources. CHIP III

appeared to be attractive to middle-aged and retired women and this suggests that APNs should encourage these particular groups to participate in similar programs. However, community programs are not always available and are not always appropriate for all. Financial concerns, time, personality, family responsibilities or lifestyle issues may influence an individual's attitude towards such programs. Individual counseling on physical activity remains the best option for many women.

APNs receive little education, if any at all, on counseling their patients regarding physical activity. In order to counsel and educate them effectively, APNs need to be knowledgeable about the current literature on LTPA and the recent guidelines and recommendations. APNs must also have the assessment skills to assess LTPA and non-LTPA of their clients. The LTPAQ might be a useful tool to guide this assessment. Curricular revisions which would include teaching APNs those skills would be beneficial to their clients.

More of the APNs' education should also focus on a community approach to delivery of care, including the development of community programs for health promotion and disease prevention, such as CHIP III. Programs must be developed to reach the goals of Healthy People 2000 which focus on decreasing the proportion of sedentary Americans. APNs,

with their background and education, are well-prepared for this task. In order to reach a more heterogeneous group of participants and remove the financial barriers to participation, the focus should be on the development of community educational support groups instead of paid programs. However, making such free programs available cannot ensure involvement of low socio-economic status individuals and those individuals who live below or at the poverty level. Those people are not only likely to have low self-efficacy but also are more concerned about meeting their basic needs, even if they are well-informed about the benefits of physical activity. This is a cultural and social problem which has no easy solutions.

Need for Further Research

Nursing research must continue regarding community health and the effectiveness of community programs. The definition of physical activity must be broadened to include household activities, child care and work activity and must not be limited to leisure-time physical activity. More research is needed about interventions that would foster involvement of different populations such as women of ethnic minorities and low socio-economic status since they are the least likely to engage in LTPA. Research must be conducted on what components of CHIP III led to such a significant increase in LTPA participation, so that other programs can be developed

based upon these findings. Measuring self-efficacy along with LTPA behavior of CHIP participants would add valuable information on the effectiveness of this program in influencing lifestyle behavior. There is also a need for more research on a uniform approach to LTPA measurement and categorization into activity levels, along with the clinical significance of the results.

Conclusion

The purpose of this study was to assess the effectiveness of CHIP III in motivating initially sedentary female participants to increase their participation in LTPA 4 months after the completion of the program. Study results revealed that 63.0% (n=41) of the initially sedentary participants (n=65) increased their LTPA participation. A Chi-square (df=2) of 10.8, $p < .005$, suggests that these findings did not occur by chance, but resulted from participation in CHIP III. The findings also suggest that participation in a community program can enable sedentary women to increase their LTPA. However, the interpretation of this study's findings are limited by the characteristics of the self-selected sample, i.e., predominantly white, well-educated women of high socio-economic status. Other limitations identified are the lack of clarity in the concept of "LTPA" and the method used to measure LTPA. Reliability of LTPAQ has been established for this study but

more research using LTPAQ must be done to generalize its reliability. Data related to non-leisure-time physical activity were not collected but if available could possibly have further clarified this concept, thus promoting more accurate measurement of the total physical activity of the participants.

APNs, as clinicians, educators, counselors , assessors and researchers need to be familiar with the latest recommendation on LTPA and the tools available to measure LTPA to appropriately promote physical activity. While CHIP III uses a multi-dimensional approach, it is still a bio-medical model. Even though physical activity is an important factor to promote health and prevent heart disease, other non-measurable and non-physical factors influence the health status of individuals. Factors including spirituality, environment, life satisfaction, relationships, and attitude towards life need to be incorporated when counseling patients. APNs need to address these factors through their holistic approach to health care delivery.

APPENDIX A

APPENDIX A

DEMOGRAPHIC DATA

1. CHIP #

2. Age _____

3. Sex: M - F

4. Marital Status: (Please circle) Married - Divorced - Widowed -
Separated - Single

5. Ethnic origin: (Please circle)

White - Black - Hispanic - Asian - Pacific Islander - American Indian -

Other: -----

6. How far did you go in school?: (Please circle)

Did not complete high school - Completed high school -

1-2 years of college - More than 2 years of college - Technical School

Other: _____

7. Current Employment Status: (Please circle)

Employed full-time - Employed part-time - Unemployed -

Student full-time- Student part-time- Retired- Other: _____

8. Number of people in your household: _____

9. Which of the following best describe your family income from all sources before taxes for 1995?

1. Less than \$20,000

4. \$60,001-80,000

2. \$20,001- 40,000

5. \$80,001-100,000

3. \$40,001-60,000

6. More than 100,000

APPENDIX B

APPENDIX B

LEISURE-TIME PHYSICAL ACTIVITY QUESTIONNAIRE

Physical Activity

This set of questions asks about your leisure time physical activity during the past month. Please respond to each question by placing a mark on the appropriate line.

1. In the past month, did you walk a mile or more at a time without stopping?

YES _____ NO _____

If yes, how many times? _____ time(s) _____ per day _____ per week
_____ per month

Each time (typically) for _____ miles and/or for _____ minutes.

- 2) In the past month, did you...

- a) Jog or run? YES _____ NO _____

If yes, how many times? _____ time (s) _____ per day _____ per week
_____ per month

On average for how long each time? _____ minutes

- b) Ride a bike or exercise bike? YES _____ NO _____

If yes, how many times? _____ time(s) _____ per day _____ per week
_____ per month

On average, for how long each time? _____ minutes

- c) Swim? YES _____ NO _____

If yes how many times? _____ time (s) _____ per day _____ per week
_____ per month

On average, for how long each time? _____ minutes

- d) Aerobics or aerobic dancing? YES _____ NO _____

If yes, how many times? _____ time (s) _____ per day _____ per week
_____ per month

On average for how long each time? _____ minutes

- e) Other dancing? YES _____ NO _____

If yes how many times? _____ time(s) _____ per day _____ per week
_____ per month

On average, for how long each time ? _____ minutes

f) Do calisthenics or exercises? YES ____ NO ____
If yes, how many times? ____ time (s) ____ per day ____ per weeks
 ____ per month
 On average, for how long each time? ____ minutes

g) Garden or do yard work? YES ____ NO ____
If yes how many times? ____ time(s) ____ per day ____ per week
 ____ per month
 On average, for how long each time? ____ minutes

h) Lift weights? YES ____ NO ____
If yes how many times? ____ time(s) ____ per day ____ per week
 ____ per month
 On average, how long each time? ____ minutes

3. In the past month have you done any other exercises, sports or physically active hobbies not mentioned? YES ____ NO ____
If yes, then what? _____

How many times? ____ time(s) ____ per day ____ per week
 ____ per month

Each time (typically) for ____ minutes

4. How does the amount of activity that you reported for the past month compare with your physical activity for the past 12 months? During the past month, were you more active, less active, or about the same? ____ more active ____ less active
 ____ about the same

5. Compared with most people your age and sex, would you say that you are more active, less active, or about the same? ____ more active ____ less active
 ____ about the same

6. Compared with yourself 10 years ago, would you say that you are more active now, less active now, or about the same? ____ more active ____ less active
 ____ about the same

7. How would you describe your health at the present time?

____ excellent ____ good ____ fair ____ poor ____ don't know

8. How satisfied are you with your level of physical activity?

___ very satisfied ___ somewhat satisfied ___ neither satisfied or dissatisfied

___ somewhat dissatisfied ___ don't know

APPENDIX C

APPENDIX C

REQUEST TO PARTICIPATE IN THE CORONARY HEALTH IMPROVEMENT PROJECT (CHIP) PROGRAM

The CHIP program is a four-week, 40-hour educational course designed to help participants make lifestyle changes, especially in their diet, exercise, smoking and outlook on life.

I voluntarily request to participate in the CHIP program, UPON THE FOLLOWING UNDERSTANDINGS AND CONDITIONS:

1. In return for my paid enrollment in the CHIP program, I understand that I will have the opportunity to participate in all core components of the program. This includes the following:
 - a. Three detailed coronary risk factor analyses consisting of a blood test, covering a complete lipid profile (total cholesterol, LDL, HDL, triglycerides) and fasting blood sugar, blood pressure and heart rate, ideal weight determination, lifestyle questionnaire, evaluation of test results and written recommendations for lifestyle improvement
 - b. CHIP handout materials (some 200 pages)
 - c. About 40 hours of instruction.

I also will have the option to participate in the following supplemental CHIP program activities for an additional cost:

- a. Applied Nutrition Workshop
 - b. Guided shopping tours
 - c. Recommended books and materials.
2. I understand that the CHIP program, headed by Dr. Diehl, will recommend choices in diet, exercise and lifestyle pattern. I understand and agree that before making any choices and changes in my diet, medication, exercise routine or any other part of my lifestyle, I should first consult with my physician.
3. To the best of my knowledge, I have no physical or medical condition that will affect my participation in the CHIP program. Should I experience any medical problems while participating in the CHIP program, then I shall inform my physician at once.
4. In addition, I do understand that a small risk is involved in collecting a small sample of blood for the lipid profile. This requires venipuncture, where a vein is punctured by a needle. Though highly remote, the risks include the possibility of fainting and slight bleeding at the site.
5. I RELEASE THE CHIP PROGRAM, HANS DIEHL, BORGESS HEALTH ALLIANCE AND ANY OF THEIR RESPECTIVE REPRESENTATIVES OR AFFILIATES FROM ANY LIABILITIES, WHETHER CAUSED BY NEGLIGENCE OR OTHERWISE, ARISING OUT OF MY PARTICIPATION IN THE CHIP PROGRAM.

I HAVE CAREFULLY READ THIS FORM BEFORE I SIGNED IT. I have had an opportunity to ask questions about the CHIP program and possible risks. My questions have been answered to my satisfaction. I understand that I am free, to ask any questions pertaining to the CHIP program at any time.

Witness: _____ (Signature)

Date: _____ (Printed Name)

APPENDIX D

APPENDIX D

CONSENT FORM FOR THE PARTICIPANTS OF THE CHIP III PROGRAM

I understand that this is a study regarding the effectiveness of the CHIP III program in positively influencing the participants' lifestyle and health habits, and in consequently decreasing the coronary risk factor levels. The knowledge gained is expected to help the CHIP program organizers to improve their services and better meet participants needs.

I also understand that:

1. Participation in this study will involve completing questionnaires about my lifestyle, my medical history and my leisure-time physical activity . Some physical findings such as weight, blood pressure and pulse along with some laboratory findings will also be recorded. The data will be collected 3 times: At the start of the program, at the end of the 4 week program and after 6 months.
2. I have been selected because I am enrolled in the CHIP III program.
3. It is not anticipated there will be any emotional or physical risk participating in this study.
4. The information I provide will be kept confidential and the data coded so that identification of individual participants will not be possible.
5. A summary of results will be made available to me upon my request.

I acknowledge that:

1. I have been given an explanation of this study, opportunity to ask questions, and these questions have been answered to my satisfaction.
2. In giving my consent, I understand my participation in this study is voluntary and I may withdraw at any time, without affecting the services I receive from the CHIP III program.
3. My decision to participate in this study or not will not affect the services I receive from the CHIP III program.
4. I also authorize the researchers to release tabulated aggregate data obtained in this study to scientific literature. I understand that I will not be identified by name.
5. I may call the CHIP III program at Borgess Medical Center at (616) 336-6761 if I have any further questions.
6. I acknowledge that I have read and understand the above information, and agree to participate in this study.

Participant signature

Witness

Date

APPENDIX E

APPENDIX E

CODEBOOK FOR LTPAQ

VARIABLE NAME	VARIABLE DESCRIPTION	CODE
ID	Subject CHIP ID Number	3003 to 3468
Age	Subject age	
Marstat	Marital status	1: Married 2: Divorced 3: Widowed 4: Separated 5: Single
Race	Ethnic origin	1: White 2: Black 3: Hispanic 4: Asian 5: Pacific Islander 6: American Indian 7: Others
School	Education level	1: Did not complete high school 2: Completed high school 3: 1-2 years of college 4: > than 2 years of college 5: Technical school
JOB	Current employment status	1: Employed full time 2: Employed part-time 3: Unemployed 4: Student full-time 5: Student part-time 6: Retired 7: Other
HHOLD	Number of people in the household	1-?

INCOME	Family Income	1: <\$20,000 2: \$20,001-40,000 3: \$40,001-60,000 4: \$60,001-80,000 5: \$80,001-100,000 6: >\$100,000
W1	Walk one mile, LTPAQ1	Y: yes N: no
W1t	Times walked	Enter value
W1pd	Per day	0: not checked 1: checked
W1pw	Per week	0: not checked 1: checked
W1pmth	Per month	0: not checked 1: checked
W1m	Miles walked	enter value
W1mn	Minutes walked	enter value
W1tot	Total walking in minutes per month	
	Compute as : $W1t * [(30 * W1pd) + (4.25 * W1pw) + w1pmth] * Wmn$	

- * If W1=Y but all other walking variables are not given, enter all data as 0 for walking.
- * if W1m given but W1mn omitted, count 1 mile/15 minutes
- * If W1t given in Wpd and Wpw and Wpmth, enter only Wpw.
- * if W1 is yes and W1t is given but W1pd, W1pw and W1pmth are omitted, enter 1 in W1pmth.
- * if range given for W1t and/or for W1mn, enter the highest value.
- * if W1 is yes but W1m and W1mn are omitted, enter 15 for W1mn.

R1	Jog or run, LTPAQ1	Y: yes N: no
R1t:	Times run	enter value
R1pd	Run per day	0: not checked 1: Checked
R1pw	Run per week	0: not checked 1: checked
R1pmth	Run per month	0 : not checked 1: checked
R1mn	Minute run	enter value
R1tot	Total time run in minutes/mth	
	Compute as:	
	$R1t * \{(30 * R1pd) + (4.25 * R1pw) + R1pmth\} * R1mn$	

- * if R1 is yes but all other variables are missing, enter 0 for all variables for run.
- * if times is given in R1pd and R1pw and R1pmth enter only R1pw
- * if R1 is yes and R1t is given but R1pd, R1pw and R1pmth are omitted, enter 1 in R1pmth.

* if range given for R1t and/or R1mn, enter the highest value.

* if R1 is yes and R1mn is omitted, enter 15.

Do the same for the other activity variables as follow:

B1	Ride a bike or exercise bike, LTPAQ1	
S1	Swim, LTPAQ1	
A1	Aerobics or aerobic dancing, LTPAQ1	
D1	Other dancing, LTPAQ1	
E1	Calisthenics or other exercises, LTPAQ1	
Y1	Garden or yard work, LTPAQ1	
L1	Lift weights, LTPAQ1	
O1	Other activities not mentioned, LTPAQ1	
TYPE1	Other activity types, LTPAQ1	Enter type
ONEY1	Physical activity for the past month compared with activity for past 12 months, LTPAQ1	1: More active 2: Less active 3: About the same
OTHPERS1	Physical activity compared with people same age and sex, LTPAQ1	1: More active 2: Less active 3: About the same
TENYEAR1	Physical activity compared with 10 years ago, LTPAQ1	1: More active 2: Less active 3: About the same
HEALTH1	Self-description of health, LTPAQ1	1: Excellent 2: Good 3: Fair 4: Poor 5: Don't know
PALEVEL1	Satisfaction with level of physical activity, LTPAQ1	1: Very satisfied 2: Somewhat satisfied 3: Neither satisfied or dissatisfied

4: Somewhat
dissatisfied

Total 1 Minutes of physical activity per month

Compute as:

$W1_{tot} + R1_{tot} + B1_{tot} + S1_{tot} + A1_{tot} + D1_{tot} + E1_{tot} + Y1_{tot} + L11_{tot} + O1_{tot}$

Tot1cat Categories of activity levels

1: sedentary if total1 ≤ 240 mn/mth

2: moderately active if total1 > 240 and < 600 mn/mth

3: active: if total1 > 600 mn/mth

Levels1 0: sedentary if total1 ≤ 240 mn/mth

1 : active if total1 > 240 mn/mth

Repeat the same procedure with LTPAQ at time 2 and add:

ALUMNI2 Participation in CHIP alumni

Y: yes

N: no

TIMES2 Number of meetings attended

0: 0 meeting

1: 1 meeting

2: 2 meetings

3: 3 meetings

4: 4 meetings

APPENDIX F

APPENDIX F

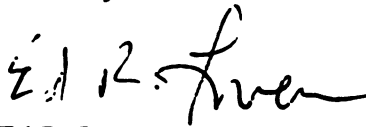
BORGESS HEALTH ALLIANCE

March 26, 1997

To Whom It May Concern:

Marie Paule Loisy, RN, BSN has been given permission by Borgess Health Alliance to conduct secondary analysis on data collected in the Coronary Health Improvement Program (CHIP) III. These data are released to Ms. Loisy with the assurance from her that subjects' confidentiality and anonymity will be maintained. Subjects will not be identified with or by personal name. Also, these data are only to be used in the scope of academic research and may not be published by Ms. Loisy, or others, in a professional or peer review journal without Borgess's written consent. Borgess retains ownership of the data.

The CHIP program has not been reviewed or approved by the Borgess IRB. Review or approval is not seen to be necessary for the operation of the program.

Sincerely,A handwritten signature in black ink, appearing to read "Ed R. Lovern". The signature is fluid and cursive, with the first name "Ed" and last name "Lovern" clearly distinguishable.**Ed R. Lovern****Vice President, Public Relations & Community Benefit Planning**

APPENDIX G

APPENDIX G

MICHIGAN STATE UNIVERSITY

April 22, 1997

TO: Joan E. Wood
A-230 Life Sciences Bldg.

RE: IRB#: 97-289
TITLE: THE EFFECTIVES OF THE CORONARY HEALTH
IMPROVEMENT PROJECT III IN MOTIVATING INITIALLY
SEDENTARY FEMALE PARTICIPANTS TO INCREASE THEIR
PARTICIPATION IN LEISURE TIME PHYSICAL ACTIVITY
4 MONTHS AFTER THE COMPLETION OF THE PROGRAM

REVISION REQUESTED: N/A
CATEGORY: 1-C, E
APPROVAL DATE: 04/21/97

The University Committee on Research Involving Human Subjects' (UCRIHS) review of this project is complete. I am pleased to advise that the rights and welfare of the human subjects appear to be adequately protected and methods to obtain informed consent are appropriate. Therefore, the UCRIHS approved this project and any revisions listed above.

RENEWAL: UCRIHS approval is valid for one calendar year, beginning with the approval date shown above. Investigators planning to continue a project beyond one year must use the green renewal form (enclosed with the original approval letter or when a project is renewed) to seek updated certification. There is a maximum of four such expedited renewals possible. Investigators wishing to continue a project beyond that time need to submit it again for complete review.

REVISIONS: UCRIHS must review any changes in procedures involving human subjects, prior to initiation of the change. If this is done at the time of renewal, please use the green renewal form. To revise an approved protocol at any other time during the year, send your written request to the UCRIHS Chair, requesting revised approval and referencing the project's IRB # and title. Include in your request a description of the change and any revised instruments, consent forms or advertisements that are applicable.

**PROBLEMS/
CHANGES:** Should either of the following arise during the course of the work, investigators must notify UCRIHS promptly: (1) problems (unexpected side effects, complaints, etc.) involving human subjects or (2) changes in the research environment or new information indicating greater risk to the human subjects than existed when the protocol was previously reviewed and approved.

If we can be of any future help, please do not hesitate to contact us at (517)355-2180 or FAX (517)432-1171.

Sincerely,

David E. Wright
David E. Wright, Ph.D.
UCRIHS Chair

DEW:bed

cc: Marie Loisy



OFFICE OF RESEARCH AND GRADUATE STUDIES

University Committee on
Research Involving
Human Subjects
(UCRIHS)

Michigan State University
246 Administration Building
East Lansing, Michigan
48824-1045

517/355-2180
FAX: 517/432-1171

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