AN ABSTRACT OF THE DISSERTATION OF

Amy A. Eyler for the degree of Doctor of Philosophy in Public Health presented on May 22, 1998. Title: Social Influences on Physical Activity in Minority Women

Abstract approved: Redacted for Privacy
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Background: Decades of research indicate that physical activity is an important behavior for health promotion and disease prevention. Despite dissemination of these research findings, many American adults are sedentary. The rates for sedentary behavior vary by race/ethnicity and gender. Women and adults from minority groups are most likely to be sedentary. Research on adults who are physically active has identified several factors that predispose, enable, and reinforce this behavior. The presence of social support is one such factor.

Purpose: The purpose of this study was to identify the nature and extent of social influence on physical activity in a nationally-representative sample of minority women.

Methods: A telephone survey of 2912 women ages 40 and older from various racial/ethnic groups was conducted from July 1996 to June 1997. Information on physical activity as well as other preventive health behaviors was collected.

Analysis: Descriptive analyses were done on physical activity levels (including an accumulation of household and occupational physical activity), physical activity-related social support (PASS), support network, and measures of social contact. Logistic regression was used to determine differences in PASS levels and physical activity. Linear Regression was used to determine the relationship between social influence and physical activity level.

Results: Women with high levels of physical activity-related social support were more likely to meet recommended levels of physical activity. There was no difference by racial/ethnic group. An index of social influence was not a significant predictor or physical activity level among all women in the sample.

Conclusion: While women with higher levels of specific support for physical activity were more likely to be physically active, a more general measure of social support did not predict level of physical activity. More research is needed in assessment of both physical activity and social support in this population.

SOCIAL INFLUENCES ON PHYSICAL ACTIVITY IN MINORITY WOMEN

by

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A DISSERTATION

Submitted to

Oregon State University

in partial fulfillment of
the requirements for the
degree of

Doctor of Philosophy

Presented May 22, 1998
Commencement June 1999

Doctor of Philosophy dissertation of Amy A. Eyler presented on May 22, 1998

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Amy A. Eyler, Author

ACKNOWLEDGEMENT

This dissertation was completed with the guidance and patience of many people. I would like to thank Dr. Rebecca Donatelle for her advisement throughout my doctoral program and with this paper. Also, I would like to give special acknowledgement to Dr. Ross Brownson at the Saint Louis University Prevention Research Center for giving me the opportunity to be a part of this research and for being a source of endless inspiration. My biggest thanks, however, go to my husband, Scott. Without his loving support and patience I could never have completed this paper.

The project described in this paper was funded through the Centers for Disease Control and Prevention contract U48/CCU710806 (Centers for Research and Demonstration of Health Promotion and Disease Prevention), including support from the Community Prevention Study of the NIH Women's Health Initiative.

CONTRIBUTION OF AUTHORS

Drs. Rebecca Donatelle, Ross Brownson, and Abby King assisted in writing, editing, and preparation of the manuscripts. Drs. David Brown and Gregory Heath provided information from national surveys and gave assistance in data analysis. Dr. James Sallis provided expertise and recommendations in the area of social support and physical activity.

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DEDICATION

This dissertation is dedicated to my mother, Beatrice Gajewski, for always encouraging me to read and learn.

Social Influences on Physical Activity in Minority Women

1. INTRODUCTION

1.1 Background

Decades of research indicate that physical activity is an important behavior for health promotion and disease prevention. Specifically, physical activity may contribute to such health benefits as lower risk of cardiovascular disease (Paffenbarger, Wing et al. 1978; Blair, Kampert et al. 1996; United States Department of Health and Human Services 1996) better control of hypertension (Stamler, Stamler et al. 1989; Folsom, Prineas et al. 1990; Paffenbarger, Jung et al. 1991),and diabetes mellitus (Helmrick, Ragland et al. 1991; Kaye, Folsom et al. 1991; Manson, Rimm et al. 1991; Manson, Willett et al. 1995), reduced risk of certain types of cancer (Vena, Graham et al. 1987; Lee 1993; Bernstein, Henderson et al. 1994), and lower risk of osteoporosis (Chow, Harrison et al. 1986; Dalsky, Stocke et al. 1988). It has been estimated that as many as 250,000 deaths per year in the United States, (approximately 12% of the total deaths per year) are attributable to a lack of regular physical activity or exercise (McGinnis and Foege 1993). Despite wide dissemination of these research findings, the number of sedentary Americans has changed very little in the past 15 years (United States Department of Health and Human Services 1995).

Almost one quarter of American adults are completely sedentary, and over half are irregularly active and do not exercise enough to meet recommendations (Pate, Pratt et al. 1995). In response to the high number of sedentary and irregularly active adults and the growing body of research promoting the health benefits of physical activity, the first-ever *Surgeon General's Report on Physical Activity and Health* was recently published (United States Department of Health and Human Services 1996). This report summarizes salient research on the benefits of physical activity and highlights the need for more research, interventions, and policies promoting an increase in the nation's physical activity level, especially in underserved populations.

One population that appears to be particularly vulnerable to hypokinetic-based risks is minority women. For some minority groups, rates of physical activity are virtually unexplored. For example, national measures of physical activity prevalence among American Indian/Alaskan Native or Asian/Pacific Islander women in the United States are unknown. However, the limited information available suggests that minority women are less likely to be involved in physical activity than their White counterparts (Centers for Disease Control and Prevention 1994). From data that are available, Black women have the highest rates of physical inactivity compared to Hispanic and White women(DiPietro and Caspersen 1991). According to 1994 National Behavioral Risk Factor Surveillance Survey Data (BRFSS), 46% of Black women were physically inactive (Brownson, Heath et al. In Review). Nearly as many (44%) of Hispanic women were physically inactive (Brownson, Heath et al. In Review).

Although some minority groups have been included in national surveys, the accuracy of the results are questionable due to the type of assessments used. Many of the standard assessments used to measure physical activity have been developed and tested almost exclusively on men (Blair, Kohl et al. 1993). Extrapolating male test results to their female counterparts may result in serious limitations in data analysis and subsequent interpretation.

Although gender bias may pose significant problems in applying past research to women, several factors appear to contribute to vast differences in survey results. Perhaps one of the largest problems relates to actual validity of instruments, particularly as it relates to interpretation of key constructs. For example, surveys measuring "leisure-time" physical activity may be misinterpreted by women (especially minority women) who do not understand the meaning of "leisure-time" as it is conventionally defined (Yeager, Macera et al. 1993). Additionally, women are found to be less active than men if sporting or vigorous activities are a prominent component of surveys. However, these women have physical activity rates similar to men if other levels of physical activity such as household or other chores are included (Ainsworth, Richardson et al. 1993; Yeager, Macera et al. 1993). Ainsworth et al. (1993) found a significant increase in women's reported physical activity when a household physical activity component was added to the assessment(Ainsworth, Richardson et al. 1993). In a study by Slater and Green (1987), the amount of physical activity reported for women of childbearing age from the National Center for Health Statistics (NCHS) depended on how the physical activity questions were asked and the type of responses offered as options. Prevalence estimates of activity levels from three different NCHS surveys ranged from 3.9-39% (Slater, Green et al. 1987).

In a recent focus group study with minority women, it was clear that the difficulty in assessing physical activity was due to the misinterpretation of the definitions used. When the women in the focus groups were given the definition of moderate physical activity that included housework or other vigorous chores, the majority of women said they were physically active. These same women would have been considered sedentary if assessed by traditional means (Eyler, Brownson et al. 1997). Difficulties in finding a standard reference point for assessing physical activity levels have led to consistent questions about the validity of previous research.

Since traditional assessments are used to determine national prevalence rates of physical inactivity, rates may reflect only a gross estimate of minority women who are physically active. Using these estimates, over a two-fold increase in the number of women who participate in regular physical activities is needed in order to meet the physical activity goals set in Healthy People 2000. While there are no goals specific to women, the general goal for physical activity is to increase the number of adults who engage in moderate daily activity to at least 30% and reduce sedentary lifestyles to no more than 15% (United States

Department of Health and Human Services 1990). Based on current statistics, this goal will be difficult for women and possibly pose an insurmountable goal for minority women to achieve by the year 2000. More research that includes women, specifically minority women, is needed to identify appropriate physical activity measures. In addition to appropriate assessment of physical activity, barriers to physical activity need to be recognized and adequately addressed in interventions.

Limited research with minority women indicates that several factors serve as barriers to physical activity. First, Blacks and other minorities often experience poorer levels of health and functional status than White Americans (Ford, Haug et al. 1990; Clark, Maddox et al. 1993), ,and disproportionately high rates of morbidity and mortality (Kagawa-Singer 1995) which may inhibit participation in physical activity (Lee 1993). For instance, the Black/White death rate ratio of females is 1.5 for heart disease, 1.8 for stroke, and 1.2 for cancer (Manton, Patrick et al. 1989). The prevalence of diabetes is also higher in Black women than in White (Lillie-Blanton, Martinez et al. 1993). The prevalence of overweight (49.2%) among Black women remains the highest of all groups identified by race and sex (Kuczmarski, Flegal et al. 1994).

Hispanic women also fare worse than whites in several diseases and risk factors. Results from the Hispanic Health and Nutrition Examination Survey (HHANES) have shown that compared with non-Latino whites, Latina women have a two- to threefold increase in the prevalence of overweight (CDC, 1989) and a two- to fourfold increase in the prevalence of diabetes (Flegal, Ezzati et al. 1991).

American Indian/Alaskan Natives have a unique set of health problems. Exceptionally high rates of diabetes and obesity are common among some tribes (Kauffman and Joseph-Fox 1996). Although heart disease rates are lower for American Indian/Alaskan Natives than for Whites, the rates are rapidly increasing mainly due to increasingly unhealthy lifestyles (Kauffman and Joseph-Fox 1996).

In addition to higher morbidity and mortality rates, another factor that may contribute to the low levels of physical activity in minority women is socioeconomic status. In general, minorities have lower educational attainment and higher rates of poverty than whites. According to 1995 US Census data, 73.8%, 66%, and 53.4% of Black, American Indian/Alaskan Native, and Hispanic adults, respectively, completed four years of high school as compared to 83% of white adults in the United States (United States Bureau of the Census 1995). Also, 29.3%, 31%, and 30.3% of Black, American Indian/Alaskan Native, and Hispanic adults, respectively, live in poverty as compared to 11.2% of whites (United States Bureau of the Census 1995). Health promoting behaviors such as physical activity are often shown to be positively associated with education and income (Ford, Haug et al. 1990; King, Blair et al. 1992), thus with lower levels of education and income, rates of physical activity in minorities presumably, are lower.

In addition to socioeconomic status, traditional social roles may be a barrier to physical activity for many women. The physically active woman is a relatively new phenomenon. For years, sports and other physical activities were geared toward men (Lutter 1994). Generations of women were discouraged from being physically active so as not to damage their reproductive organs or interfere with motherhood (Lutter 1994). Competition in sports was seen as "unladylike" and there was widespread belief that women who participated in sports developed masculine appearances (Yeager, Macera et al. 1993; Lutter 1994).

In addition to social roles, traditional gender roles may influence physical inactivity in minority women. Women are more likely than men to have domestic responsibilities, and outside employment thus leaving little time to exercise or increase levels of physical activity (Johnson, Carrigan et al. 1990). Verhoef et al. (1992) found that women who have children exercise less than those who do not, ostensibly due to excessive demands on both time and energy (Verhoef, Love et al. 1992). Of special importance in minority populations is the added responsibility of single-parenting and taking responsibility for extended family (Eyler, Baker et al. In press). All of these domestic obligations may act as barriers and contribute to the high prevalence of sedentary behavior in minority women.

Despite what may seem like overwhelming barriers to increasing physical activity, one factor has shown promise in several health behavior change interventions. Both friend and family support have been found to be important factors in smoking cessation maintenance (Rice, Templin et al. 1196; Salazar, Becker et al. 1994), weight management (Cwikel and Isreal 1987; Feuerstein, Papciak et al. 1989), and preventive health practices such as mammography/pap smear usage(Suarez, Lloyd et al. 1994). The social support of family and friends has also been found to be related to physical activity participation. Dubbert et al. (1992) found that family participation is a strong predictor of exercise maintenance for women(Dubbert 1992). Spousal support has been positively associated with maintenance in exercise programs (Dubbert 1992; Dishman and Sallis 1994). Family social support has also been shown to be a predictor of physical activity participation in a population of mainly white adults. (Baranowski, Nader et al. 1982; Treiber, Baranowski et al. 1991; Dubbert 1992; Dishman and Sallis 1994).

As promising as the results from these studies may seem, research in this area is quite preliminary. As with general physical activity research, very few of these studies on social support have included minority women (Folsom, Cook et al. 1991).

It is well documented that social support and other factors predispose, reinforce, and enable positive health behaviors such as physical activity in those who are White, educated, and of higher socioeconomic status (United States Department of Health and Human Services 1996). Conversely, little is known about the same factors among those who are less advantaged, including minority women.

1.2 Statement of Problem

Presently, no population-based data exist on the nature and extent of social influences on physical activity among middle and older-aged adult women of various racial and ethnic minorities. In order to develop physical activity interventions for this high-risk population, it is necessary to assess social, personal, and environmental factors that may influence the initiation and maintenance of physical activity.

1.3 Purpose

The purpose of this study was to identify those factors in the social environment of minority women that appear to be associated with increased levels of physical activity. This study also explored differences in social influences among physically active and sedentary minority women.

1.4 Definitions

Physical Activity: any bodily movement produced by skeletal muscles that results in energy expenditure.

<u>Leisure-time Physical Activity:</u> participation in exercises, sports or physically active hobbies as recreation.

<u>Housework Activity:</u> participation in domestics activities such as vacuuming, mopping, lifting/carrying laundry, or other vigorous household chores.

<u>Occupational Activity:</u> participation in work-related physical activities such as walking, lifting/carrying heavy objects, or other strenuous tasks defined by participant.

<u>Physically Active:</u> those individuals who meet the CDC/ACSM guideline of "accumulating 30 minutes or more of moderate-intensity physical activity on most days of the week" (Pate et al, 1995). This 30 minute total may come from leisure-time activities, housework, or occupational activity or a combination of the three (also defined as cumulative activity).

<u>Sedentary:</u> those individuals who reported not participating in any leisure time physical activity.

<u>Regular Exercisers:</u> those individuals who participate in leisure-time physical activity at a minimum of moderate intensity, for at least 30 minutes per session, at least 5 days a week.

<u>Social Support:</u> an interactive process in which particular actions or behaviors can have a positive effect on an individual's social, psychological, or physical well-being (O Reilly 1988).

<u>Social Network:</u> the number of close friends and relatives identified by an individual.

<u>Support Network:</u> members of one's social network that may provide emotional support and encouragement.

<u>Social Influences:</u> a cumulative term describing both social network and support network as well as other measures of social contact such as employment, church attendance, and marital status.

<u>Physical Activity Social Support:</u> specific support that close family and friends of an individual may have on level of physical activity level of that individual.

1.5 Research Questions

Does the nature and extent of social influence predict physical activity among minority women?

Hypotheses:

H1. Participation in cumulative physical activity to the level of the ACSM/CDC recommendation will be related to the level of social influence.

H2. Level of regular exercise participation will be directly related to the level of specific physical activity social support.

Is there a difference among Black, Hispanic, American Indian/Alaskan Native, and White women in the social influence on physical activity?

Hypotheses:

H1: Social influence will equally predict fulfillment of the ACSM/CDC recommendation for physical activity among minority groups.

H2: Social influence will equally predict level of regular exercise participation in minority women

Do physical activity levels for those who receive support for physical activity from friends differ from those who receive physical activity social support from family members?

Hypotheses:

H1: High levels of social support from family and high levels of social support from friends will equally predict fulfillment of the ASCM/CDC recommendation for physical activity.

H2: High levels of social support from family and high levels of social support from friends will equally predict regular exercise participation.

1.6 Limitations

There are limitations to this study. First, there are several limitations inherent in any research with minority groups. With minority research, it is difficult to generalize results from sub-groups and sub-cultures of a population. For instance, American Indian tribes are very different from one another (e.g. reservation vs. urban living environment) (Tom-Orme 1995). What may be a physical activity barrier to women living on a reservation may not be relevant to those living in urban settings. Also, level of acculturation may make it difficult to generalize results. A woman who is a recent immigrant to the United States will invariably have different attitudes about physical activity or difficulty expressing these attitudes due to language barriers than a woman of the same ethnicity that was born in the United States or has lived in the United States for several years (Eyler, Baker et al. In press).

Another limitation of this study was the survey language. Even though representative focus groups were held to help identify problem areas with the survey, lack of understanding about "physical activity" and "exercise" may still have affected results of women who were not familiar with the definitions or recommendations prior to this study.

A fourth limitation of this study was the method of data collection. The survey data was collected via telephone and thus the sample was limited to only those households with telephones. Although people with telephones tend to be younger and better educated than those without, the difference between estimates obtained using phone surveys and the household interview approach has generally been found to be small (Marcus and Crane 1986).

1.7 Delimitations

A nationally representative sample of 3,000 Black, Hispanic, American Indian/Alaskan Native, and White women were surveyed on the determinants of physical activity. The sample size, representativeness, and the content of the survey make it unique.

One delimitation of this study is the omission of Asian American women from the sample. The original sampling frame included Asian Americans. However, due to the unsuccessfulness of the pilot-test (2000 calls for 14 completed interviews), the reluctance of the Asian American women to participate once they were reached, and language barriers led the research team to make the most cost-effective use of resources available and drop Asian-American women from the sample.

2. LITERATURE REVIEW

Despite a great deal of epidemiologic and clinical research on physical activity and health, availability of guidelines to promote and increase physical activity among the general population, (Pate, Pratt et al. 1995), and the recent release of the Surgeon General's Report on Physical Activity and Health (United States Department of Health and Human Services 1996), relatively little is known about patterns of physical activity among American women, particularly minority women. Furthermore, although research in recent decades identified benefits from being physically active, (Caspersen and Merritt 1995; Pate, Pratt et al. 1995) many of the studies have been conducted solely on men (e.g. Paffenbarger et al., 1986) or have included a disproportionately small number of women (e.g. Sherman et al.,1994). In addition, tools to measure physical activity that were developed and tested almost exclusively on men frequently are used to estimate the level of physical activity in women (Blair, Kohl et al. 1993).

Not surprisingly, little is known about which behavioral strategies might be effective in encouraging women to begin or maintain a physically active lifestyle. This review presents a summary of principal studies on the benefits of physical activity that have included U.S. women, discusses several measures of the prevalence of physical activity among U.S. women, and identifies social support as a possible determinant for increasing physical activity in this population.

2.1 Health Benefits of Physical Activity

2.1.1 Improvements in Cardiovascular Disease Risk

Physical activity has considerable promise for preventing chronic disease. Cardiovascular disease (CVD) and coronary heart disease (CHD) in particular, has been studied extensively in men, but not in women. The Surgeon General's report found that only 8 of 55 population-based studies that cardiovascular disease and physical activity or cardiorespiratory fitness included women (United States Department of Health and Human Services 1996). Studies that describe CHD mortality and physical activity produced consistent results for men, but those including women have had varied results (Blair, Kohl et al. 1993). A 1989 report from Blair et al. found a strong, positively graded association in women between a single measure of physical fitness and mortality from cardiovascular disease; i.e. higher levels of fitness predicted lower risks of mortality. Blair et al.(1996), reported low fitness to be an independent predictor of all-cause mortality in women (Blair, Kampert et al. 1996). However a 1993 report by, Blair, Kohl, Barlow found an inverse association between all-cause mortality and physical fitness, but no relation between physical activity and mortality in women (Blair, Kohl et al. 1993). Similarly, a review by Powell et al.(1987) found that 71% of published studies found no relationship between CHD and activity in women (Powell, Thompson et al. 1987) . More recently, Sherman et al.(1994) also failed to find an association between level of physical activity and cardiovascular mortality rates in women (Sherman, D'Augustino et al. 1994). Failure to find an association may be due to inclusion of a relatively small number of women and thus reducing the chance of finding statistical significance (Blair, Kohl et al. 1993; Sherman, D'Augustino et al. 1994). Because of hormonal influences, women initially lag far behind men in the incidence of coronary heart disease; studies of certain populations could well suffer from a dearth of women. Another possibility is that physical activity measures that were developed and validated primarily on men may be inadequate for assessing physical activity levels in women (Blair, Kohl et al.1993).

Despite the varied results in relating physical activity and cardiovascular disease mortality, studies show that women who are active have more favorable cardiovascular risk profiles than inactive women. Improved blood pressure (Dannenberg, Keller et al. 1989; Folsom, Prineas et al. 1990; Ainsworth, Keenan et al. 1991; Young, Haskell et al. 1993; Kokkinos, Holland et al. 1995) and improved body mass index (Folsom, Prineas et al. 1990; Young, Haskell et al. 1993; Kokkinos, Holland et al. 1995; Anspaugh, Hunter et al. 1996) have both been associated with increased physical activity. Studies have demonstrated that physical activity is tied to better blood lipid concentrations (Ainsworth, Keenan et al. 1991; Owens, Matthews et al. 1992; Young, Haskell et al. 1993; Macera, heath et al. 1994; King, Haskell et al. 1995; Anspaugh, Hunter et al. 1996). For example, King et al. (1995) found subjects improved their high density lipoprotein (HDL) cholesterol concentrations as a result of physical training (King, Haskell et al. 1995). Macera et al. (1994) found favorable changes in HDL cholesterol were associated with self-reported increases in leisure-time physical activity among white women but not African-American women (Macera, heath et al. 1994). However, HDL levels improved among most women in this four-year follow-up study independently of physical activity status (Macera, heath et al. 1994). Conversely, in a randomized study by Cauley et al. (1987), older women who participated in a physical activity program did not experience increased HDL cholesterol after two years (Cauley, Kriska et al. 1990). Differences in these studies may be attributable to variations in measurement of the mode, frequency, and intensity of physical activity rather than true differences in physical parameters.

2.1.2 Physical Activity and Cancer Risk

Although many researchers have examined the relationship of physical activity and cancer, relatively few have considered women specifically. Two reports on colon cancer suggest that the reduction in gastro-intestinal time (resulting from physical activity) lowers risk of this disease by decreasing exposure to possible carcinogens (Shepard 1990; Potter, Slattery et al. 1993). A higher level of physical activity may also reduce the risk of colon cancer through its effect on prostaglandins (Bartram and Wynder 1989). Slattery et al. (1988) found that active women, especially those who were vigorously active, had a lower risk of colon cancer than those who were inactive (Slattery, Schumacher et al. 1988). Ballard-

Barbash et al. (1990), reported that physically inactive women had only a modest relative increase in the risk of this disease but their results may have been affected by the narrow range of physical activity measured and the small number of subjects who reported intense physical activity (Ballard-Barbash, Schatzkin et al. 1990).

Shepard has hypothesized that regular physical activity moderates the functions of sex hormones (Shepard 1990) and therefore may reduce cancer risk, especially breast cancer. In the case of breast cancer, the most common cancer among U.S. women other than those of the skin, (American Cancer Society 1996)the evidence of the benefits of physical activity is mixed.

Several studies support the hypothesis that active women have lower breast cancer rates, (Frisch, Wyshak et al. 1987; Albanes, Blair et al. 1989; Bernstein, Henderson et al. 1994; Mittendorf, Longnecker et al. 1995) but other studies have found an increased risk of breast cancer with physical activity (Dorgan, Brown et al. 1994) or no association between activity and the risk of this disease (Taioli, Barone et al. 1995). A recent review of epidemiologic studies indicates that physically active women as a group have a decreased risk of breast cancer, but several of the studies have methodological limitations

(Friedenreich and Rohan 1995). The review authors noted that comparability of studies is limited because of differences in physical activity assessment, study design (e.g., retrospective versus prospective), and the level of control for possible confounders (e.g., obesity, parity).

2.1.3 Reducing Osteoporosis Risk with Physical Activity

The relationship of physical activity to osteoporosis has been the subject of considerable research. This condition, characterized by loss of bone density, is responsible for 1.5 million fractures a year, which in addition to causing pain and suffering may lead to disability, high medical costs, and loss of independence (Avioli 1993). Prevention of osteoporosis by increasing or maintaining bone mass may be pursued by increasing calcium intake, undergoing hormone replacement therapy, and being physically active. By engaging in lifetime physical activity, women can enhance peak bone mass, allowing them to begin the inevitable period of bone loss with a better store of bone (Barth and Lane ; Steinberg and Roettger 1993).

Much of the research on osteoporosis and its relationship to physical activity has been conducted among women. Evidence suggests that bone mineral increases in response to application of mechanical stress although the type, duration, frequency, and intensity of exercise appropriate for applying this stress has not been defined (Snow-Harter and Marcus 1991). Cross-sectional studies report that athletic women have higher bone densities than non-athletic women, which supports the hypothesis that exercise is effective in maintaining bone mass (Snow-Harter and Marcus 1991; Marcus, Drinkwater et al. 1992). Both randomized and non-randomized trials have reported modest correlations between bone density and several types of physical activity (Pocock, Eisman et al. 1986; Dalsky, Stocke et al. 1988; Zystra, Hopkins et al. 1989; Snow-Harter and Marcus 1991; Krall and Dawson-Hughes 1994; Greendale, Barrett-Connor et al. 1995). However, because there is a strong association between muscle strength and bone mineral density (Snow-Harter and Marcus 1991; Marcus, Drinkwater et al. 1992) more research is needed to identify the mechanism that mediates this relationship.

2.1.4 Physical Activity and Mental Health Status

Regular physical activity enhances psychological health as well as physical health. Psychological problems are widespread; in a National Institute of Mental Health study; 15.4% of adult participants reported at least one mental disorder in the previous month(Reiger, Botd et al. 1988). Stress-related conditions such as anxiety and depression accounted for most of the disorders (Reiger, Botd et al. 1988). In general, women are more likely to suffer from depression than men (American Psychological Association 1996). Four epidemiological studies on physical activity and mental health in men and women (Farmer, Locke et al. 1988; Ross and Hayes 1988; Camacho, Roberts et al. 1991; Thirlaway and benton 1992), as well as several intervention studies (Greist, Eischens et al. 1979; Doyne, Chambless et al. 1983; Doyne, Ossip-Klein et al. 1987; King, Taylor et al. 1993; Brown, Wang et al. 1995)indicate that physical activity has positive effects on mental health. In a group of men and women, Greist et al.(1979) found that a 12-week exercise program was as effective as two other types other treatments (both psychotherapy) for reducing depression, and improvements in depression persisted (Greist, Eischens et al. 1979). Aerobic exercise (Doyne, Chambless et al. 1983; Doyne, Ossip-Klein et al. 1987) and weightlifting (Doyne, Ossip-Klein et al. 1987) have also been used to treat depression effectively and improve self-concept in women (Ossip-Klein, Doyne et al. 1989). Finally, exercise has also been shown to decrease levels of perceived stress and anxiety (King, Taylor et al. 1993) and to enhance mood (Brown, Wang et al. 1995).

2.2 Prevalence of Physical Activity

Despite the well-established benefits of physical activity, millions of US adults remain essentially inactive (United States Department of Health and Human Services 1996). Indeed less than half of adult Americans engage in regular leisure-time physical activity (Caspersen and Merritt 1995). Women consistently have lower rates than men (Dishman and Sallis 1994; Caspersen and Merritt 1995; United States Department of Health and Human Services 1996). The 1990 National Health Interview Survey, for example, found that 34.3% of women (31.2% of men) reported no physical activity in the previous month. In that study only 5.9% of women (8.2% men) were classified as regularly exercising at the recommended levels (Caspersen and Merritt 1995). The 1994 Behavioral Risk Factor Surveillance System (BRFSS) survey had similar findings. These data indicate that 32.6% of women (27.7% of men) reported no leisure-time physical activity in the previous month (G.W. Heath, personal communication). Only 18.6% of women (20.4% of men) met the American College of Sports Medicine recommendation for regular, sustained, moderate physical activity. Finally, in the Minnesota Heart Health Study, 17% of women (34% of men) reported a leisure-time energy expenditure of 2,000 kcal/week or greater (Ford, Merritt et al. 1991). There are also discrepancies by gender among adolescents. Only 56% of girls (compared to 75% of boys) in grade 9-12 were classified in a 1993 national survey (which used self-report) in the category "vigorous physical activity", defined as engaging in "activities that made them sweat and breathe hard for at least 20 minutes on $\geq$ 3 of the 7 days preceding the survey" (Centers for Disease Control and Prevention 1995).

In surveys that stratified data by age, older women (e.g. 65 years and older) had the lowest rates of aerobic activity of any sociodemographic group (Lee 1993; Caspersen and Merritt 1995). In one such study, the Stanford Five-City Project, women 65-74 years old age group averaged only six minutes of activity per week (Sallis, Haskell et al. 1985). An analysis of rural New York Behavioral Risk Factor Surveillance System (BRFSS) survey data found that 56.3% of women over 65 were sedentary (Eaton, Nafziger et al. 1994). Even in high school, being older can mean less exercise. In the 1993 Centers for Disease Control and Prevention survey, rates of vigorous physical activity among girls decreased as their grade level rose (9th grade 68%; 10th grade 61%; 11th grade 53%; and 12th grade 45%) (Centers for Disease Control and Prevention 1995).

Women who are members of minority groups seem less likely than white women to be physically active. The 1994 Behavioral Risk Factor Surveillance System (BRFSS) Survey, for example, found that 46.3% of non-Hispanic black women (29.8% white women) were physically inactive. Folsom et al. (1991) found that the disparities between Black and White women are due primarily to socio-economic variables (Folsom, Cook et al. 1991), but others (King, Blair et al. 1992)suggest that Black women have consistently been found to be less active when studies are controlled for socioeconomic status.

Hispanic women as well have lower activity rates than White women (Centers for Disease Control and Prevention 1993; Centers for Disease Control and Prevention 1994). In the 1994 Behavioral Risk Factor Surveillance System (BRFSS) survey, 44.2% of Hispanic women were physically inactive. An analysis of BRFSS data for the San Francisco area supported the national finding; Latinas there were significantly less likely than non-Latina whites to ever report exercising or exercising daily (Perez-Stable, Marin et al. 1994). Among adolescents, similar findings were obtained in the 1993 Centers for Disease Control survey; 59% of white girls in grades 9-12 were classified as participating in vigorous physical activity, versus 50% of Hispanic and 49% of African Americans (Centers for Disease Control and Prevention, 1995).

Few population-based data exist on physical activity patterns among other racial/ethnic groups. Limited information suggests that rate of physical activity among American Indians and Alaskan Natives as well as Asians and Pacific Islanders are lower than those for whites (Centers for Disease Control and Prevention, 1994).

Rates of physical activity may also be biased by the types of assessments used. Two studies have found women to be less active than men if sporting or vigorous activities are a prominent component of surveys. These studies also indicated that women have physical activity rates similar to men if household or other chores are included (Ainsworth, Richardson et al. 1993; Yeager, Macera et al. 1993).

Using questions on "leisure-time" physical activity to determine overall levels of physical activity may be inappropriate for those women (particularly minority women) who have no "leisure-time" as it is conventionally defined (Yeager, Macera et al. 1993). In a study by Slater et al.

(1987), the amount of physical activity reported for women of childbearing age from The National Center for Health Statistics (NCHS) depended on how the physical activity questions were asked and the kinds of responses available. The authors found that prevalence estimates of activity levels from three different NCHS surveys ranged from 3.9% to 39.1% (Slater, Green et al. 1987). It appears that difficulties in assessment explain much of the difference between the genders in physical activity research (Dannenberg, Keller et al. 1989; Blair, Kohl et al. 1993; Yeager, Macera et al. 1993).

2.3 Determinants and Barriers of Physical Activity

Interventions to increase the levels of physical activity among women should be informed by an understanding of the determinants of being physically active. Equally important are past and present barriers to exercise for women. An example of a past barrier is the general history of physical activity in women. Social and gender roles reinforced the belief that physical activity was not for women. Competition in sports was seen as "unladylike" and there was a widespread belief that women who participated in sports developed a masculine appearance

(Lutter 1994; Yeager and Macera 1994). Women who are now middle-aged or older (and thus, at increased risk for chronic disease) were discouraged from vigorous physical activity in their youth and most have had little experience with physical activity other than limited school physical education (O'Brien and Vertinsky 1991; Lutter 1994). A lack of education and a lack of skills are both important barriers to physical activity in the female population as a whole (King, Blair et al. 1992; Dishman and Sallis 1994).

If they do not have a history of physical activity at a young age, women are less likely to be physically active as adults (King, Blair et al. 1992; Sallis, Hovell et al. 1992). For example, Ebrahim and Rowland (1996) found that levels of sporting activity were predicted by previous sports participation at school and in early life (Ebrahim and Rowland 1996). Similarly, lack of experience may be reflected in a negative attitude toward exercise. Wilcox and Storandt (1996) found that older women had much worse attitudes about exercise than younger women (Wilcox and Storandt 1996).

Unfortunately, even though Title IX of the 1972 Education Act greatly increased athletic opportunities for college women, many women who came of age in the 1970's or 1980's appear to be choosing the path of earlier generations with minimal participation in physical activity. The mothers of these women may have been taught that physical activity is inappropriate and, through their own behaviors, influenced their daughters not be active. A mother's modeling of activities and her support (or lack of support) strongly predict later physical activity in the daughter (Johnson, Carrigan et al. 1990).

Not having enough time for physical activity is also a common reason for lack of physical activity in women. Eaton et al.(1994) found in a New York Study that lack of time was the most common reason women reported for physical activity (Eaton, Nafziger et al. 1994). Women are more likely than men to have domestic responsibilities, which frequently must be met while they have outside employment (Johnson, Carrigan et al. 1990). Furthermore, the proportion of women with children under the age of six who work outside the home has increased dramatically from 18.6% in 1960 to 61.7% in 1994 (United States Bureau of the Census 1995). Verhoef, Love & Rose (1992) found that women who have children exercise less than those who do not principally because they lack time and energy (Verhoef, Love et al. 1992). More recently, however, these authors found that number of children, employment, and marital status were unrelated to level of participation in exercise which suggests that motherhood itself is a barrier (Verhoef and Love 1994).

2.4 Social Support

2.4.1 Background

One determinant of increased physical activity as well as other healthy behavior changes, is the presence of social support. Within the literature, the term "social support" has been used to refer to a wide range of variables. In general, social support has been defined as an interactive process in which particular actions or behaviors can have a positive effect on an individual's social, psychological, or physical well-being (O Reilly 1988). Social support is considered to be a dynamic phenomenon. It has determinants which are internal to the individual (e.g. temperament or patterns of perceiving and interacting with the environment) and those which are externally mediated (e.g. social role definitions) (Broadhead, Kaplan et al. 1983). Much of the research on social support and health is based on the premise that social support may influence health outcomes by encouraging individual behavior (House, Robbins et al. 1982; Cohen 1988; House, Landis et al. 1988; Bloom 1990; Cohen and Herbert 1996; Uchino, Cacioppo et al. 1996). Social support may influence health directly by providing access to information or by enhancing motivation to engage in adaptive behavior or indirectly by encouragement to maintain health promoting behaviors (Bloom 1990). Examples of individual health behaviors that may be influenced by social support include physical activity (Baranowski, Nader et al. 1982; Zimmerman and Connor 1989; Treiber, Baranowski et al. 1991; Wallace, Raglin et al. 1995), diet (Feuerstein, Papciak et al. 1989; Parham 1993; Felton and Parsons 1994; Bovbjerg, McCann et al. 1995), smoking cessation (Rice, Templin et al. 1196; Bjornsen, Rand et al. 1995; Murray, Johnston et al. 1995; Gritz, Neilsen et al. 1996), and others (Cohen 1988).

The study of social support as it relates to health and health behaviors is not a new concept. In early theory, Durkheim's classic conception of social integration posited that social relationships such as marriage, parenthood, religious involvement, and employment promote health by providing a sense of meaning and purpose in life and by creating a set of constraints or controls on individual behavior (Durkheim and Simpson 1951). Cassel (1976) identified a general category of psychosocial processes designated as health-promoting (Cassel 1976). These processes involved the strength of social supports provided by groups of most importance to the individual. Caplan (1974) identified significant others as providing emotional, tangible, and cognitive guidance through challenging circumstances in order to maintain wellness (Caplan 1974). Cobb (1976) also suggested that supportive interactions among people protect against the consequences of life stress and thereby may protect people from a wide variety of pathological states (Cobb 1976). Cassel (1976), Caplan (1974), and Cobb (1976) all emphasize that much of the beneficial health effects of social relationships are due to their buffering properties in the presence of stress (Caplan 1974; Cassel 1976; Cobb 1976). Kaplan et al., (1977) even assert that health protectiveness of social support will only be effective in times of stress (Kaplan, Cassel et al. 1977). There is much debate among researchers of social support with regard to the "buffering" theory. Some have argued that the apparent buffering of social relationships on health are due to the confounding measures or the existence of an underlying factor (e.g., personal attributes such as social skills or personal competence) which determines both the level of health and social relationships (Thoits 1982). Other research has posited that the processes of social support operate at all times (main effects) rather that only when an individual is under stress (House, Landis et al. 1988).

Part of the "buffering theory" of social support involves the perception of social support. Perceived support is defined as support a person believes to be available if he or she should need it (Sarason, Sarason et al. 1990). Perceived social support is often characterized as both a general perception of a current state or the belief that support would be available if one wished it (Sarason, Sarason et al. 1990). Perceived support may serve as a buffer to stress when the outcome measure is self-perceived symptoms such as depression or the inability to concentrate on a behavioral task (Sarason, Sarason et al. 1990). It is the perception of social support that is most closely related to health outcomes (Blazer 1982; Antonucci and Israel 1986; Wethington and Kessler 1986).

In addition to subjective perceptions about satisfaction with the level of support and the degree to which it can be relied on, many assessments rely on an "objective" measure of an individual's personal relationships or social network. This network may be described in terms such as size, composition, scope, density, geographic dispersion, and frequency of contact, as well as more qualitative measures such as intimacy, strength, and value (Shye, Mullooly et al. 1995).

2.4.2 Mortality and Social Support

Social network has been studied in relation to mortality. Mortality has been negatively correlated with social support or social network (Cassel 1976; Berkman and Syme 1979; House, Robbins et al. 1982). Several prospective studies of community populations exemplify this. The first major prospective study on social relationships and mortality was the Alameda County Study(Berkman and Syme 1979). The data from the Alameda study included measures of the presence or absence of four types of social ties: marriage, contacts with extended family and friends, church membership, and other formal and informal group affiliations. Each of these four types of social relationships predicted mortality over nine years. In this study, a "Social Network Index" was also calculated and used to predict mortality rates of a sample of county residents. This "Social Network Index" was found to be a significant predictor of mortality with a relative risk of about 2.0 for persons with low versus high scores on the Index rating (Berkman and Syme 1979). Berkman and Syme (1979) found that people lacking social and community ties were more likely to die in the follow-up period that those with extensive social network.

A similar study, (part of the Tecumseh Michigan Community Study), concluded that composite indexes of social relationships and activities were inversely related to mortality over a 10-12 year follow-up period (House, Robbins et al. 1982). These data included three major classes of social relationships and activities: intimate social relationships (e.g. marital status), formal organizational involvement outside of work (e.g. church attendance), and active leisure pursuits involving social contact (e.g. attending classes). Adjusted for all risk factors, the relative risk ratios of death among persons with low levels of social relationships and activities (relative to those with high levels) were about 2.0-3.0 among men and 1.5-2.0 among women (House, Robbins et al. 1982).

A smaller study of men and women in Durham, North Carolina, Blazer (1982) reported similar results. Three types of social support (roles and attachments available, frequency of interactions with friends and relatives, and perception of social support) were all inversely associated with mortality (Blazer 1982).

In the Evans County (Georgia) Cardiovascular Epidemiologic Study (Shoenbach et al.,1986), a social network index similar to that used in the Alameda study significantly predicted mortality, although a weaker predictor than both the Alameda and Tecumseh studies.

2.4.3 Differences in Social Support Between Men and Women

Although there is evidence that social integration decreases mortality risk only or primarily for men (House, Robbins et al. 1982; Schoenbach, Kaplan et al. 1986), some studies have found effects for both men and women (Berkman and Syme 1979; Orth-Gomer, Unden et al. 1988). In these instances however, the relationship seems to be weaker and more complex (Shumaker and Hill 1991). For example, men who are socially isolated are at increased risk for heart disease mortality independent of most major cardiovascular disease risk factors. When these major risk factors are controlled for women, the relationship between social isolation and negative health is greatly reduced (Berkman 1986). Additionally, in the both the Alameda study and the Tecumseh study, higher social support was associated with a greater association between social network and mortality among men than among women (Berkman and Syme 1979; House, Robbins et al. 1982). In a 15-year follow-up study of elderly HMO members, Shye and colleagues (1995) found that social network size provides direct protection from mortality risk to both men and women, but that men gain protection at a lower level of network size than women (Shye, Mullooly et al. 1995). Men's mortality risk was elevated only at the lowest levels of network size, while women with low and medium network size had increased risk when compared to those with high network size. Also, social network size affected men's mortality risk indirectly, through their health status, while no such effect was found for women (Shye, Mullooly et al. 1995).

One explanation for the difference between men and women is that women's social support networks are not adequately assessed (Shumaker and Hill 1991). Women are more likely to be support providers as well as support recipients, and the women are more likely than men to provide support that places emotional burdens and demands on them. Women's networks tend to be larger than men's, providing more opportunity for support but increasing the potential demands on their resources that may negate potential benefits (Shumaker and Hill 1991). Researchers have found that women may choose to engage in protective buffering even at the cost of their own distress (Coyne and Smith 1991; Suls, Green et al. 1997).

The differences in gender in social support processes was depicted in a recent review (Uchino, Cacioppo et al. 1996). Of the studies on cardiovascular regulation and social support that were reviewed, 8 out of the 20 studies reported gender effects. However, it may not be that social support is more important for health outcomes in men more than women. From studies that measured types of social support and gender differences, it was found that social support is important for both genders, but that specific types of social support (e.g. tangible, informational) may be as important as a function of gender (Henderson, Byrne et al. 1980; Bland, Krogh et al. 1991).

In addition to findings from mortality studies, there are other gender differences in the social relationships. For example, women's social networks have a higher proportion of family and friends, whereas men's networks are more work-related (McFarlane, Neale et al. 1981). Ross and Mirosky (1989) found higher levels of perceived support among women than among men (Ross and Mirowsky 1989). Also, it has been found that women discuss more content areas with their networks and feel more helped by the people with whom they discuss their concerns (Broadhead, Kaplan et al. 1983). While women tend to self-disclose at higher levels than men (Dindia and Allen 1992), this self-disclosure may not be more beneficial for women than for men. Studies examining the effects on physiological processes have typically found comparable effects for men and women (Pennebaker, Kiecolt-Glaser et al. 1988; Esterling, Antoni et al. 1990).

Although women appear to be more advantaged in terms of numbers of confidants and perhaps other support resources, other studies have reported little or no difference by sex in level of perceived support (Holahan and Moos 1982; Fusilier, Ganster et al. 1986).

2.4.4 Marital Status and Social Support

The social support of marriage is considered by itself to produce "buffering effects" (Cohen and Wills 1985). Marriage seems to have more of a buffering effect on health for men than for women (House, Robbins et al. 1982). One possible explanation of this difference between men and women is that a spouse can influence preventive routines. Since women often serve as "hidden providers" of health care who transmit health information, monitor health practices, and reinforce health-enhancing behaviors of people in their households, men benefit more than women (Stoller and Pollow 1994; Shye, Mullooly et al. 1995).

Two studies found that married men and women reported more confidants and perceived their social support as more adequate (Gerstel, Reissman et al. 1985; Ross and Mirowsky 1989). However, in a study by Preston et al (1995), findings suggested that married women (age 65 and older) were in the poorest health and most vulnerable to stress. For them, social support in terms of both number of confidants and access to helping networks was not protective (Preston 1995).

2.4.5 Physical Activity and Social Support

Research has indicated evidence of the role that social support and/or social networks have in changing personal health behaviors (O Reilly 1988). To some extent, social support from family and friends has been consistently and positively related to adult physical activity (Treiber, Baranowski et al. 1991; Sallis, Hovell et al. 1992; Felton and Parsons 1994). Social support for physical activity can be instrumental (e.g. giving a non-driver a ride to an exercise class; informational (telling a neighbor about a community exercise program); emotional (e.g. calling a friend to see how their new exercise program is faring); or appraising (e.g. providing encouragement or reinforcement for learning a new activity or skill)(Isreal and Schurman 1990).

Family support seems to be especially important. Rakowski et al, (1988) concluded that the success of interventions to modify health practices such as increasing physical activity seems especially dependent on the family environment (Rakowski 1988). Gottleib (1988) similarly concluded that reason for so many failed health promotion interventions is the inability to enhance the family support environment (Gottlieb and Green 1987).

There are several aspects of family support for physical activity. Family members can reinforce existing behaviors and remove structural barriers (Hawkes and Holm 1993). In a study of the effects of significant others on behavior change, Zimmerman and Connor (1989) found that family members were particularly helpful in changing exercise behaviors (Zimmerman and Connor 1989). Other studies found that the exercise behavior of family members is a strong predictor of exercise in women (Dubbert 1992; Dishman and Sallis 1994).

Another example is the effect of family support on exercise levels of children. Parental support for physical activity has been shown to increase physical activity levels in children (Biddle and Goudas 1996). Similarly, Stucky-Ropp, & DiLorenzo (1993) reported small but significant relationships between social and family influence and physical activity levels of 11-year old boys and girls (Stucky-Ropp and DiLorenzo 1993). Children have also been shown to assist in increasing parental levels of physical activity. In a study by Eaton et al (1993), school children's recommendation of exercise was one of the factors that predicted the adoption or maintenance of increased physical activity in women (Eaton, Reynes et al. 1993). In a recent focus group study, Eyler et al (in press) found that some minority women who took care of grandchildren indicated increased physical activity due to the encouragement and physical activity levels of their grandchildren (Eyler, Baker et al. In press).

In addition to encouragement from children, spousal social support may increase levels of physical activity. Several intervention studies exemplify this. Wallace et al. (1995), found that participants who exercised with their spouses had a significantly higher attendance and lower drop out rate in a 12 month exercise program than married people who exercised without their spouses (Wallace, Raglin et al. 1995). In cardiac rehabilitation patients, Daltroy & Godin (1989) found that spousal approval and intention to encourage the cardiac patient were important aspects of the patient's exercise participation (Wallace, Raglin et al. 1995). In a study on the psychosocial predictors of the intention to exercise, passive forms of spousal support increased the explained proportion of variance for men (Godin and Shepard 1985). O'Reilly & Thomas (1989) found that in a program to reduce cardiovascular disease risks, the spouse (wife) was the primary selection as a member of the subjects' support network (O'Reilly and Thomas 1989).

In addition to support from family members and spouses, friend support seems to play a role in physical activity participation. For some groups of people, the mere social contact that occurs during a structured exercise program enhances physical activity participation. Gillette (1988) also found that social interaction was an important determinant for exercise in women (Gilette 1988). In focus group research by Clark (1996), older Black women indicated than an exercise routine that involved a group of people like themselves would be valuable and enjoyable to them (Clark 1996). In other focus group research, over half of the minority women participants indicated that having a friend to exercise with would greatly enhance motivation to stick with a program (Eyler, Baker et al. In press).

Also, a worksite study of middle-aged women, King et al (1990) found that support from friends predicted vigorous exercise (King, Taylor et al. 1990). In another study, it was found that the higher the perceived social support, the higher the perceived control over attendance in an exercise class (Courneya and McAuley 1995).

Most of reports on social support and behavior change, specifically, increasing physical activity, indicate that interventions aimed at developing social support in both families and friends may encourage the initiation and maintenance of the behavior change. While more research with distinct populations is needed, social support shows promise as a component of a successful intervention to increase physical activity.

3. METHODS

3.1 Sampling

The data for this study were collected via telephone survey. The modified random sample for the telephone survey was based on the 1990 US Census information categorized by zip code. The average population per US zip code is 7,025, with a range of 1 to 112,047. Zip codes provide a more concise parameter than counties, and are more easily identified than census tracts. In order to get a nationally representative, yet cost efficient sample of minority women, zip codes having greater than 20% of each of the following racial categories were chosen for the sampling frame: African-American, American Indian/Alaskan Native, and Hispanic. White women were also included in the sample to provide a comparison to the minority data.

Because only zip codes with greater than 20% of the desired population were chosen, appropriate measures were taken to assure that the sample had similar proportionality to the total population. Proportional-to-size sampling was conducted by ranking the zip codes for each of the minority groups by number of desired population per zip code. These lists were then divided into quartiles. For each quartile, a percentage of the minority population to the minority population of the total sample was computed. From this percentage, the number of randomly chosen zip codes was derived. One hundred zip codes were chosen proportionally and randomly from each of the minority zip code lists which served as the final sampling frame from which telephone numbers were generated. From this sampling frame, a standard multi-stage cluster technique for random telephone numbers was followed (Waksberg 1978).

The Mitofsky-Waksberg Method was used for random digit dialing. In this method, there are two stages of sampling. Primary sampling units (PSU) of 100 numbers are randomly generated using the first eight digits of a phone number. One number from the frame is chosen. If this number is a residential number, the whole PSU of 100 numbers is retained for stage two. If the number is non-residential, the whole PSU is discarded. In the second stage, from each retained PSU, numbers are drawn and dialed until the desired number of responses are achieved (Waksberg 1978).

Because of the possibility that telephone numbers may fall outside the randomly chosen zip codes, a zip code screening question was included at the beginning of the survey and only those who lived within the chosen zip codes and met the survey criteria (female, 40+ years old, Black, American Indian/Alaskan Native, Hispanic, or White) were surveyed.

3.2 Sample Size

Based on the *Behavioral Risk Factor Procedure Manual* (Centers for Disease Control 1986), estimates of sample size (power calculations) for this survey were formulated. In order to detect a behavior with a population prevalence of .20-.30, with a confidence interval of 95% and a preciseness of ±.03, 683-896 subjects were needed. Based on these calculations, 750 surveys were completed for each of the minority groups and white women for a total sample of 3000.

3.3 Instrument

The survey instrument was developed using a combination of questions from the Behavioral Risk Factor Surveillance Survey (permission granted), adaptations of questions from the National Health Interview Survey, and other surveys. Several topic questions were specifically developed for this survey method (telephone) and population (older women). The survey included a total of 92 questions (including skip patterns). Average time of completion was

29 minutes and the response rate for this survey was 91%. A list of the number of questions per topic is listed below:

Screening and Socio-demographics	19
Physical Activity	21
Physical Activity Barriers and Social Support	9
Health Information	3
Physical Activity Policy	5
Tobacco Use/ETS	9
Eating Habits and Weight Control	6
Health Care/Preventive Health	7
Health and Functional Status	7
Social Support	6

3.4 Survey Procedure/Quality Control

Since physical activity shows seasonal variation, the data collected reflects year-long averages. Surveying was completed during the first two weeks of every month from July 1996 through June 1997. Interviewers who conducted the survey underwent at least 8 hours of training prior to making calls. Calls were made at various times during the day, and included all days of the week.

Four attempts were made on each phone number selected. After the fourth unsuccessful attempt, the number was thrown out of the sample and replaced by another randomly selected number. If a household was reached where an eligible woman resided but was not home, three more attempts were made to reach her.

The interviewers recorded the subjects' responses on a paper-and-pencil instrument. Each survey was reviewed by a supervisor before data entry. If missing data or a number outside the acceptable range for a variable was indicated, three attempts were made to reach the subject in order to rectify the missing or unacceptable data. If more than one variable remained missing after re-contact attempts, the questionnaire was not used for analysis.

3.5 Pilot Testing and Reliability

This survey was pilot-tested (n=28) using the sampling plan developed for the actual survey. Test-retest call-backs were made 14-28 days after the initial survey and a reliability test for the core questions of the survey was conducted. Kappa scores were calculated with the pilot test results and ranged from .32 to .96 with an average of

.75. Four variables (all within the same scale) fell below the acceptable range. These questions were reworded for clarity.

For the actual survey, the same type of test-retest reliability call-backs were completed for every 10^{th} respondent. Data were collected from 200 respondents and analyzed for concordance and Kappa values. Coefficients of reliability were consistently high for sociodemographic variables (i.e. race/ethnicity, age, income, and education level), with values ranging from .86 for income and .92 for age and education level. Kappa coefficients among the total sample of women ranged from .26 to .51. The physical activity Kappa scores on main constructs were between .23 and .78. For the series on social support, the kappa scores ranged from .39 to .75. As a reference, Landis and Koch (1977) have suggested ratings for Kappa in the following categories: 1.0-0.8 (almost perfect), 0.8-0.6 (substantial), 0.6-0.4 (moderate), 0.4-0.2 (fair), 0.2-0.00 (slight), and 0.0 to -1.0 (poor)(Landis and Koch 1977).

4. PHYSICAL ACTIVITY AND WOMEN IN THE UNITED STATES: AN OVERVIEW OF HEALTH BENEFITS, PREVALENCE, AND INTERVENTION OPPORTUNITIES

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(Published in *Women and Health* (1997)26: 27-50.)

4.1 Abstract

Despite decades of physical activity research and interventions conducted on men, very little is known about the patterns of physical activity among US women. Rates from several national surveys show much lower rates of physical activity for women than for men. Among women, rates may vary by socioeconomic status. Studies relating physical activity and experience with heart disease, cancer, osteoporosis, and mental health are discussed. Interventions in the workplace and the community may increase the level of physical activity among US women. A history of not participating in exercise and lack of time for this activity appear to be important constraints for many women. The Surgeon General's Report on Physical Activity sanctioned future research on specific groups, such as women. Applied research coupled with community and workplace policies that support women's effort to be more physically active may decrease the rates of some chronic diseases in this population.

4. 2 Introduction

Despite a great deal of epidemiologic and clinical research on physical activity and health, availability of guidelines to promote and increase physical activity among the general population, (Pate, Pratt et al. 1995) and the recent release of the Surgeon General's report on physical activity (United States Department of Health and Human Services 1996), relatively little is known about patterns of physical activity among American women. Furthermore, although research in recent decades identified many health benefits of being physically active, (Caspersen and Merritt 1995; Pate, Pratt et al. 1995)many of the studies have been conducted solely on men (e.g. Paffenbarger et al. 1978) or have included a disproportionately small number of women (e.g. Sherman et al. 1994). In addition, tools to measure physical activity that were developed and tested almost exclusively on men frequently are used to estimate the level of physical activity in women (Blair, Kohl et al. 1993).

Not surprisingly, little is known about which behavioral strategies might be effective in encouraging women to begin or maintain physical activity. This article presents an overview of principal studies on the benefits of physical activity that have included U.S. women, discusses several measures of the prevalence of physical activity among U.S. women, and identifies policy and environmental strategies that may be used to increase physical activity levels.

4.3 Health Benefits of Physical Activity

4.3.1 Improvements in Cardiovascular Disease Risk

Physical activity has considerable promise for preventing chronic disease (Table 4.1). Cardiovascular disease (CVD) and coronary heart disease (CHD) in particular, has been studied extensively in men, but not in women. The Surgeon General's report found that only 8 of 55 population-based studies that cardiovascular disease and physical activity or cardiorespiratory fitness included women (United States Department of Health and Human Services 1996). Studies that describe CHD mortality and physical activity produced consistent results for men, but those including women have had varied results (Blair, Kohl et al. 1993). A 1989 report from Blair et al. found a strong, positively graded association in women between a single measure of physical fitness and mortality from cardiovascular disease; i.e. higher levels of fitness predicted lower risks of mortality. Blair et al.(1996), reported low fitness to be an independent predictor of all-cause mortality in women. However a another report found an inverse association between all-cause mortality and physical fitness, but no relation between physical activity and

RESEARCHERS	STUDY DESIGN	AGE	NUMBER OF WOMEN	MEASURE OF ACTIVITY	SUMMARY
Cardiovascular Disease					
Anspaugh et al, 1996	cross-sectional	30-59	1412	HRA plus physiological measures for CHOL, BP, Weight, Height	Women who reported exercising had lower weight, BMI, BP, and higher HDL than non-exercisers.
Folsom et al, 1985	cohort	25-74	770	Minnesota LTPA Survey	Greater heavy intensity activity associated with higher HDL, lower thiocynate levels, BMI, and systolic BP.
Cauley et al, 1987	random	Avg. 57.7	255	Paffenbarger questionnaire plus large-scale integrated activity monitor	No apparent HDL increases observed with increased activity.
Blair et al, 1989	cohort	20-60+	3120	Self report, VO_2 max test, and physical exam	Strong graded association between physical fitness and mortality due to causes, CVD, and cancer.
Blair et al, 1996	cohort	20-88	7080	Maximal test on treadmill	Low fitness independently predicted mortality in women.
Blair et al, 1993	cohort	-	3120	Maximal treadmill test and self-report survey	Age-adjusted, all-cause mortality inversely associated with physical fitness but death rates didn't differ across fitness levels.
Dannenberg et al, 1989	cohort	20-69	1762	Minnesota LTPA Survey	Improvements in HDL, HDL: total cholesterol ratio, and BMI associated with higher activity levels.
Owens et al, 1992	cohort	-	507	Paffenbarger physical activity questionnaire	Women who reported higher activity levels at baseline had smallest decreases in HDL cholesterol.
Young et al, 1993	cohort	18-74	427	Validated 7-day recall by interview	Increase in physical activity was associated with significant improvements in CV risk factors such as increased HDL, decreased LDL, and decreased BMI.
Sherman et al, 1994	cohort	50-74	1404	Physical interview of activity and physical activity index calculated	No association between level of physical activity and CVD mortality/morbidity, but lower overall mortality rates.
King et al, 1995	cohort	50-65	120	Treadmill exercise test	After two years of training, significant increases in HDL and decrease in waist-to-hip ratio.
Kokkinos et al, 1995	cohort	22-79	478	Bruce graded exercise test	Moderate level (10 mets) of physical fitness associated with a more favorable coronary risk profile in women.
Ainsworth, et al, 1991	cohort	25-50	1096	Self-report of activity	Physical inactivity an independent risk factor for hypertension.
Macera et al, 1994	cohort	18-89	1351	Primary leisure-time physical activity in past month	HDL increased in white women who increased their activity levels but not in African-American women.

Table 4.1 Summary of Selected Epidemiologic and Intervention Studies (n>=80).

RESEARCHERS	STUDY DESIGN	AGE	NUMBER OF WOMEN	MEASURE OF ACTIVITY	SUMMARY
Cancer					
Albanes et al, 1989	cohort	25-74	7407	NHANES 1 (one question to estimate recreational physical activity)	Increased risk in inactive women of breast cancer (RR = 1.7) and cervical cancer (RR = 5.2), but low number with cancer overall, possibly affecting results.
Bernstein et al, 1994	case control	<40 at diagnosis	545-545	Interviews and self-reports of lifetime recreational activity	Women averaging 3.8 hours of physical activity per week had decreased breast cancer risk relative to inactive women.
Taoili et al, 1995	case control	25-65+	617-531	Self-report questionnaire on leisure-time physical activity	Few women reported strenuous activity. For those who did, physical activity had no significant effect on breast cancer risk.
Ballard-Barbash et al, 1990	cohort	30-62	2038	Minnesota LTPA Survey self-reported activity	RR for large bowel cancer (highest tertile of physical) versus middle and lowest was 1.2 and 1.1 respectively. Narrow range of physical activity and minimal heavy activity reported may have skewed data.
Mittendorf et al, 1995	case control	17-74	6889-9539	Retrospective self-report of strenuous activity during ages 14-22 and current report of activity	Those reporting strenuous activity ages 14-22 RR=.95 Those who exercised vigorously at least once a day, RR=.5 (For Breast Cancer)
Slattery et al, 1988	case control	40-79	119-204	Leisure and occupational physical activity report	Total physical activity was protective against development of colon cancer, OR=.48-0.55 for intense physical activity.
Dorgan et al, 1994	cohort	35-68	2307	Minnesota LTPA Survey physician administered	Findings indicate an increased risk for cancer associated with adult physical activity.
Mental Health					
Farmer et al, 1988	cohort	20-79	1036	NHANES 1 (one question to estimate recreational physical activity)	Little or no recreational physical activity significantly predicted depressive symptoms at follow-up in those women who had few symptoms at baseline.
Camacho et al, 1991	cohort	20+	2686	Physical activity index based on self report	Women who reported a low activity level at baseline were at significantly greater risk for depression at follow-up.
Thirlaway & Benton, 1992	cohort	18-63	91	Sub maximal bike test plus self-report questions	Physical activity associated with better overall mental health and mood.
Ross & Hayes, 1988	random	18-83	224	Self-report by asking respondents if they participated in any physical activity, exercise or sports	Exercise associated with decreased symptoms of depression.
Osteoporosis					
Pocock et al, 1986	cohort	20-75	84	predicted VO_2 max measuring fitness	Correlation between physical fitness and bone mass in both the femur, neck and lumbar spine.
Zylstra et al, 1989	case control	40-60	123-141	detailed questionnaire by interview	Both spine and neck bone densities significantly correlated with walking.
Krall et al, 1994	cohort	43-72	239	self-report questionnaire and quadriceps strength measurement	Linear relationship between miles walked and whole body bone mineral density.
Greendale et al, 1995	cohort	73	1014	modified Paffenbarger survey	Positive association between current exercise and BMD at hip, but no association between former or

Table 4.1 Continued.

mortality in women(Blair, Kohl et al. 1993). Similarly, a review by Powell et al.(1987) found that 71% of published studies found no relationship between CHD and activity in women (Powell, Thompson et al. 1987). More recently, Sherman et al.(1994) also failed to find an association between level of physical activity and cardiovascular mortality rates in women (Sherman, D'Augustino et al. 1994). A possible explanation for failure to find an association would be a study having a relatively small number of women and thus a reduced chance of finding statistical significance. Because of hormonal influences, women initially lag far behind men in the incidence of coronary heart disease; studies of certain populations could well suffer from a dearth of women. Another possibility is that physical activity measures that were developed and validated primarily on men may be inadequate for assessing physical activity levels in women (Blair, Kohl et al. 1993).

Despite the varied results in relating physical activity and cardiovascular disease mortality, studies show that women who are active have more favorable cardiovascular risk profiles than inactive women. Improved blood pressure (Folsom, Caspersen et al. 1985; Dannenberg, Keller et al. 1989; Ainsworth, Keenan et al. 1991; Young, Haskell et al. 1993; Kokkinos, Holland et al. 1995; Anspaugh, Hunter et al. 1996) and improved body mass index (Folsom, Caspersen et al.

1985; Kokkinos, Holland et al. 1995; Anspaugh, Hunter et al. 1996), have both been associated with increased physical activity. Studies have demonstrated that physical activity is tied to better blood lipid concentrations (Folsom, Caspersen et al. 1985; Dannenberg, Keller et al. 1989; Ainsworth, Keenan et al. 1991; Owens, Matthews et al. 1992; Young, Haskell et al. 1993; Macera, heath et al. 1994; King, Haskell et al. 1995; Anspaugh, Hunter et al. 1996). For example, King et al. (1995) found subjects improved their high density lipoprotein (HDL) cholesterol concentrations as a result of physical training (King, Haskell et al. 1995). Macera et al. (1994) found favorable changes in HDL cholesterol were associated with self-reported increases in leisure-time physical activity among white women but not African-American women. However, HDL levels improved among most women in this four-year follow-up study independently of physical activity status (Macera, heath et al. 1994). Conversely, in a randomized study, older women who participated in a physical activity program did not experience increased HDL cholesterol after two years (Cauley, Kriska et al. 1990). Differences in these studies may be attributable to variations in measurement of the mode, frequency, and intensity of physical activity rather than true differences in physical parameters.

4.3.2 Physical Activity and Cancer Risk

Although many researchers have examined the relationship of physical activity and cancer, relatively few have considered women specifically. Two studies on colon cancer suggest that the reduction in gastro-intestinal time resulting from physical activity lowers risk of this disease by decreasing exposure to possible carcinogens (Shepard 1990; Potter, Slattery et al. 1993). A higher level of physical activity may also reduce the risk of colon cancer through its effect on prostaglandins (Bartram and Wynder 1989). Slattery et al. (1988) found that active women, especially those who were vigorously active, had a lower risk of colon cancer than those who were inactive (Slattery, Schumacher et al. 1988). Ballard-Barbash et al. (1990), reported that physically inactive women had only a modest relative increase in the risk of this disease but their results may have been affected by the narrow range of physical activity measured and the small number of subjects who reported intense physical activity (Ballard-Barbash, Schatzkin et al. 1990).

Shepard has hypothesized that regular physical activity moderates the functions of sex hormones (Shepard 1990) and therefore may reduce cancer risk, especially breast cancer. In the case of breast cancer, the most common cancer among

U.S. women other than those of the skin, (American Cancer Society 1996) the evidence of the benefits of physical activity is mixed.

Several studies support the hypothesis that active women have lower breast cancer rates, (Frisch, Wyshak et al. 1987; Bernstein, Henderson et al. 1994; Mittendorf, Longnecker et al. 1995) but other studies have found an increased risk of breast cancer with physical activity (Dorgan, Brown et al. 1994) or no association between activity and the risk of this disease (Taioli, Barone et al. 1995). A recent review of epidemiologic studies indicates that physically active women as a group have a decreased risk of breast cancer, but several of the studies have methodological limitations (Friedenreich and Rohan 1995). The review authors noted that comparability of studies is limited because of differences in physical activity assessment, study design (e.g., retrospective versus prospective), and the level of control for possible confounders (e.g., obesity, parity).

4.3.3 Reducing Osteoporosis Risk with Physical Activity

The relationship of physical activity to osteoporosis has been the subject of considerable research. This condition characterized by loss of bone density, is responsible for 1.5 million fractures a year, which in addition to causing pain and suffering may lead to disability, high medical costs, and loss of independence (Avioli 1993). Prevention of osteoporosis by increasing or maintaining bone mass may be pursued by increasing calcium intake, undergoing hormone replacement therapy, and being physically active. By engaging in lifetime physical activity, women can enhance peak bone mass, allowing them to begin the inevitable period of bone loss with a better store of bone (Barth and Lane 1988; Steinberg and Roettger 1993).

Much of the research on osteoporosis and its relationship to physical activity has been conducted among women. Evidence suggests that bone mineral increases in response to application of mechanical stress although the type, duration, frequency, and intensity of exercise appropriate for applying this stress has not been defined (Snow-Harter and Marcus 1991). Cross-sectional studies report that athletic women have higher bone densities than non-athletic women, which supports the hypothesis that exercise is effective in maintaining bone mass (Snow-Harter and Marcus 1991; Marcus, Drinkwater et al. 1992). Both randomized and non-randomized trials have reported modest correlations between bone density and several types of physical activity (Pocock, Eisman et al. 1986; Dalsky, Stocke et al. 1988; Zylstra, Hopkins et al. 1989; Snow-

Harter and Marcus 1991; Krall and Dawson-Hughes 1994; Greendale, Barrett-Connor et al. 1995). However, because there is a strong association between muscle strength and bone mineral density (Snow-Harter and Marcus 1991; Marcus, Drinkwater et al. 1992) more research is needed in this area to identify the mechanism that mediates the relationship between physical activity and bone mineral density.

4.3.4 Physical Activity and Mental Health Status

Regular physical activity enhances psychological as well as physical health. Psychological problems are widespread; in a National Institute of Mental Health study, 15.4% of adult participants reported at least one mental disorder in the previous month (Reiger, Botd et al. 1988). Stress-related conditions such as anxiety and depression accounted for most of the disorders (Reiger, Botd et al. 1988). In general, women are more likely to suffer from depression than men (American Psychological Association 1996). Four epidemiological studies on physical activity and mental health in men and women (Farmer, Locke et al. 1988; Ross and Hayes 1988; Camacho, Roberts et al. 1991; Thirlaway and benton 1992), as well as several intervention studies (Greist, Eischens et al. 1979; Doyne, Chambless et al. 1983; Doyne, Ossip-Klein et al. 1987; King, Taylor et al. 1993; Brown, Wang et al. 1995) indicate that physical activity has positive effects on mental health. In a group of men and women, Greist et al.(1979) found that a 12-week exercise program was as effective as two other types of treatments (both psychotherapy) for reducing depression, and improvements in depression persisted (Greist, Eischens et al. 1979). Aerobic exercise (Doyne, Chambless et al. 1983; Doyne, Ossip-Klein et al. 1987) and weightlifting ((Doyne, Ossip-Klein et al. 1987) have also been used to treat depression effectively and improve self-concept in women (Ossip-Klein, Doyne et al. 1989). Finally, exercise has also been shown to decrease levels of perceived stress and anxiety (King, Taylor et al. 1993) and to enhance mood (Brown, Wang et al. 1995).

4.4 Prevalence of Physical Activity

Despite the well-established benefits of physical activity, millions of US adults remain essentially inactive(Centers for Disease Control and Prevention 1993). Indeed less than half of adult Americans engage in regular leisure-time physical activity (Caspersen and Merritt 1995). Women consistently have lower rates than men (Centers for Disease Control and Prevention 1993; Dishman and Sallis 1994; Caspersen and Merritt 1995). The 1990 National Health Interview Survey, for example, found that 34.3% of women (31.2% of men) reported no physical activity in the previous month. In that study only 5.9% of women (8.2% men) were classified as regularly exercising at the recommended levels (Caspersen and Merritt 1995). The 1994 Behavioral Risk Factor Surveillance System (BRFSS) survey had similar findings. These data indicate that 32.6% of women (27.7% of men) reported no leisure-time physical activity in the previous month (G.W. Heath, personal communication). Only 18.6% of women (20.4% of men) met the American College of Sports Medicine recommendation for regular, sustained, moderate physical activity. Finally, in the Minnesota Heart Health Study, 17% of women (34% of men) reported a leisure-time energy expenditure of 2,000 kcal/week or greater (Folsom, Cook et al. 1991). There are also discrepancies by gender among adolescents. Only 56% of girls (compared to 75% of boys) in grade 9-12 were classified in a 1993 national survey (which used self-report) in the category "vigorous physical activity", defined as engaging in "activities that made them sweat and breathe hard for at least 20 minutes on $\geq$ 3 of the 7 days preceding the survey" (Centers for Disease Control and Prevention 1995).

In surveys that stratified data by age, older women have the lowest rates of aerobic activity of any sociodemographic group (Lee 1993). In one such study, the Stanford Five-City Project, women 65-74 years old age group averaged only six minutes of activity per week (Sallis, Haskell et al. 1985). An analysis of rural New York Behavioral Risk Factor Surveillance System (BRFSS) survey data found that 56.3% of women over 65 were sedentary (Eaton, Nafziger et al. 1994). Even in high school, being older can mean less exercise. In the 1993 Centers for Disease Control and Prevention survey, rates of vigorous physical activity among girls decreased as their grade level rose (9th grade 68%; 10th grade 61%; 11th grade 53%; and 12th grade 45%) (Centers for Disease Control and Prevention 1995).

Women who are members of minority groups seem less likely than white women to be physically active (Table 4.2). The 1994 Behavioral Risk Factor Surveillance System (BRFSS) Survey, for example, found that 46.3% of non-Hispanic black women (29.8% white women) were physically inactive. Folsom et al. (1991) found that the disparities between black and white women are due primarily to socio-economic variables, but others suggest that black women have consistently been found to be less active when studies are controlled for socioeconomic status (King, Blair et al. 1992).

Hispanic women also have lower activity rates than white women (Centers for Disease Control and Prevention 1993; Centers for Disease Control and Prevention 1994). In the 1994 Behavioral Risk Factor Surveillance System (BRFSS) survey, 44.2% of Hispanic women were physically inactive. An

	Activity Levels			
	Inactive	Irregular	Regular Not Intense	Regular Intense
Age Group (y)				
18-39	26.3	28.3	31.1	14.3
40-54	32.2	26.8	23.1	17.9
55-75	39.5	23.3	21.4	15.7
76+	52.7	21.1	13.8	12.4
Education				
< HS	54.6	20.8	17.1	7.4
HS grad/GED	36.8	26.1	24.4	12.7
Some College	24.6	28.5	29.8	17.0
College Grad.	20.6	27.5	28.9	22.9
Race				
White	29.8	26.7	26.9	16.5
Black	46.3	24.5	19.2	9.9
Latino	44.2	22.9	21.1	11.8

a. From the 1994 Behavioral Risk Factor Surveillance System Survey (personal communication, Dr. Greg Heath, Centers for Disease Control and Prevention, August 5, 1995). Estimates are percentages weighted using SUDAAN 94.
b. *Inactive*: no leisure-time physical activity in the past month. *Irregular*: <3 times per week or <20 minutes per occasion *Regular, not intense*: $\geq$3 times per week, $\geq$20 minutes per occasion at <60% of maximal cardiorespiratory capacity. *Regular, intense*: $\geq$3 times per week, $\geq$20 minutes per occasion and $\geq$60% of maximal cardiorespiratory capacity, with rhythmical contraction of large muscle groups.

Table 4.2 Prevalence of Physical Activity Among US Women analysis of BRFSS data for the San Francisco area supported the national finding; Latinas there were significantly less likely than non-Latina whites to ever report exercising or exercising daily (Perez-Stable, Marin et al. 1994). Among adolescents, similar findings were obtained in the 1993 Centers for Disease Control survey; 59% of white girls in grades 9-12 were classified as participating in vigorous physical activity, versus 50% of Hispanic and 49% of African Americans (Centers for Disease Control and Prevention 1995).

Few population-based data exist on physical activity patterns among other racial/ethnic groups. Limited information suggests that rates of physical activity among American Indians and Alaskan Natives as well as Asians and Pacific Islanders are lower than those for whites (Centers for Disease Control and Prevention 1994).

Interpretation of the results of surveys on women, particularly minority women, should consider that two studies have found women to be less active than men if sporting or vigorous activities are a prominent component of surveys, but have physical activity rates similar to men if household or other chores are included (Ainsworth, Richardson et al. 1993; Yeager and Macera 1994). In one of these studies, Ainsworth et al. (1993) found a significant increase in reported activity levels when a component of household physical activity was added.

Using questions on "leisure-time" physical activity to determine overall levels of physical activity may be inappropriate for those women (particularly minority women) who have no "leisure-time" as it is conventionally defined (Yeager, Macera et al. 1993). In a study by Slater et al.(1987), the amount of physical activity reported for women of childbearing age from The National Center for Health Statistics (NCHS) depended on how the physical activity questions were asked and the kinds of responses available. The authors found that prevalence estimates of activity levels from three different NCHS surveys ranged from 3.9% to 39.1% (Slater, Green et al. 1987). It appears that difficulties in assessment explain much of the difference between the genders in physical activity research (Dannenberg, Keller et al. 1989; Blair, Kohl et al. 1993; Yeager, Macera et al. 1993).

Even if reported rates do a poor job of describing the proportion of women who are physically active, more than a two fold increase in the number of women who participate in regular physical activities appears to be needed in order to meet the physical activity goals set in Healthy People 2000 (United States Department of Health and Human Services 1990). While there are no goals specific to women, the targets for US adults are 30% or better participation in moderate daily activity in moderate daily activity and a rate of sedentary lifestyle of 15% of less. Based on current statistics (Table 2), these goals will be difficult for women and possibly pose an insurmountable goal for minority women. Even though the 1995 progress report on these goals notes a 20% increase in those who exercise at least three times a week, the number of sedentary adults has not changed appreciably (United States Department of Health and Human Services 1995). Accurate measuring of physical activity, conducting more research on the determinants of physical activity, and applying research findings to enhance intervention efforts in this area all should help to move US women toward our national goals.

4.5 Determinants and Barriers

Interventions to increase the levels of physical activity among women should take into consideration the determinants of being physically active as well as an appreciation of past and present barriers to the participation of women. First, the physically active woman is a relatively new phenomenon. For years, sports and other physical activities were geared only toward men (Lutter 1994). Generations of women were discouraged from being physically active so as not to damage their reproductive organs or interfere with motherhood (Lutter 1994).

Social and gender roles also reinforced the belief that physical activity was not for women. Competition in sports was seen as "unladylike"(Lutter 1994; Yeager and Macera 1994), and there was a widespread belief that women who participated in sports developed a masculine appearance (Lutter 1994; Yeager and Macera 1994). Women who are now middle-aged or older (and thus, at increased risk for chronic disease) were discouraged from vigorous physical activity in their youth and most have had little experience with physical activity other than limited school physical education (O'Brien and Vertinsky 1991; Lutter 1994). A lack of education and a lack of skills are both important barriers to physical activity in the female population as a whole (King, Blair et al. 1992; Dishman and Sallis 1994).

If they do not have a history of physical activity at a young age, women are less likely to be physically active as adults (Sallis, Hovell et al. 1992). For example, researchers found that levels of sporting activity were predicted by previous sports participation at school and in early life(Ebrahim and Rowland 1996). Similarly, lack of experience may be reflected in a negative attitude toward exercise.Wilcox and Storandt (1996) found that older women had much worse attitudes about exercise than younger women(Wilcox and Storandt 1996).

Unfortunately, even though Title IX of the 1972 Education Act greatly increased athletic opportunities for college women, many women who came of age in the 1970's or 1980's appear to be choosing the path of earlier generations with minimal participation in physical activity. The mothers of these women may have been taught that physical activity is inappropriate and, through their own behaviors, influenced their daughters not be active. A mother's modeling of activities and her support (or lack of support) strongly predict later physical activity in the daughter (Johnson, Carrigan et al. 1990).

Not having enough time for physical activity frequently constrains women as well. Eaton et al.(1994) found in a New York Study that lack of time was the most common reason women reported for physical activity (Eaton, Reynes et al. 1993). Women are more likely than men to have domestic responsibilities, which frequently must be met while they have outside employment (Johnson, Carrigan et al. 1990). Furthermore, the proportion of women with children under the age of six who work outside the home has increased dramatically from 18.6% in 1960 to 61.7% in 1994 (United States Bureau of the Census 1995). Verhoef, Love & Rose (1992) found that women who have children exercise less than those who do not principally because they lack time and energy. More recently, however, these authors found that number of children, employment, and marital status were unrelated to level of participation in exercise which suggests that motherhood itself is a barrier (Yeager and Macera 1994).

Support from others can be very important in determining physical activity. Family members can reinforce exercise behaviors and remove structural barriers (Hawkes and Holm 1993). Several studies have found that family support for exercise predicts the adoption of physical activity (Treiber, Baranowski et al. 1991; Sallis, Hovell et al. 1992; Eaton, Reynes et al. 1993). In addition, friends can be influential; in a worksite survey of middle-aged women, King et al.(1990) found that support from friends predicted vigorous exercise (King, Taylor et al. 1990). Group physical activity (e.g., exercise classes, walking clubs) also may foster social support and adherence to exercise.

Concerns about safety are no doubt barriers for many women, especially those who live in urban areas with high crime levels. However, relationships between physical activity and neighborhood safety have been infrequently studied (King, Blair et al. 1992). Women who live in the country may also be constrained by safety concerns. A recent study found lack of access to a safe, convenient place to exercise to be a problem in rural areas (Brownson, Schmid et al. 1997).

Personal factors such as self-efficacy and self-motivation have been found to be determinants of physical activity (McAuley and Jacobson 1991). High self-efficacy has been shown to be a determinant for adopting and maintaining moderate activity in a variety of settings (Sallis, Haskell et al. 1985; Desharnais, Bullon et al. 1986). However, Dishman and Sallis (1994) report that the association of self-efficacy and physical activity reflects a selection effect; that is, active individuals report high self-efficacy because of their past success with physical activity(Dishman and Sallis 1994). Self-motivation has been correlated with physical activity in some women (Dishman and Steinhardt 1990) but not others (Garcia and King 1991).

Sociodemographic variables also are important (Table 4.2). Race is one of several that seems to be consistently associated with physical inactivity among women. Having less education and being elderly are other important markers for inactivity (King, Blair et al. 1992). Ford et al. (1991) found that women of low socioeconomic status (SES) were the least active group and in their study, had lower leisure-time, job-related, and household physical activity than higher SES women(Ford, Merritt et al. 1991). However, Dishman and Sallis (1994) note that differences by demographic variables (such as race and SES) may reflect selection biases rather than causation because the effects of ethnicity and socioeconomic status can be entangled (Dishman and Sallis 1994).

As sociodemographic characteristics often cannot be changed, and because many psychological or personal factors are resistant to change (King, Blair et al. 1992), elements such as time, social support, access, and safety that may be amenable to change should be the focus of future physical activity interventions.

4.6 Environmental Approaches to Increasing Physical Activity in Women

Individually focused approaches to get people to engage in physical activity are frequently unsuccessful (King, Jeffery et al. 1995). Thus perhaps the most efficient and effective way to increase physical activity in women is to carry out interventions integrated into the workplace or the community, an approach that recognizes that personal health is integrally connected to the physical and social environments (Brown, Ritchie et al. 1992). Policies that alter these environments can provide a cost-effective way to target groups of people rather than individuals and thus have greater public health potential to increase physical activity among the population at large.

4.6.1 Workplace

Fifty-eight percent of all US women in the work outside the home (United States Bureau of the Census 1995). The combination of this work and domestic chores leaves many women with little time for extra physical activity such as planned exercise. Workplace policies that promote physical activity by allowing employees time off to exercise, offering programs during the lunch hour, or providing discounts to exercise centers with child care or concurrent programs for children may increase the levels of physical activity in women. Such interventions may also enhance health promotion efforts in the workplace. Other examples of useful workplace interventions include offering the following:

- flexible schedules that provide opportunities to be physically active
- shower and locker facilities at the workplace
- job sharing that includes rotating to less sedentary jobs
- comprehensive management support or participation
- "buddy programs" or group exercise to facilitate social support

- incentives to adopt and maintain a physically active lifestyle
- encouragement to take "walking breaks" throughout the workday, as well as to use the stairs instead of the elevator
- offering non-traditional forms of exercise such as cultural dance in programs of physical activity

4.6.2 Community

Both women who work and those who do not might be encouraged to exercise through community interventions. As motherhood and the need for child care are barriers to physical activity (Verhoef, Love et al. 1992), interventions that provide mothers and their children with concurrent physical activity may be effective. Other community interventions that might promote increased physical activity include the following:

- no/low cost child care are exercise facilities
- transportation services that are wither free or inexpensive
- increasing access to activities by funding and maintaining bike paths, walking trails, or sidewalks
- increasing the collaboration of community agencies, organizations such as churches, libraries, businesses (e.g., grocery stores, malls), and schools in efforts to promote physical activity promotion
- organizing neighborhood watch programs or walking groups to promote safety

- increasing access to exercise videos at public libraries
- promoting development of neighborhood gardens
- for women who are "unsure" about engaging in physical activity because of health reasons, offering a low-cost physical exam to provide clearance to exercise
- in rural locations without malls or walking trails, encouraging the use of school halls or tracks for walking

Increasing physical activity levels in women is a complex task that requires a multi-faceted approach. Environmental interventions can enhance efforts to increase activity levels in women by reducing or eliminating barriers. Environmental interventions also encourage maintenance of a physical activity habit because they often become permanent aspects of workplaces and communities.

4.7 Conclusion

Research shows that the majority of health benefits occur when sedentary adults become moderately active (Caspersen and Merritt 1995; Pate, Pratt et al. 1995). Eliminating or reducing of physical inactivity decreases the risk of many chronic diseases (Powell and Blair 1994). Much of the research supporting these claims has primarily or exclusively included men, but available evidence indicates that women, as well as men can benefit by becoming more active. However, there is a clear need for additional research on physical activity and women's health. The recent Surgeon General's report on physical activity calls for more research to identify the specific health benefits of physical activity for women (United States Department of Health and Human Services 1996). This report coupled with programs such as the National Institutes of Health Women's Health Initiative, may stimulate research that will help employers, community leaders, and public health officials plan and implement successful physical activity interventions for women in the United States.

5. PHYSICAL ACTIVITY SOCIAL SUPPORT AND MIDDLE- and OLDER-AGED MINORITY WOMEN: RESULTS FROM A U.S. SURVEY

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Submitted to *Social Science and Medicine* (in review)

5.1 Abstract

BACKGROUND: Many American adults remain sedentary despite many known health benefits. Research on the determinants of physical activity have indicated that social support is one of the strongest correlates, but little is known about this relation in important subgroups of middle and older-aged women.

OBJECTIVE: The purpose of this study was to assess the association of physical activity-related social support on several measures of physical activity in a national sample of minority women. A unique aspect of these measures is the inclusion of vigorous household tasks and occupational physical activities.

METHODS: The US Women's Determinants Study was conducted in 1996-1997. The survey was a modified-random sample, telephone survey of 2912 Black, Hispanic, American Indian/Alaskan Native, and White women age 40 and older. A composite score of physical activity social support (PASS) was analyzed as the independent variable in logistic regression analyses. Four measures of physical activity levels served as the dependent variables. The potential confounding effect of race/ethnicity, marital status, age, income and education were evaluated and adjusted in the models.

RESULTS: Hispanic women were more likely to have high PASS scores than the other racial/ethnic groups. Odds ratios indicate that subjects with high levels of PASS were significantly less likely to be sedentary than those with low support, even after adjusting for race/ethnicity. While there were significant associations among levels of social support and physical activity, this was not true for the measure of "regular exercise." There was no significant difference between the contribution of "friend" support versus "family" support on all four measures on physical activity.

DISCUSSION: Based on our results, enhancing social support may be an important aspect of interventions aimed at increasing physical activity in a population of sedentary women of various racial/ethnic backgrounds. Also, "regular exercisers" in this population appear to be less reliant on social support to maintain their behavior.

5.2 Introduction

Decades of research indicate that physical activity is an important behavior for health promotion and disease prevention. Specifically, physical activity contributes to health benefits such as lower risk of cardiovascular disease (Paffenbarger, Wing et al. 1978; Blair, Kohl et al. 1993; United States Department of Health and Human Services 1996), better control of hypertension (Stamler, Stamler et al. 1989; Folsom, Prineas et al. 1990; Paffenbarger, Jung et al. 1991), and diabetes mellitus (Helmrich, Ragland et al. 1991; Kaye, Folsom et al. 1991; Manson, Rimm et al. 1991; Manson, WIllett et al. 1995), reduced risk of certain types of cancer (Vena, Graham et al. 1987; Lee, Paffenbarger et al. 1991; Bernstein, Henderson et al. 1994), and lower risk of osteoporosis (Chow, Harrison et al. 1986; Dalsky, Stocke et al. 1988). Despite widespread dissemination of information supporting the health benefits of physical activity, the proportion of sedentary Americans has changed very little in the past 15 years (United States Department of Health and Human Services 1995).

Almost one quarter of American adults are completely sedentary, and over half do not exercise regularly. (Pate, Pratt et al. 1995). The first-ever *Surgeon General's Report on Physical Activity and Health* summarized salient research on the benefits of physical activity and emphasized the need for more research, interventions, and policies promoting an increase in the nation's physical activity level. In particular this report provided an alarming trend toward disparate risks based on gender, selected sociodemographics, and racial/ethnic background.

These data are particularly interesting, as it is clear that for some minority groups rates of physical activity are virtually unknown. For example, there are no national measures of physical activity prevalence among American Indian/Alaskan Native or Asian/Pacific Islander women in the United States. However, the limited information available suggests lower rates than among Whites (Centers for Disease Control and Prevention 1994). From data that are available, Black women have the highest rates of physical inactivity compared to Hispanic and white women (Caspersen and Merritt 1995). According to 1994 National Behavioral Risk Factor Surveillance Survey Data (BRFSS), 46% of non-Hispanic Black women were physically inactive (Brownson, Heath et al. In Review). Nearly as many (44%) of Hispanic women were physically inactive (Brownson, Heath et al. In Review).

5.3 Physical Activity and Social Support

Although there has been much speculation over factors that may contribute to this apparent disparity in physical activity levels, there are many unanswered questions. Several literature reviews have identified many determinants of physical activity (Dubbert 1992; King, Blair et al. 1992; Dishman and Sallis 1994). One possible determinant that has received little attention to date is the relative contribution of social support to physical activity behavior. To some degree, social support from family and friends has been consistently and positively related to adult physical activity (Treiber, Baranowski et al. 1991; Sallis, Hovell et al. 1992; Dishman and Sallis 1994; Felton and Parsons 1994). This social support typically is related to tasks or steps that significant others take to facilitate behavior. For example, social support for physical activity can be instrumental (e.g. giving a non-driver a ride to an exercise class); informational (telling a neighbor about a community exercise program); emotional (e.g. calling a friend to see how their new exercise program is faring); or appraisal (e.g. providing encouragement or reinforcement for learning a new activity or skill) (Isreal and Schurman 1990).

Family support appears to be especially important. Some researchers found that the success of interventions to modify health practices seems especially dependent on the family environment (Gottlieb and Green 1987; Rakowski 1988). However, families may not "naturally" provide social support for health changes and families must be directly and indirectly taught how to provide it in order to strengthen interventions (Baranowski, Nader et al. 1982.)

Spousal social support also may increase levels of physical activity. Several intervention studies exemplify this in both exercise (O'Reilly and Thomas 1989; Wallace, Raglin et al. 1995) and cardiac rehabilitation (Godin and Shepard 1985; Daltroy and Godin 1989).

In addition to support from family members and spouses, friend support seems to play a significant role in physical activity participation (King, Taylor et al. 1990; Courneya and McAuley 1995). For some groups of people, the mere social contact that occurs during a structured exercise program may enhance physical activity participation. Social interaction during exercise was found to be an important determinant for exercise in women (Gilette 1988). Focus group studies conducted with women of various racial/ethnic groups found that the social aspect of group physical activity is a motivating factor for commencing or maintaining a physical activity habit (Clark 1996; Eyler, Baker et al. In press).

The purpose of this study was to identify the relationship of social support for physical activity in a population-based sample of racial/ethnically diverse women. The questions on physical activity-related social support (PASS) were part of a national survey of risk factors among women ages 40 and older (The US Women's Determinants Study).

5.4 Methods

The US Women's Determinants Study was a national telephone survey conducted from July 1996 to June 1997. Hispanic, Black, and American Indian/Alaskan Native women over age 40 were the focus of this study. A sample of White women was also surveyed for comparison purposes. A modified-random cluster sampling technique was used. In order to use our resources most efficiently, separate lists of zip codes with greater than 20% of the minority group of interest was compiled from 1990 US Census data. These lists were the basis for deriving the random phone numbers. For the sample of White women, a straight random digit dialing technique was used (Waksberg 1978). For a more detailed description of this sampling plan, see Brownson et al. (Brownson, Heath et al. In Review). The physical activity social support questions were derived from (Sallis, Grossman et al. 1987). While this original physical activity social support scale has been tested as valid and reliable (Sallis, Grossman et al. 1987; Sallis, Hovell et al. 1992; Sallis, Hovell et al. 1992), the questionnaire was shortened and altered to fit our population (minority women) and survey method (telephone). The sampling and survey method was pilot tested (n = 47), analyzed and revised. During the actual survey, an attempt was made to re-interview every 10th respondent for reliability analysis. Two hundred respondents were re-interviewed and data were analyzed for measure of agreement from the first interview to the second.

5.5 Analysis

Data were analyzed using SPSS 7.5 computer software. A cumulative score of physical activity social support was derived by adding the responses to all the physical activity-related social support questions together resulting in a score from 0 to 5. A frequency of the PASS scores was run, and divided into tertiles: HIGH support (a score of 4-5), MEDIUM (a score of 2-3), and NO/LOW support (a score of 0-1). This variable (Physical Activity Social Support) served as the independent variable in the analyses. For the odds ratio calculations, the NO/LOW support category was used as the referent category.

Several logistic regression analyses were conducted using four different measures of physical activity as the dependent variable. The first dependent variable was a measure of participants who were sedentary (SEDENTARY). A sedentary person was described as someone who reported no participation in exercise, sports, or physically active hobbies in the past two weeks. In a second regression, the dependent variable was a measure of regular exercise (REGULAR EXERCISE). "Regular exercise" was calculated using self-reported participation in leisure-time physical activity at least 5 days a week for at least 30 minutes per session. A third regression was done using another method of assessing regular physical activity as the dependent variable (CDC/ACSM RECOMMEDATION). A cumulative total of leisure-time physical activity minutes was calculated from responses to the series of leisure-time physical activity questions on the survey. Based on the CDC/ACSM recommendation (Pate, Pratt et al. 1995) of " 30 minutes of activity "most" (interpreted as 5) days of the week", a dichotomous variable was created. This variable was coded as 1 if the subject participated in at least a cumulative total of 150 minutes of leisure-time physical activity and 0 if the subject did less than 150 minutes of leisure-time physical activity per week. For a fourth regression, an index was designed to reflect lifestyle physical activity, which is done as part of daily routines. This variable (LIFESTYLE ACTIVITY) was a cumulative total of physical activity from leisure, housework, and occupational categories. It was coded as 1 if the subject completed at least 300 minutes of total activity per week and 0 if the subject did less than 300 minutes per week. Housework activities included vacuuming/mopping, lifting/carrying, digging/planting, and "other" vigorous household chores. Occupational activity included walking, lifting/carrying, or "other" vigorous tasks completed at work. Because these activities are more likely to be less intense than leisure-time activities or exercise, the number of minutes required for meeting this criterion was double that of solely leisure-time physical activity to make up for presumably lower intensity.

These dependent variables were used for various reasons. "REGULAR EXERCISE" follows traditional exercise definitions of sustained physical activity used by the national Behavioral Risk factor Surveillance System Survey. "CDC/ACSM RECOMMENDATION" represents the more recent guidelines for accumulated activity. "LIFESTYLE ACTIVITY" includes non-traditional physical activity rather than the sole use of leisure-time physical activity which is possibly more appropriate given the population of middle aged and older women of various race/ethnicity.

Separate logistic regressions were computed with the four dependent variables stated above, using the PASS score as the independent variable. In order to present properly adjusted odd ratios, potential confounders (race, marital status, age, education, and income) were tested and only included in the final model if the original odds ratios changed by 10% or more (referred to as "substantial" change in the rest of this report) (Greenland 1989; Maldonado and Greenland 1993).

5.6 Results

The total population for analyses was 2912. Ninety-three cases were omitted due to missing age or race/ethnicity data. The response rate (calculated using the method recommended by the council of American Survey Research Organization (CASRO) for the US Women's Determinants Study was 91% (White 1983). From the reliability re-interviews (n = 200) Cohen's Kappa (κ) statistic for the physical activity social support questions were calculated (Cohen 1960). As a reference, Landis and Koch (1977) have suggested ratings for κ in the following categories: 1.0-0.8 (almost perfect), 0.8-0.6 (substantial), 0.6-0.4 (moderate), 0.4-0.2 (fair), 0.2-0.00 (slight), and 0.0 to -1.0 (poor) (Landis and Koch 1977). The κ for the physical activity social support questions ranged from .36 to .55, the whole scale had a κ of .40. Cronbach's *a* was used to measure internal consistency. The internal consistency of the physical activity social support questions was Cronbach's *a* = .70 which is considered to be adequate.

Table 5.1 lists the percentage of women in the four measures of physical activity by racial/ethnic group. American Indian/Alaskan Natives had the highest percentage (46%) of sedentary behavior among all racial/ethnic groups.

Seventeen percent of Hispanic women in the sample met the criteria for regular exercise as opposed to 7% of Black women. Hispanic women and White women (34% and 31%) had higher percentage of women who met the CDC/ACSM Recommendation than Black and American Indian/Alaskan Native women (18% and 19%). At least 72% of women in all the racial/ethnic groups met the LIFESTYLE ACTIVITY criteria.

Table 5.2 lists the frequency of women in the physical activity related social support categories by race/ethnicity. Chi square statistics indicate a significant difference among the racial/ethnic groups for the total PASS score, Family PASS, and Friends PASS. For the total PASS Score, the Hispanic group in this sample had the largest percentage (56%) of women in the "high" PASS category (i.e. a PASS score of 4-5), followed by American Indian/Alaskan Native women with 54% in the "high" PASS category. For the Family PASS Score, 58% of Hispanic women in the sample fell in the "high" category as opposed to 42% of White women. For the Friend PASS Score, Hispanic, Black, and American Indian/Alaskan Native women (49%, 48%, and 46%, respectively) all had a significantly higher percentage than White women (39%) in the high PASS category.

Crude odds ratios (OR) and 95% confidence intervals by race/ethnicity are listed in Table 5.3. There were

	Total	Black	AI/AN	Hispanic	White
Sedentary[1]	37.5	41.3	45.5	32.0	30.7
Regular Ex[2]	11.4	7.2	10.8	16.7	11.4
CDC/ACSM Rec[3]	25.2	18.0	19.0	33.5	31.2
Lifestyle[4]	76.9	71.7	77.8	81.9	76.0

1. Sedentary is defined as a "no" response to the question "Have you participated in any exercises, sports, or physically active hobbies in the past two weeks?"
2. Regular exercise is defined as at least 5 times a week, at least 30 minutes per session.
3. CDC/ACSM recommendation is defined in this study as an accumulation of 150 minutes of participation in exercises, sports, or physically active hobbies per week.
4. Lifestyle activity criteria is met if participant accumulated 300 minutes of combined exercises, sports, physically active hobbies, vigorous household chores, occupational physical activity per week.

Table 5.1 Percentage of Women In Each of the Four Physical Activity Measures by Racial/Ethnic Group.

PASS Score	Total n = 2790		Black n = 714		AI/AN n = 696		Hispanic n = 639		White n = 741	
	#	%	#	%	#	%	#	%	#	%
No/Lo	430	(15.4)	107	(15.0)	105	(15.1)	68	(10.6)	150	(20.2)
Med	958	(34.3)	248	(34.7)	217	(31.2)	216	(33.8)	277	(37.4)
High	1402	(50.3)	359	(50.3)	374	(53.7)	355	(55.6)	314	(42.4)

x^2 = 39.3 Sig. = <.001

Family PASS Score	Total n = 2850		Black n = 729		AI/AN n = 715		Hispanic n = 647		White n = 759	
	#	%	#	%	#	%	#	%	#	%
No/Lo	653	(22.9)	180	(25.0)	154	(22.0)	107	(16.5)	207	(27.3)
Med	787	(27.6)	201	(27.6)	184	(25.7)	166	(25.7)	236	(31.1)
High	1410	(49.5)	346	(47.5)	374	(52.3)	374	(57.8)	316	(41.6)

x^2 = 44.8 Sig. = <.001

Friend PASS Score	Total n = 2871		Black n = 739		AI/AN n = 721		Hispanic n = 654		White n = 757	
	#	%	#	%	#	%	#	%	#	%
No/Lo	666	(23.2)	154	(20.8)	168	(23.3)	128	(19.6)	216	(28.5)
Med	899	(31.3)	227	(30.7)	223	(30.9)	204	(31.2)	245	(32.4)
High	1306	(45.5)	358	(48.4)	330	(45.8)	322	(49.2)	296	(39.1)

x^2 = 25.4 Sig. = <.001

Table 5.2 Frequency of Physical Activity Social Support Categories by Race/Ethnicity from the US Women's Determinants Study, 1996-1997

	Black OR (95% CI)	Am. Indian OR (95% CI)	Hispanic OR (95% CI)	White OR (95% CI)
SEDENTARY				
PASS				
No/Lo	--	--	--	--
Med	.47(.30-.75)	.71(.45-1.14)	.81(.46-1.42)	.46(.30-.70)
High	.37(.24-.58)	.43(.28-.67)	.70(.41-1.19)	.43(.28-.64)
REGULAR EXERCISE				
PASS				
No/Lo	--	--	--	--
Med	.75(.32-1.76)	2.64(1.07-6.78)	1.24(.52.64)	1.2(.66-2.18)
High	.95(.44-2.09)	2.12 (.88-5.18)	1.16(.56-2.39)	.75(.40-1.39)
CDC/ACSM RECOMMENDATION				
PASS				
No/Lo	--	--	--	--
Med	1.11(.60-2.05)	1.42(.73-2.76)	.92 (.82-2.96)	1.49 (.96-2.31)
High	1.37(.77-2.44)	1.80 (.97-2.75)	1.05 (.61-1.82)	1.35 (.87-2.08)
LIFESTYLE ACTIVITY				
PASS				
No/Lo	--	--	--	--
Med	1.76(1.10-2.84)	1.64(.98-2.75)	1.54(.80-2.96)	1.07(.68-1.70)
High	2.58(1.63-4.08)	2.29(1.41-3.73)	1.68(.91-3.12)	1.56(.98-2.48)

Table 5.3 Crude Odds Ratios for Measures of Physical Activity by PASS category Among Racial/Ethnic Groups, US Women's Determinants Study, 1996-1997.

DV	PASS Level	# (%)	Crude OR(95% CI)	Adjusted OR(95% CI)
SEDENTARY	No/Lo	218/1031 (21.1)	--	--
n = 1031	Med.	357/1031 (34.6)	0.57(.46-.72)	0.36(.26-.50)
x^2 = 46.7 (.00)	High	456/1031 (44.2)	0.47(.38-.58)	0.33(.24-.45)
REGULAR EX	No/Lo	43/326 (13.2)	--	--
n = 326	Med.	123/326 (37.7)	1.35(.94-1.95)	1.47(.93-2.34)
x^2 = 2.5 (.28)	High	163/326 (49.1)	1.17(.82-1.67)	.91(.56-1.50)
CDC/ACSM REC	No/Lo	93/719 (12.9)	--	--
n = 719	Med.	252/719 (34.2)	1.25(.96-1.65)	1.48(.96-2.30)
x^2 = 5.2 (.08)	High	388/719 (52.9)	1.37(1.05-1.77)	1.35(1.04-1.75)
LIFESTYLE ACT	No/Lo	287/2121 (13.5)	--	--
n = 2121	Med.	711/2121 (33.5)	1.52(1.19-1.96)	1.21(.89-1.62)
x^2 = 33.1 (.00)	High	1155/2121 (52.9)	2.07(1.62-2.64)	1.55(1.16-2.06)

Table 5.4 Odds Ratios and Confidence Intervals for Physical Activity Social Support and Measures of Exercise, US Women's Determinants Study, 1996-1997.

significant differences among PASS categories for Black, American Indian/Alaskan Native, and White groups. The majority of the odds ratios were significant for the "SEDENTARY" variable, but only one was significant for the "REGULAR EXERCISE" variable (medium compared to no/low support for the American Indian/Alaskan Native group. Odds Ratios indicated no significant differences in the relationship of PASS category on the "CDC/ACSM RECOMMENDATION" variable. American Indian/Alaskan Native and Hispanic women in the medium PASS category were significantly more likely to meet the criteria for the "LIFESTYLE" variable.

Table 5.4 lists the crude and the adjusted odds ratios for the total population in the study. Participants in the medium or high support categories were less likely to be sedentary than those with no/low support (OR = 0.57 and 0.47 respectively). When race was added as a potential confounder, the odds ratios became 0.36 and 0.33, and remained significant. Since the odds ratios changed by more than 10%, race was left in the physical activity social support model for sedentary behavior. Adding marital status, age, education, or income, did not substantially change these odds ratios. For REGULAR EXERCISE, the crude odds ratios indicated that there were no significant differences among the categories of PASS. For "CDC/ACSM RECOMMENDATION" odds ratios were 1.25 for the medium and 1.37 (significant) for the high support categories. Of the potential confounders, race had a substantial effect on the odd ratio for the medium support category (OR = 1.48) so it was added to the model for "CDC/ACSM RECOMMENDATION" variable. Marital status, age, education, or income had no substantial effect. For "LIFESTYLE ACTIVITY", participants in the high support category were twice as likely to have completed 300 minutes of total weekly activity compared to those in the no/low category. When race was added to the model, odds ratios changed substantially. The odds ratios for this variable also changed substantially when both age and income was added, resulting in adjusted odds ratios of 1.21 for the medium and 1.55 (significant) for high support categories.

Another focus of the analysis was to determine if there was a difference in the four measures of physical activity between physical activity-related social support from relatives and physical activity-related social support from friends. Both "friend" and "family" social support had similar odds ratios in all four physical activity measures. All but the "REGULAR EXERCISE" variable had significant odd ratios. All the odds ratios for the "friend support" fell within the confidence intervals for "family support" indicating little difference between the two in this analysis.

5.7 Discussion

As expected, those with low physical activity social support were more likely to be sedentary. This remained true when marital status, age, income, and education were considered. Our finding is consistent with the limited research in this area conducted with minority women. (Clark 1996; Eyler, Baker et al. In press). Social support specific to physical activity may provide the initial motivation to increase physical activity levels. Promoting social support from friends and family as a component in physical activity interventions for sedentary women may be advantageous.

Unlike the sedentary variable, there was no difference in regular exercise participation among the three levels of physical activity related social support. Perhaps once a regular routine of exercise is established, participants may no longer rely on external motivating factors to continue their behavior. While women may rely on the social support from others to initiate a new behavior such as exercise, the role of social support may shift as this behavior becomes a habit.

For the "CDC/ACSM RECOMMENDATION", those with high support were significantly more likely to accumulate at least 150 minutes of leisure-time physical activity a week than those in the no/low support category. While most of the participants who accumulated 150 minutes of physical activity did not meet the stringent criteria for "regular exercise" (5x a week for 30 minutes per session), they are at least minimally active as recommended by the CDC/ACSM (Pate, Pratt et al. 1995). Support from friends and family seems more important for moderate than regular, sustained physical activity. For women limited by lack of time due to family and work responsibilities, perhaps short bouts of activity seem more achievable with encouragement from friends and family.

Results from the analysis with the "LIFESTYLE ACTIVITY" variable demonstrated a pattern similar to that of the "CDC/ACSM RECOMMENDATION" variable. Subjects with high levels of physical activity social support were 1.5 times as likely to complete 300 minutes of total activity per week. This finding may have important implications in physical activity interventions for several reasons. First, promotion of increased daily physical activity rather than solely leisure-time physical activity may be very appropriate for this population. While this measure of total activity may not come replete with the cardiovascular benefits of sustained physical activity or the stress-relieving benefits associated with leisure-time physical activity, it is reasonable to assume that subjects who complete more total physical activity per week experience at least some health benefits of being physically active. Completing vigorous household chores and occupational activity (as opposed to being sedentary) may enhance the ability and stamina to carry out basic activities of daily living. Second, promoting support and encouragement for all types of physical activity (leisure, occupational, and housework) may help women initiate and maintain a more physically active lifestyle.

Additionally, our results suggested that there were no differences between physical activity-related social support from friends versus that from family on each measure of physical activity for the population sub-groups under study. Perhaps for this population, the fact that some social support exists is more important than from whom this support comes. Interventions should focus on creating a supportive atmosphere for physical activity both in the home and in social circles of participants in order to increase the chances of successful behavior change.

5.8 Limitations

There are limitations to this study. First, there are several limitations inherent in any research with minority groups. With minority research, it is difficult to generalize results from sub-groups and sub-cultures of a population. For instance, American Indian tribes are very different from one another (e.g. reservation vs. urban living environment) (Tom-Orme 1995). What may be a physical activity barrier to women living on a reservation may not be relevant to those living in urban settings. Also, level of acculturation may make it difficult to generalize results. A woman who is a recent immigrant to the United States may have different attitudes about physical activity or difficulty expressing these attitudes due to language barriers than a woman of the same ethnicity that was born in the United States (Eyler, Baker et al. In press). Since our survey was only conducted in English, approximately 8.8% of the eligible women reached were not surveyed due to language barriers.

Another limitation of this study was the method of data collection. The survey data was collected via telephone and thus the sample was limited to only those households with telephones. Telephone coverage in our sample was analyzed by racial/ethnic group. The percentage of households with telephones in the zip codes surveyed was 92% for Blacks, 86% for American Indians, 89% for Hispanics, and 93% for Whites, which is similar to that of the US population (US CENSUS 1990). Although people with telephones tend to be younger and better educated than those without, the difference between estimates obtained using phone surveys and the household interview approach has generally been found to be small (Marcus and Crane 1986).

Additionally, because the survey had several foci, survey length inhibited us from fully assessing specific dimensions of physical activity-related social support (e.g. tangible, informational, etc.). This is a potential topic for future research.

Despite these limitations, this study has many strengths. This was the first survey of a nationally representative sample of middle and older-aged women from different racial/ethnic groups. The large sample allowed for complex multivariate analysis. Another strength is the use of multiple physical activity measures. The standards of sedentary behavior and regular exercise were based on other surveys, but the LIFESTYLE assessment is unique to this survey and may be a more appropriate measure of total activity for this population.

5.9 Summary

Our results showed that those participants with no social support or low social support for physical activity were more likely to be sedentary than those with higher levels of physical activity-related social support. Interventions that promote increased encouragement from family and friends to be physically active may have a positive impact and help initiate behavior change. Our finding suggest that those with higher levels of physical activity related social support were more likely to meet the CDC/ACSM recommendation for an accumulation of 150 minutes of moderate intensity physical activity per week. Social support to be physically active may be an important aspect of interventions geared toward achievement of this recommendation.

Research on physical activity among minority women is scarce (Eyler, Brownson et al. 1997). Studies such as this one are important in identifying possible determinants of physical activity in a population that has a comparatively low prevalence of this health-enhancing behavior. Also, identifying more comprehensive measures of physical activity for women of various racial/ethnic groups is an important topic for future research. These determinants can then be used to plan and implement successful interventions.

6. SOCIAL INFLUENCE ON PHYSICAL ACTIVITY IN MINORITY WOMEN

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Intended for Submission to American Journal of Health Behavior

7.1 Abstract

BACKGROUND: Despite national emphasis on increasing physical activity, almost one quarter of Americans remain sedentary. Research on the determinants of physical activity can be useful in intervention planning and implementation. One determinant that may be an important factor in physical activity research is social support.

PURPOSE: The purpose of this study was to assess the nature and extent of social influence on physical activity in a nationally representative sample of women over 40 years of age from various racial/ethnic groups.

METHODS: As part of the US Women's Determinants Study, data were collected on several measures of social contact including support network, marital status, employment, and regular church attendance. From these variables an index of social influence was created. Data on frequency and duration of physical activity were also collected. For women who indicated that having someone to exercise with would influence their level of physical activity, linear and logistic regression were used to determine the relationship between social support and physical activity.

RESULTS: The index of social influence did not predict the total minutes of physical activity for women in the sample. However, women with at least four people in their support network were more likely to do at least some physical activity (versus being sedentary) than those with fewer than four people in their support network.

CONCLUSION: Even though social influence did not predict level of physical activity in our sample, it seemed to be important in predicting whether women were active at all. More research is needed to identify better assessments of both social support and physical activity in minority women.

6.2 Introduction

Decades of research have demonstrated that physical activity is an important behavior for health promotion and disease prevention(United States Department of Health and Human Services 1996). Although there has been national emphasis on increasing physical activity levels, the proportion of American Adults who are sedentary (about 25%) has changed very little in the past 15 years(United States Department of Health and Human Services 1995). In order to increase the number of Americans who participate in recommended levels of physical activity, it is necessary to identify antecedents of exercise behavior as well as determining a clear profile of those most likely to take part in this behavior and those who are least likely. Identification of these determinants is useful in physical activity assessment as well as intervention planning and implementation.

Past research has identified several factors associated with the likelihood of being physically active. For example, a physically active person is more likely to be younger than older, and in many cases, more likely to be male than female (King, Blair et al. 1992; Dishman and Sallis 1994). Environmental factors (e.g. access, supportive policy) and individual factors (e.g. self-efficacy, self-motivation, history) also seem to play a role in whether or not a person is physically active (King, Blair et al. 1992; Dishman and Sallis 1994; United States Department of Health and Human Services 1996). Another factor that has been positively associated with physical activity as well as other health outcomes such as smoking cessation (Rice, Templin et al. 1996; Murray, Johnston et al. 1995; Gritz, Neilsen et al. 1996), weight management(Kaymann, Bruvold et al. 1990; Nunn, Newton et al. 1992), and stress management(Isreal and Schurman 1990),is social support. Much of the research on social support and health is based on the premise that social support may influence health outcomes by encouraging individual behavior (ie. exercising more or eating healthier)(Cohen and Herbert 1996).

Social support for physical activity is related to tasks or steps that significant others take to facilitate behavior. For instance, examples of this support include instrumental support(e.g. giving a non-driver a ride to an exercise class); emotional support(e.g. calling a friend to see how their new exercise program is faring); or appraisal support (e.g. providing encouragement or reinforcement for learning a new activity or skill)(Isreal and Schurman 1990).

Despite the potential contribution of social support in physical activity interventions, the study of social support and physical activity has been limited to mainstream populations. Research with women, especially of various racial/ethnic groups is scarce. However, two qualitative studies with minority women identified social support as an important component in initiating and maintaining an exercise habit (Clark, Maddox et al. 1993; Eyler, Baker et al. In press).

The purpose of this study was to identify the nature and extent of social influence on physical activity in a national sample of women ages 40 and older, from various racial/ethnic groups. Assessing and perhaps enhancing social support in these populations may be crucial factors in successful physical activity interventions in the future.

6.3 Methods

The US Women's Determinants Study was a national telephone survey conducted from July 1996 to June 1997. Hispanic, Black, and American Indian/Alaskan Native women were the focus of this study. A sample of White women was also surveyed for comparison purposes. A modified random cluster sampling technique was used. In order to use our limited resources most efficiently, separate lists of zip codes with greater than 20% of the minority group of interest were compiled from 1990 US Census data. These lists were the basis for deriving the random phone numbers. For the sample of White women, a straight random-digit dialing technique was used [18]. For a more detailed description of the sampling plan or survey methods, see (Brownson, Heath et al. In Review).

The US Women's Determinants Survey was a compilation of constructs from existing surveys (Behavioral Risk Factor Surveillance Study Survey and National Health Interview Survey) as well as new scales developed specifically for this population (minority women) and survey method (telephone). The survey had a total of 92 questions (including skip patterns). Average time of completion was 29 minutes and the response rate for this survey was 91%(Brownson, Heath et al. In Review).

6.4 Analysis

The cases selected for this analysis were those participants who responded "strongly agree or agree" to the statement "*If I had someone like a friend or family member to exercise with, chances are I'd exercise more.*" The outcome variable for the first analysis (linear regression) was a measurement of total minutes of leisure-time physical activity per week. This was determined by responses to series of questions on the frequency and duration of the top two physical activities they participated in within the last two weeks of the survey. The number of minutes per week was categorized into increments of 75 minutes.

The predictor variable for the linear regression was a complex index measure of social influence. Based on the sum of responses to two questions (*Of your close friends, how many would you confide in about personal problems*? and *Of your close relative, how many would you confide in about your personal problems*?) a variable called SUPPORT NETWORK was created. The three categories for the SUPPORT NETWORK variable were "no-low" (a score of 0-3), "medium" (a score of 4-7), and "high" (a score of 8 or more) based on mathematical tertiles. Three other variables of social contact were used to form the social influence index. Marital status (married versus not married), employment (full or part time versus unemployed, retired, homemaker etc.), and regular church attendance (at least 4 times per month versus less than four times per month) were added to the support network variable and combined to create the levels of the social influence index. The levels of this index are depicted in Figure 6.1.

A second analysis was conducted using logistic regression. A dichotomous variable of sedentary versus some activity was used as the dependent variable. This variable was based on the answer to the question "*Have you*

	Support Network Category	Other measures of social contact (1.married, 2.employed full or part-time, 3.attends church regularly)
Highest	High or Medium	All three
	High or Medium	Two of the three
	High or Medium	One of the three
	High or Medium	None of the three
	No/Low	All three
	No/Low	Two of the three
	No/Low	One of the three
Lowest	No/Low	None of the three

Figure 6.1 Levels of Social Influence Index

participated in any exercises, sports, or physically active hobbies in the last two weeks?" Participants who responded "no" were classified as sedentary and those who responded "yes' were classified as active. The independent variable for this logistic regression was the SUPPORT NETWORK variable. The "no/low" category was the referent category. In order to assess if regular church attendance, marital status, or employment were confounding factors, they were individually added to the regression as independent variables. If the odds ratio for the SUPPORT NETWORK variable changed by a relative 10% (Greenland 1989; Maldonado and Greenland 1993), it was kept in the model.

6.5 Results

The number of cases used for this analysis was 2277. Table 1 lists the frequencies by racial/ethnic group for the variables used in the analyses. There were significant differences among the groups for physical activity minutes, marital status, regular church attendance, and social influence index. American Indian/Alaskan Native women were more likely to be sedentary (0 minutes of physical activity) than the other groups. Forty-seven percent of American Indian/Alaskan Native women reported no physical activity as opposed to 30% of White women. More Hispanic women were in the highest physical activity minutes category (225+ per week) than any other group.

Some differences were also noted in the social influence index. More American Indian/Alaskan Native women were in the highest level of social influence (medium or high support network plus being employed, married, and regularly attending church) than any of the other groups (17% versus 7% for Black women). Only 3% of Hispanic women were in the lowest level of social influence (no/low support network plus not employed, not married, not regular church attendance) as opposed to 6% of Black women.

The index of social influence was used to predict minutes of leisure time physical activity in a linear regression model. The data met the criteria for normality, non-multicollinearlity, and homescedascity. The R^2 for the regression was .006, indicating no predictive value.

For the logistic regression analysis using the dichotomous "sedentary versus active" as the dependent variable, significant results were found. Even when marital status, regular church attendance, and employment were adjusted, women in the "medium" support network category (having 4-7 people they could confide in about personal problems) were 1.5 times more likely to be active

Variable	White	Black	Am. Ind.	Hispanic	Total
	n=561	n=584	n=597	n=535	N=2277
LTPA min	%	%	%	%	%
0	30.1	40.9	44.4	31.8	37.0
1-74	17.5	26.2	19.9	15.5	19.9
75-149	22.6	15.1	16.1	19.4	18.2
150-224	11.6	08.2	10.7	12.7	10.8
225+	18.2	09.6	08.9	20.6	14.1
x2 =47.1	p < .001				
Support Network[1]					
	n = 545	n = 518	n = 549	n = 518	N = 2162
No/Low	32.8	42.9	31.0	40.0	36.6
Medium	37.8	35.3	32.6	35.3	35.2
High	29.4	21.8	36.4	24.7	28.1
x^2 = 40.2 p<.001					
Marital Status[2]					
	n = 561	n = 584	n = 597	n = 535	N = 2277
Married	64.3	39.4	60.5	66.7	57.5
Not Mar.	35.7	60.6	39.5	33.3	42.5
X^2 = 109.9 p<.001					
Employment[3]					
	n = 561	n = 583	n = 597	n = 535	N = 2276
Employed	48.1	44.4	49.4	46.0	47.0
Not Emp.	51.9	55.6	50.6	54.0	53.0
X^2 = 3.45 p=.35					
Church Attendance[4]					
	n = 561	n = 584	n = 597	n = 535	N = 2277
4+ x/mo	48.3	66.3	64.3	66.7	61.4
0-3 x/mo	51.7	33.7	35.7	33.3	38.6
X^2 = 54.99 p<.001					

1. Categories of total number of close friends and relatives participants reported being able to confide in about personal problems.
2. Marital status was divided into two categories: married or in a committed relationship and all others included divorced, widowed, separated, never married.
3. Employment was divided into two categories: employed full or part time and all others including homemaker, retired, student, disabled, unemployed.
4. Church attendance was divided into number of services attended per month. Four times a month is defined as "regular".

Table 6.1 Frequencies of Variables Used in Analyses then women in the "no/low" support network category (OR = 1.53, 95% CI = 1.24-1.88). Women in the "high" support network category (having 8 or more people they could confide in about personal problems) were 1.4 times more likely to be active than women in the "no/low" support network category (OR = 1.38, 95% CI = 1.11-1.72). There were no significant differences in these odds ratios among the minority groups.

6.6 Discussion

Despite prior research indicating the importance of social support in initiating or maintaining an exercise program (King, Blair et al. 1992; Dishman and Sallis 1994) we found that an index of social influence did not predict total minutes of leisure-time physical activity per week in this sample of middle and older-aged minority women. Our results raise several important questions to be addressed in future research. First, we found that women in the sample who had support networks of at least 4 people were more likely to do some kind of physical activity. While support network may influence whether or not a woman is sedentary versus doing some type of activity, the non-significant results from the linear regression indicates that it may not be the mere presence of social support that influences the level of physical activity, but the actual informational, appraisal, or emotional support that may be the important predictors. Assessments of social support and physical activity should include an assessment of these distinct components. In addition, data assessing the specific support mechanism related to sedentary versus active exercise behavior should be explored.

Because physical activity is a complicated concept to assess, particularly in groups that have not been included in much of past physical activity research (Eyler, Brownson et al. 1997), more attention must be directed toward the unique components of exercise behaviors in underrepresented groups. A significant difference was found among the levels of support network on the dichotomous variable "sedentary versus active", but the support network variable (as part of the social influence index) did not produce significant results when used to predict a more complex measure of physical activity (total minutes of LTPA). The "total minutes" variable was computed from a series of questions on frequency and duration whereas the dichotomous "sedentary versus active" variable was based on response to one question. Perhaps despite adequate reliability, validity of the series of physical activity questions in this population may be questionable and may need to be more thoroughly tested in this population. Especially pertinent to future research is the interpretation of "physical activity" as it may be very different than for non-minority groups.

6.7 Limitations

There are limitations to this study. First, there are several limitations inherent in any research with various racial/ethnic groups. With minority research, it is difficult to generalize results from sub-groups and sub-cultures of a population. Additionally, level of acculturation may make it difficult to generalize results. A woman who is a recent immigrant to the United States may have different conception of physical activity or social support or difficulty in adequately reporting these concepts due to language barriers than a woman of the same ethnicity born in the United States. Since our survey was conducted in English, approximately 8.8% of the eligible woman reached were not surveyed due to language barriers.

Another limitation of this study was the method of data collection. The survey data was collected via telephone and thus the sample was only limited to only those households with telephones. Telephone coverage in our sample was analyzed by racial/ethnic group. The percentage of households with telephones in the zip codes surveyed was 92% for Blacks, 86% for American Indian/Alaskan Natives, 89% for Hispanics, and 93% for Whites, which is similar to that of the US population (United States Bureau of the Census 1995). Although people with telephones tend to be younger and better educated than those without, the difference between the estimates obtained using telephone surveys and the household interview approach has generally been found to be small (Marcus and Crane 1986).

Additionally, because the survey had several foci, survey length inhibited us from fully assessing specific dimensions of social support (e.g. appraisal, emotional). This is a potential topic for future research. Another potential problem is that the questions used to measure social support may not have been the best for this population.

Despite these limitations, this study had several strengths. This was the first survey of a nationally-representative sample of middle and older-aged women from different racial/ethnic groups. The large sample added power to the analyses. The variety of concepts covered in the survey allowed for complex analyses.

6.8 Summary

For women in the sample who indicated that they believed having someone to exercise with would have influenced their level of physical activity, our results showed that level of support network may predict whether participants were active or sedentary. However, an index of social influence (including level of support network, marital status, employment, and regular church attendance) did not predict the level of physical activity.

More research is needed to test both physical activity and social support assessments in populations of various racial/ethnic groups. Since other research shows the importance of social support in initiating or maintaining an exercise habit, specific components of social support need to be researched and applied to physical activity intervention planning and implementation.

7. CONCLUSION

7.1 Summary

More is learned about chronic diseases through research and evaluation each year. Especially important is finding ways to prevent the diseases from occurring. Decades of research have identified regular physical activity as an important preventive behavior for many chronic diseases. Specifically, physical activity contributes to health benefits such as lower risk of cardiovascular disease (Paffenbarger, Wing et al. 1978; Blair, Kampert et al. 1996) better control of hypertension (Folsom, Prineas et al. 1990; Paffenbarger, Jung et al. 1991), and diabetes mellitus (Manson, Rimm et al. 1991; Manson, Willett et al. 1995), reduced risk of certain types of cancer (Lee, Paffenbarger et al. 1991; Mittendorf, Longnecker et al. 1995) and lower risk of osteoporosis (Dalsky, Stocke et al. 1988; Avioli 1993). Although the message is clear that physical activity is an important factor in reducing health risks, efforts to motivate various segments of the population to exercise have been met with little success.

While we can assume that the health benefits of exercise identified by research conducted with white men is applicable to women and minority groups, we cannot be certain that the determinants and barriers to physical activity are the same. Efforts to increase exercise and physical activity among these populations may be futile unless more is learned about the predisposing, reinforcing, and enabling factors of this behavior.

For women, limited research suggests several factors that are barriers to increased physical activity. First, women have a much shorter history of being physically active than men (Lutter 1994). Without history, women may lack skills and the self-efficacy necessary to successful integrate a health behavior change (Dishman and Sallis 1994). Second, women have much different gender roles than men. Most often, they are mothers, wives, employees, caregivers, etc., which leaves little time to pursue extraneous activities. Third, minority women have additional barriers. Cultural issues (e.g. modesty), socioeconomic issues (e.g. unsafe living environments or lack of access), and disparate health risks (e.g. higher rates of obesity) all contribute to sedentary behavior.

In contrast to these barriers to physical activity, minority women seem to have stronger family, social, and religious networks than White women do. Higher levels of social support have been associated with lower mortality rates (Berkman and Syme 1979; House, Robbins et al. 1982; Schoenbach, Kaplan et al. 1986), increased immune system efficiency (Keicolt-Glaser, Garner et al. 1984; Cohen and Herbert 1996), and many health behavior changes (Johnson, Carrigan et al. 1990; Kaymann, Bruvold et al. 1990; Murray, Johnston et al. 1995; Gritz, Neilsen et al. 1996).

It is reasonable to assume that the greater one's social support, the more likely one would be to participate in physical activity. This support can come in several forms. It can be specific to physical activity. For example, friends or family members can encourage exercise behavior. The support can also be general. Perhaps having a larger social network means having someone to help with housework or childcare, freeing up time for exercise. These support networks as well as the type of support should be assessed and utilized as potential catalysts for increasing physical activity levels.

In the current study, specific encouragement to be physically active from both friends and relatives was positively related to level of exercise. In fact, those women who scored low on the physical activity-related social support scale (PASS) were significantly more likely to be sedentary than those who scored in the medium or high PASS category. Women in this sample who were not encouraged to be physically active, were not physically active. Even though temporality in this case is difficult to determine, bolstering such social support should be an important part of physical activity interventions in this population.

In addition to assessing specific social support for physical activity, another focus of this current study was to identify the nature and extent of a general measure of social influence on physical activity levels. It was found that greater social ties (support network, spouse, religious ties, employment) was not a significant predictor of total minutes of leisure-time physical activity for women of various racial/ethnic groups. However, in another analysis, women with larger social support networks were more likely to do some physical activity versus none at all.

These findings are important for several reasons. First, results indicate that social support is a factor in the environment that can help facilitate or hinder health behavior change. Several theories exemplify this. For instance, the Social Cognitive Theory (Bandura 1986) is based on the premise that people and their environments interact continuously. The environment (including social environment) shapes, maintains, and constrains behavior; but people can create and change this environment. In the Theory of Planned Behavior (Ajzen 1991), social environment is a component of perceived behavioral control. The Triandis Model (Valois, Desharnais et al. 1988), includes a set of facilitating conditions that may help or hinder behavior change. The social environment is included in these conditions.

Second, while the findings reported here indicate that social support may be an important aspect of physical activity, more research is needed to determine what types of social support works best in different populations. Additionally, it is necessary to match the type of social support with personality types. What works for one person may not be as effective for another person. For example, a simple phone call from an exercise leader may be enough to keep some people motivated, but for others, social support may need to be as specific as having an actual person to walk with each day.

It is also important to assess the most effective types of social support throughout the behavior change process. In the current study, there was no difference in the effect of level of physical activity-related social support for women in the sample who were regular exercisers, but there were significant differences in the other measures of physical activity.

Supportiveness or encouragement is not an innate skill for most. Programs that focus on increasing the physical activity levels of minority women should not only focus on the women themselves, but also include information for their social networks as well.

7.2 Recommendations

A third important finding from this study is the lack of adequate research in the area of social support, exercise behavior, and minority populations. There is an apparent need for a more in-depth analysis of specific elements of social support that are predictive of exercise behaviors. Broad conceptual-based social support may poorly predict selected elements of motivation to initiate and sustain exercise behaviors. Based on the literature review and findings from the current study, several recommendations can be made:

- There is a need for better physical activity and social support assessments. These assessments must be tailored to and tested on minority populations.

- More research on specific types of social support that may enhance exercise behavior change is needed.
- There is a need to add a social support component to interventions aimed at increasing physical activity.
- In these interventions, members of participants support network should be given information and training to facilitate successful behavior change.
- Evaluation of the social support component in physical activity interventions needs to be ongoing and used to modify program is necessary.
- There is a need to combine social support with other facilitating conditions such as access to safe places to exercise and cultural and gender specific program availability.

In summary, social support has the potential to be an important factor in increasing the physical activity levels of minority women. For many of these women, strong social ties already exist. To effectively use these existing social networks to help facilitate change, more specific research is needed. It will be necessary to identify the types of support that work best and to distinguish the most effective methods of teaching significant others to be supportive of increased physical activity.

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APPENDIX

JULY, 1996

National Determinants Questionnaire
Environmental Factors and Physical Activity in Women

Hello, I'm ________________ calling for the Saint Louis University Prevention Center. We are doing a study of the health practices of women in the United States. Your phone number has been chosen randomly to be included in the study, and we'd like to ask some questions about things people do which may affect their health. The interview will only take a short time, and all the information obtained in this study will be **confidential**. First,. . . .

1. Would you say that in general your health is:

Please read

1 Excellent

2 Very Good

3 Good

4 Fair
OR
5 Poor

Do not read

777 Don't know/Not sure

999 Refused

These next questions ask for some information about yourself.

2. What is your age?

__ __ Enter age in years

777 Don't know/Not sure

999 Refused

3. What is your race? Would you say: **Please Read**

1 White

2 Black/African-American

3 Asian, Pacific Islander (specify group: ________________)

4 American Indian, Alaskan Native (specify tribe: ________________)

or

5 Other: (specify)

Do not read

777 Don't know/Not sure

999 Refused

4. Are you of Hispanic origin, such as Mexican American, Latin American, Puerto Rican, or Cuban?

1 Yes (specify group: ____________________)

2 No

777 Don't know/Not sure

999 Refused

5. Indicate sex of respondent. Ask only if necessary.

1 Male

2 Female

6. Are you currently:

Please Read

1 Employed for wages.. full-time

2 Employed for wages part-time

3 Self-employed ......

4 Out of work for more than 1 year

5 Out of work for less than 1 year.

6 Homemaker

7 Student

777 Retired

OR

888 Disabled and unable to work

Do not read

999 Refused

IF RESPONDENT IS FEMALE, GREATER THAN 40 YEARS OLD, AND OF THE SPECIFIED MINORITY GROUP, CONTINUE WITH SURVEY. IF NOT READ THE PARTICIPATION STATEMENT:

Section I: Exercise

7. In the past two weeks, have you done any exercises, sports, or physically active hobbies?

1 Yes

2 No .... **GO TO #**..... **17**

777 Don't know/Not sure

999 Refused

8. In the past two weeks, what exercise, sport, or physically active hobby did you do the most?

Do not read

1 Walking
2 Gardening or yard work
3 Jogging/Running
4 Hiking
5 Calisthenics
6 Biking
7 Swimming or water exercises
8 Aerobic dance
9 Other (please indicate)____________________________________. ....
777 Don't know/Not sure
999 Refused

9. In the past two weeks, about how many days did you _____________ (take from question # **8**) ?

___ Number of days

IF ZERO SKIP TO # 17

777 Don't know/Not sure

999 Refused

10. On average, how many minutes did you _________(take from question # **8**) each time?

____ Number of minutes

777 Don't know/Not sure

999 Refused

11. When you ______________ (take from question 8), did you usually have a small increase, a medium increase, a large increase, or no increase at all in your heart beat and/ or breathing?

Please read

1 No increase

2 Small increase

3 Medium increase

4 Large increase

777 Don't know/Not sure

999 Refused

12. Was there another physical activity or exercise that you participated in during the last two weeks?

1 Yes

2 No... **GO TO QUESTION 17**

777 Don't know/Not sure

999 Refused

13. What was this other activity?

Do not read

1 Walking

2 Gardening or yard work

3 Jogging/Running

4 Hiking

5 Calisthenics

6 Biking

7 Swimming or water exercises

8 Aerobic dance

9 Other (please indicate)____________________

777 Don't know/Not sure

999 Refused

14. In the past two weeks, about how many days did you __________ (take from question # **13**) ?

___ Number of days
IF ZERO SKIP TO # 17

777 Don't know/Not sure

999 Refused

15. On average, how many minutes did you _________(take from question # **13**) each time?

___ Number of minutes

777 Don't know/Not sure

999 Refused

16. When you ___________ (take from question # **13**), did you usually have a small increase, a medium increase, a large increase, or no increase at all in your heart beat and/ or breathing?

Please read

1 No increase

2 Small increase

3 Medium increase .

4 Large increase

777 Don't know/Not sure

999 Refused

17. In an average week, about how many hours do you spend doing the following?

Please read

____ Vacuuming and mopping

____ Digging/planting in a garden

____ Lifting/carrying laundry

____ Other vigorous household chores

FOR PEOPLE WHO RESPONDED **1, 2, OR 3 FOR QUESTION 6,** CONTINUE... IF NOT GO TO QUESTION 19

18. On a work day, about how much time in minutes or hours do you spend doing the following:

Please read

_____ Sitting *enter minutes or hours*

____ Standing *enter minutes or hours*

_____ Walking "

_____ Lifting or carrying heavy object

_____ Other strenuous tasks

777 Don't know/Not sure

999 Refused

FOR THOSE THAT ANSWERED **"YES (1)" TO QUESTION** 7 CONTINUE. IF NOT GO TO QUES. 24.

Section I a. Exercise Enjoyment

19. On a scale from 1 to 5 with 1 meaning *I hate it* and 5 meaning *I enjoy it*, how much do you enjoy exercise when you are doing it?

____ (enter number 1 to 5)

777 Don't know/Not sure

999 Refused

20. On a scale from 1 to 5 with 1 meaning *I feel bored* and 5 meaning *I feel interested*, how much are you interested in exercise when you are doing it?

____ (enter number 1 to 5)

777 Don't know/Not sure

999 Refused

21. On a scale from 1 to 5 with 1 meaning *no fun at all* and 5 meaning *it's a lot of fun*, how fun is exercise for you?

____ (enter number 1 to 5)

777 Don't know/Not sure

999 Refused

22. On a scale from 1 to 5 with 1 meaning *it's very unpleasant* and 5 meaning *it's very pleasant*, how pleasant is exercise for you?

___	(enter number 1 to 5)
777	Don't know/Not sure
999	Refused

23. On a scale from 1 to 5 with 1 meaning *I feel bad physically* and 5 meaning *I feel good physically*, how do you feel while you are exercising?

___	(enter number 1 to 5)
777	Don't know/Not sure
999	Refused

Section I b. Physical Activity Stages

24. When responding to the following five statements, use these definitions for **exercise** and **regular**.

Exercise includes activities such as power walking, jogging, aerobic dancing, biking, rowing, weight lifting, etc.
Regular exercise means 3 times or more per week for 20 minutes or longer each time.

YES	NO	DK/NS	REF	
1	2	777	999	I currently exercise.
1	2	777	999	I intend to exercise in the next six months
1	2	777	999	I currently exercise regularly.
1	2	777	999	I have exercised regularly for the past six months.
1	2	777	999	I have exercised regularly in the past for a period of at least three months.

25. When responding to the next five statements, use these definitions for **physical activity** and **regular**.

Physical activity means walking briskly, vacuuming, digging in the garden, general housework, or any other physical activity with similar exertion. These physical activities are less strenuous than "exercise."

Regular physical activity means accumulating 30 minutes or more in the above activities 5 or more days out of the week. For example, to accumulate 30 minutes for one day you could:
* work in the garden for 30 minutes OR
* take three 10 minute walks OR
* complete 10 minutes of vacuuming, 10 minutes of walking <u>and</u> 10 minutes of digging in the garden

YES	NO	DK/NS	REF	
1	2	777	999	I am currently physically active.
1	2	777	999	I intend to become physically active in the next 6 months
1	2	777	999	I currently engage in regular physically activity.
1	2	777	999	I have been physically active regularly for the past 6 months
1	2	777	999	I have been physically active regularly in the past for a period of at least 3 months.

26. Which is more appealing to you?

1 Exercising in a group with an exercise leader

2 Exercising on your own with some instruction

777 Don't know/Not sure

999 Refused

<u>I c. Barriers</u>

27. **I am going to read you some things that may interfere with or prevent you from exercising or being physically active. For each one, tell me how often it interferes or prevents you from exercising or being physically active?**

Scale: 1=NEVER. 2=RARELY, 3=SOMETIMES,4=OFTEN, 5=VERY OFTEN, 777=DK/NS, 999=REF

___ Others discourage me.

___ I am self-conscious about my looks.

___ I am afraid of injury

___ I have a lack of time

___ I am too tired

___ I lack a safe place to exercise or walk

___ I have care-giving duties

___ The weather is bad

___ I am not in good health

___ I lack the energy to exercise

28. How safe is it to walk or jog alone in your neighborhood during the day?

Please read

1 Very Unsafe

2 Unsafe

3 Neutral

4 Safe

5 Very Safe

Do not read

777 Don't know/Not sure

999 Refused

29. Please indicate which of the following apply in you neighborhood.

Yes	No	DK/NS	REF	
1	2	777	999	Side walks
1	2	777	999	Heavy traffic
1	2	777	999	Hills
1	2	777	999	Street lights
1	2	777	999	Dogs that are unattended
1	2	777	999	Enjoyable scenery
1	2	777	999	Frequently see people exercising
1	2	777	999	High crime

30. When you see someone similar to yourself jogging down the street for exercise, how could you describe the way you feel?

Do not read

1 Guilty for not exercising
2 Disgusted by their display
3 Admiration
4 Jealous of their dedication
5 I wish I was jogging with them.
6 Embarrassed for them
7 Angry
9. Other (please indicate ______________________)
777. Don"t Know/Not Sure
999 Refused

31. If I had someone like a friend or family member to exercise with, chances are that I would exercise more.

Please read

1 Strongly Agree

2 Agree

3 Disagree

or

4 Strongly Disagree

Do not read

777 Don't know/Not sure

999 Refused

32. My friends encourage me to exercise.

Please read

1 Strongly Agree

2 Agree

3 Disagree

4 Strongly Disagree

Do not read

777 Don't know/Not sure

999 Refused

33. I have at least one friend who would commit to exercise with me.

Please read

1 Strongly Agree
2 Agree
3 Disagree
4 Strongly Disagree

Do not read

777 Don't know/Not sure
999 Refused

34. Relatives encourage me to exercise.

Please read

1 Strongly Agree
2 Agree
3 Disagree
4 Strongly Disagree

Do not read

777 Don't know/Not sure
999 Refused

35. I have at least one relative who would commit to exercise with me.

Please read

1	Strongly Agree
2	Agree
3	Disagree
4	Strongly Disagree
	Do not read
777	Don't know/Not sure
999	Refused

36. Thinking only of the family members 10 or over who live with you, in the past month, have you had any discussions about-

Y	N	DK	REF	
1	2	777	999	Nutrition and health eating habits?
1	2	777	999	Exercise, sports, or other physical activities, as related to health?
1	2	777	999	Health issues related to cigarette smoking or other tobacco use

37. Where do you get most of your information on exercise?

Do not read–Record single most important source

1	Co-Workers
2	Doctor
3	Employer
4	Family
5	Friends
6	Minister/Clergy
7	Neighbors
8	Other Health Professional....
9	Health Literature
10	Local Health Agency
11	Newspaper/Magazines
12	Radio
13	Television
14	None
777	Don't know/Not sure
88	Other
999	Refused

38. Exercise reduces the risk of heart disease.

1	Strongly Agree
2	Agree
3	Disagree............... .... **GO TO #40**
	OR
4	Strongly Disagree ....**GO TO #40**
777	Don't know/Not sure .....**GO TO #40**
999	Refused .... **GO TO #40**

39. How much exercise does a person need to reduce their risk of heart disease?

__ __	Days per week (convert as needed).
__ __	Time per session (convert as needed)
777	Don't know/Not sure
999	Refused

I c Policy Attitudes/Access

40. Do you think local employers in your community should provide time during the work day for employees to exercise?

1	Yes
2	No
777	Don't know/Not sure
999	Refused

41. Do you think schools in your community should require physical education for all students?

1	Yes
2	No
777	Don't know/Not sure
999	Refused

42. Do you think local government funds should be spent to build and maintain places in your community where people can exercise such as:

YES	NO	DK/NS	REF	
1	2	777	999	Walking trails
1	2	777	999	Swimming pools
1	2	777	999	Recreation centers
1	2	777	999	Bicycle paths

43. To promote exercise, zoning regulations should include walking or bike paths. Do you:

Please Read

1	Strongly Agree
2	Agree
3	Disagree
	OR
4	Strongly Disagree
777	Don't know/Not sure
999	Refused

44. In your community, do you have easy access to the following:

YES	NO	DK/NS	REF	**Please Read**
1	2	777	999	Walking trails
1	2	777	999	Swimming pools
1	2	777	999	Recreation centers
1	2	777	999	Bicycle paths

<u>Section II: Tobacco Use</u>

Now I'd like to ask a few questions about cigarette smoking...

45. Have you smoked at least 100 cigarettes in your entire life?

5 packs =100 cigarettes

- 1 Yes-
- 2 No .... **Go to Q. 51**
- 777 Don't know/Not sure ....**Go to Q. 51**
- 999 Refused ....**Go to Q. 51**

46. Do you smoke cigarettes now?

- 1 Yes
- 2 No ....**Go to Q. 52**
- 999 Refused ....**Go to Q. 52**

47. On the average, about how many cigarettes a day do you now smoke?

1 pack = 20 cigarettes

_ _ _ Number of cigarettes

- 777 Don't smoke regularly
- 999 Refused

48. How soon after you awake in the morning do you usually smoke your first cigarette?
Enter hours/minutes or minutes only

_ _ _ Number of hours/minutes

- 777 Don't know/Not sure
- 999 Refused

49. Are you seriously considering quitting smoking:

Please read

1 Within the next month

2 Within the next six months

3 Sometime in the future
OR
4 Not planning to quit..

Do not read

777 Don't know/Not sure

999 Refused

50. Have you ever made a serious attempt to stop smoking cigarettes?

1 Yes

2 No

999 Refused

51. When you are at home, are you exposed to smoke from other people's cigarettes, pipes, or cigars?

1 Yes

2 No

777 Don't know/Not sure

999 Refused

IF RESPONDENTS ANSWERED **1, 2, OR 3 TO QUESTION 6,** CONTINUE, IF NOT GO TO QUESTION 55

52. When you are at work, are you exposed to the smoke from other people's cigarettes, pipes, or cigars?

1 Yes

2 No

777 Don't know/Not sure

999 Refused

53. [At your workplace] which of the following best describes the smoking policy for areas in which employees work?

Please Read

1 Not allowed in any work areas

2 Allowed in some work areas

3 Allowed in all work areas

OR

777 Don't know/Not sure

999 Refused

Section III: Eating Habits

54. In the past month, how many average daily servings of vegetables did you usually eat, not counting potatoes or salad,?

___ Enter times per day

555 Never

777 Don't know/Not sure

999 Refused

55. In the past month, about how many servings of fruit did you eat, including 100% juices?

___ Enter number of servings

777 Don't know/Not sure

888 None

999 Refused

56. Would you say your diet is high, medium, or low in fat?

1 High

2 Medium

3 Low

777 Don't know/Not sure

999 Refused

57. Are you:

Please read

1 Married

2 Divorced

3 Widowed

4 Separated

5 Never been married

OR

6 A member of an unmarried couple

Do not read

999 Refused

58. What is the language most often spoken in your home by those persons five and older?

Do not read

1 English

2 Spanish

3 Chinese

4 Japanese

5 Korean

6 Vietnamese

7 Arabic

8 Native North American

9 Other

777 Don't know/Not sure

999 Refused

59. How many children live in your household who are...

Please read

___ Less than 5 years old

___ 5 through 12 years old

___ 13 through 17 years old

888 None

999 Refused

60. What is the highest grade or year of school you completed?

Read Only if Necessary

1	Eighth grade or less
2	Some high school.
3	High school or GED certificate
4	Some technical school
5	Some college
6	College graduate
7	Post grad or professional degree
999	Refused

61. Which of the following categories best describes your annual household income from all sources?

Please read

1	Less than $ 5,000.
2	$ 5,000 to less than $10,000
3	$10,000 to less than $15,000
4	$15,000 to less than $20,000
5	$20,000 to less than $25,000
6	$25,00 to less than $35,000
7	$35,000 to less than $50,000

OR

8	$50,000 to $75,000
9	Over 75,000

Do not read

777	Don't know/Not sure
999	Refused

62. Do you have more than one telephone number in your household?

1	Yes
2	No .... **Go to Q. 64**
999	Refused .... **Go to Q. 64**

63. How many residential telephone numbers do you have?

___	Enter number
999	Refused

64. What is your zip code?

__ __ __ __ __

777	Don't know/Not sure
999	Refused

65. About how much do you weigh without shoes?

____	Weight in pounds
777	Don't know/Not sure
999	Refused

66. About how tall are you without shoes?

__/__ __	Height (ft./in.)
777	Don't know/Not sure
999	Refused

I would like to ask you a few questions about medical exams.

67. A mammogram is an x- ray taken only of the breasts by a machine that presses the breast against a plate. About how long has it been since you had a mammogram?

Please read

1	Never had a mammogram...
2	Within the past year..
3	1 to 2 years ago
4	Over 2 years ago
	Do not read
777	Don't Know/ Not Sure
999	Refused

68. Pap smear is a routine gynecological test in which the doctor examines the cervix and sends a cell sample to the lab.

About how long has it been since you had a Pap smear test? Was it within the past year, between 1 and 3 years ago, or over 3 years ago?

Please read

1	Never had a Pap smear test
2	Within the past year
3	1 to 3 years ago
4	Over three years ago.
	Do not read
777	Don't Know/ Not Sure
999	Refused

Now I would like to ask you a few questions about body image and weight control.

69. How do you feel about your body size right now? Would you say you are

1	Very satisfied
2	Somewhat satisfied
3	Not satisfied
777	Don't know/Not sure
999	Refused

70. Are you now trying to lose weight?

1.	Yes
2.	No .... **Go to Q. 72**
3.	No, trying to gain weight .... **Go to Q. 72**
777	Don't know/Not sure .... **Go to Q. 72**
999	Refused .... **Go to Q. 72**

71. Are you doing any of the following to (**70a.** lose weight or) keep from gaining weight?

Yes	No	DK/NS	REF	
1	2	777	999	Eating fewer calories by eating less food or less often?
1	2	777	999	Exercising or increasing physical activity?

<u>Section IV : Preventive Health Practices</u>

The next questions are about your personal health and the availability of medical care in your area.

72. Have you ever been told by a doctor that you have any of the following?

Yes	No	DK/NS	Ref.	**Please read**
1	2	777	999	Arthritis
1	2	777	999	Diabetes
1	2	777	999	Hypertension/High Blood Pressure
1	2	777	999	High blood cholesterol.
1	2	777	999	Heart Disease
1	2	777	999	Cancer
1	2	777	999	Depression

73. Do you have any kind of health care coverage, including health insurance, prepaid plans such as HMO's, or government plans such as Medicare, Medicaid, or Veteran's care?

1	Yes
2	No .... **Go to Q. 77**
777	Don't know/Not sure .... **Go to Q. 77**
999	Refused .... **Go to Q. 77**

74. What kind do you have?

Read only if necessary

1	Medicaid
2	Medicare
3	Veteran's health care benefits
4	Commercial insurance
5	Health maintenance organization (HMO)
6	Preferred provider organization (PPO)
7	Self-insured
777	Don't know/Not sure
88	Other: ________________
999	Refused

75. Do you have a doctor whom you see for regular health care?

1	Yes
2	No, but I see a nurse or other health professional.
3	No
777	Don't know/Not sure
999	Refused

76. Have you been advised **within the last year** by a doctor to:

Yes	No	DK/NS	REF	**Please read**
1	2	777	999	Exercise more?
1	2	777	999	Eat more fruits and vegetables?
1	2	777	999	Reduce your weight?
1	2	777	999	Reduce stress?

Ask current smokers only (if answer was "yes" to question 46)

1	2	777	999	Quit smoking? *If Yes then...*
1	2	777	999	Did the advice include the use of nicotine gum or nicotine patch?

<u>Section 5 : Health and Functional Status</u>

These questions are about your physical and mental health and limitations you may have in your daily life.

77. Now thinking about your physical health, which includes physical illness and injury, for how many days during the past 30 days was your physical health not good?

__ __	Number of days
88	None
777	Don't know/Not sure
999	Refused

78. Now thinking about your mental health, which includes stress, depression and problems with emotions, for how many days during the past 30 days was your mental health not good?

__ __	Number of days
88	None
777	Don't know/Not sure
999	Refused

79. Are you able to walk a mile without assistance?

1	Yes
2	No
777	Don't know/Not sure
999	Refused

80. Do you need help from another person to climb up or down a flight of stairs?

1	Yes
2	No
777	Don't know/Not sure
999	Refused

81. Are you LIMITED in any way in any activities because of any impairment or health problem?

1	Yes
2	No .... **GO TO 84**
777	Don't know/Not sure ..... **GO TO 84**
999	Refused .... **GO TO 84**

82. What is the major impairment or health problem that limits your activities?

Read only if necessary

1 Arthritis

2 Spinal Injury

3 Head Injury

4 Post-polio syndrome

5 Leg injury

6 Back or neck problems

7 Other fracture, bone/joint injury

8 Walking problem

9 Lung/breathing problems

10 Hearing problems

11 Eye/vision problems

12 Heart problem

13 Stroke problem

14 Hypertension/high blood pressure

15 Diabetes

16 Cancer

17 Asthma

18 Emphysema

19 Depression/anxiety/emotional problem

20 Other impairment/problem

777 Don't know/Not sure

999 Refused

83. Because of any impairment or health problem, do you need the help of other persons with your PERSONAL CARE needs, such as eating, bathing, dressing, or getting around the house?

1 Yes

2 No

777 Don't know/Not sure

999 Refused

<u>Section VI: Social Support/Isolation</u>

The next few questions ask about the way you interact with family and friends.

84. How many close friends do you have?

__ __	Number
777	Don't know/Not sure
88	None
999	Refused

85. Of those friends, how many would you confide in about personal problems?

__ __	Number
777	Don't know/Not sure
88	None
999	Refused

86. How many relatives do you have that you feel close to?

__ __	Number
777	Don't know/Not sure
88	None
999	Refused

87. Of these relatives, how many would you confide in about personal problems?

__ __	Number
777	Don't know/Not sure
88	None
999	Refused

88. Do you belong to a church?

1	Yes
2	No
777	Don't know/Not sure
999	Refused

89. How often do you attend religious services?

1__ __ Times per day

2__ __ Times per week

3__ __ Times per month

4__ __ Times per year

555 Never attend

666 Never attend but watch/listen

777 Don't know/Not sure

999 Refused

90. We'd like to share the summary of our study with you and other respondents. If you would like a copy of our preliminary report, we'd like to have your name and address.

91. We may wish to contact you for a follow-up study. May we include you in this follow-up?

92. What's your name (**ask only if "no" to 90 and "yes" to 91**)?

CLOSING STATEMENT

That's my last question. Everyone's answers will be combined to give us information about health practices of people.

Thank you very much for your time and cooperation.