The effects of life-stress, social support and health on formal medical utilization: a longitudinal study

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The effects of life-stress, social support and health
on formal medical utilization: A longitudinal study

by

Haeseon Lee

A dissertation submitted to the graduate faculty
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

Department: Human Development and Family Studies
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1996

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CHAPTER I. INTRODUCTION

The population of the United States is growing older yet healthier. Being healthy and increasing longevity because of low fertility and mortality rates, particularly heightened phenomena in recent years, have become the population's ultimate and universal goals in their lives. Although recent statistics prove that general health levels of the population in the U.S. have improved (Eisenhauer, 1995), a question still remains as to whether living longer is always accompanied by living healthier. Some argue that extended life expectancy does not necessarily correlate with being healthy (Manton, 1990). One of the trends in relation to the health status of the increasing elderly population concerns a shift between chronic and acute illnesses, i.e., more elderly are suffering from (possibly multiple) chronic illnesses today than in the past (Manton & Stallard, 1994).

In the past, acute rather than chronic illnesses were considered more problematic and fatal; however, today, chronic diseases are more prevalent and tend to be incurable. Ironically the very scientific success that causes people to live longer and survive the danger of fatal acute diseases, has created the potential of today's elderly having the likelihood of facing more chronic problems as they age. This makes the elderly group quite distinct from younger generations since the incidence of getting chronic diseases is less likely to occur for the younger group.

Meanwhile, the prominent health phenomena have brought heavy demands on health care and formal health services. People have paid increasing attention to
the health care system. Since the 1970s, it has been generally believed that all people should receive fair and adequate medical care services, and they have tended to have high expectations with respect to the extent to which medical care can contribute to general health levels for the whole population (Andersen & Newman, 1973). These beliefs and expectations are prevalent in the health care endeavor yet today. Particularly the aged are an important target group for better and improved health care systems, an ongoing political debate over years. They are also significant and heavy consumers of formal medical services (Soldo & Manton, 1985).

The purpose of this study presented is to explore determinants and predictors of health service utilization among elderly individuals. In this study, a framework for viewing health behavior, in terms of the individual, interactional, and social milieu will be presented. With a nationwide sample of over 2590 elderly persons, data are taken from LSOA (Longitudinal Study of Aging) published in 1991. More specifically, formal medical utilization among elderly individuals is viewed as the outcome of the influence of social support, especially functional support, provided by their family networks and the effect of older persons' dispositional characteristics along with their later health status. In addition to these effects, the study expands its interest further in the perspective of life-long stress. Stressful life events such as retirement and decreasing health are believed to have an impact on elderly individuals, their relationships with family, and ultimately their consumption of medical services (Krause, 1988).
Although health-related service utilization has received ongoing attention because of the health service utilization model of Andersen and his colleagues (Anderson, 1968; Andersen, Kravits, & Anderson, 1975; Andersen & Newman, 1973), the Andersen model was constructed for use with the whole population regardless of age. As a result, few studies have attempted to investigate the model with elderly subjects. Considerably less research has investigated the joint effect of life stress and social support in conjunction with later status of functional health in a longitudinal setting. In this study, the direct as well as the indirect effects of predicting determinants are examined in their relationships with formal medical utilization among elderly adults in nationwide states. Further analyses will examine differences by different age cohorts, and by gender. Another additional analysis will compare the model with inclusion of some significant variables and without the variables. In this longitudinal study, understanding the process by which the direct and the indirect effects occur would highlight the importance of the roles of life stress, social support, and health status and their contributions to formal medical utilization among older persons.

**Theoretical Framework**

The theoretical framework for this study uses three broad approaches to explain the complicated relationships between the determinants and utilization of formal medical services. The proposed model combines determinants of health service utilization and predictors of social support using a life stress perspective.
More specifically, the first approach is at the individual level based on the Andersen behavioral model (Andersen, 1968; Andersen et al., 1975; Andersen & Newman, 1973) which is the most widely used framework for the study of formal medical utilization. The second approach at the social and interactional level incorporates studies on social support (or informal support) as direct or buffering effects and its relationship with stressors. The two approaches are finally applied to a life-long stress perspective for older adults who experience stressful life events in their lives. In fact, there have been few rigorous studies conducted to formulate mechanisms and processes of formal medical utilization behavior for the elderly. The present longitudinal study proposes a systematic investigation using the three theoretical approaches to explain formal medical use behavior for elderly individuals. The following sections discuss the three approaches in detail, and later a framework proposed for the current study will be presented.

**Health Behavioral Model**

The health behavioral model is an extensively used framework of illness behavior developed by Andersen (1968). Originally this model was devised to investigate social-structural factors and barriers to the medical care system (Andersen, 1968); however, it has been utilized to examine various forms of illness behavior, and it has become a classic theoretical model to explain health service utilization.
The three main components of the model are societal determinants (e.g.,
technology, norms), individual determinants (e.g., predisposing, enabling, illness
level) and health service system (e.g., resources, organization). The model
proposes that these determinants affect health service utilization both directly as
well as indirectly.

Among those determinants, in particular, the utilization of health services can
be viewed as a type of individual behavior. Individual characteristics including
demographic factors determine health service use. There are three categories
involved in individual components; 1) predisposition to use services (predisposing
factors); 2) the ability to secure services (enabling factors); and 3) illness level

The first component of the behavioral model, the predisposing factors, refers to
the propensity or inclination to use health services where individual propensity
toward use tends to exist prior to the onset of illness (Andersen & Newman, 1973).
These characteristics include demographic, social structural, and attitudinal-
belief variables. Among demographic variables, age, gender, marital status and
past illness experiences are suggested, and social structural variables contain
factors such as education, race, occupation, family size, ethnicity, religion and
residential mobility. Finally, variables on health beliefs include; 1) values
concerning health and illness, 2) attitudes toward health services, 3) knowledge
about disease. People with certain of these characteristics are more likely to use
medical services and a propensity to use services can be predicted by personal characteristics (Andersen & Newman, 1973).

The enabling factors, which are the second component of the behavioral model, reflect individuals' ability to use formal medical services. They are defined as "a condition which permits a family to act on a value or satisfy a need regarding health service use" (Andersen & Newman, 1973). Enabling conditions can be influenced by family resources such as income, health insurance, whether or not the individual has a regular source of health care, and type of regular sources. In addition, community characteristics such as the ratios of health facilities and personnel to population, and price of health services are included in that category.

Finally, need factors are identified by illness level or episodes. Among them, perceived need is perception of health measured by indicators that are related to disability, functional impairment and self-reported general health state. Evaluated need refers to a clinical evaluation on illness level by medical professionals. Among the three components, predisposing, enabling, and need, need factors tend to be the most immediate cause of health service use (Andersen & Newman, 1973).

As described above, the behavioral model suggests that the utilization of health services is a function of the three components of individuals. In addition to these factors, the model assumes that people with different predisposing characteristics have different amounts and types of disease and ultimately different types of health service use. It also assumes that people with different
social-structural characteristics have different life patterns, thus different types of health service use, and that health services use is dependent on individuals' health beliefs (Andersen & Newman, 1973).

Since Andersen (1968) proposed predisposing, enabling and need factors, there have been numerous attempts to evaluate the behavioral model. Although few studies have been done with elderly subjects, in general, studies on formal health service use among the elderly have shown that the behavioral model explains less variance in health service use especially for elderly adults. Findings also have suggested that the need characteristics are the major predictors of health service utilization, and that in the model, the roles of predisposing and enabling factors are not of importance in accounting for variance in health service utilization (Wolinsky & Coe, 1984; Wolinsky & Johnson, 1991). Taken together, the general findings have not proved the usefulness of the three components of the model, and criticisms have been raised to reconstruct the behavioral model more appropriately in recent years (Krause, 1990).

Models on Social Support

Numerous studies have examined the effect of social support on psychological and physical outcomes. Particularly, the buffering and direct models of social support in relation to stressors have guided the majority of research on social support (Cobb, 1976; Cohen & Wills, 1985; Ensel & Lin, 1990; George, 1989;

A model on social support as a main effect posits that social support has a beneficial and direct effect on psychological and physical outcomes regardless of the presence of stressors (Cohen & Wills, 1985). It is also called the independent model by Ensel and Lin (1990) in which resources (i.e., social support) influence outcome factors (i.e., distress) regardless of whether stressors are present or absent. It shows that the presence of social support directly reduces the distress level, however, it does not have any implications for the influence of social support on the presence of stressors.

The other model, the indirect or buffering model proposes that social support is associated with psychological or physical outcomes primarily for persons under stressful situations. That is, social support protects people from the negative influence of stressors by enhancing their adaptive coping behaviors. Resources (social support) can be employed as mechanisms to cope with stressful circumstances (Ensel & Lin, 1990). For example, distress tends to be high when stress levels get high and social support is low.

Despite the simple ideas of these hypothetical models, they have not generated consistent empirical findings. Previous evidences show that direct and/or buffer, or neither effect exists. For instance, while studies have found that social support protects persons from negative effects of stressful events (Cohen & Wills, 1985; Thoits, 1982), others have discovered that social support has an
impact on physical and mental health status regardless of whether the persons suffer from stressful situations (Aneshensel & Stone, 1982). Moreover, a longitudinal study (Russell & Cutrona, 1991) supports both the direct and buffering effects of social support, reporting that not only did deficits in social support predict the severity of psychological health directly, but they also influenced psychological health of older subjects through increasing the likelihood of experiencing daily hassles. These inconsistent findings have been produced over time and criticisms on social support research still continue today.

However, it is evident that the direct and buffering models have been more carefully specified and new models developed over time. As the quality of studies improves, conceptualization and measurement of social support, its relationship to the stress process and testing the models have been attempted in dynamic and careful ways. In particular, the multidimensional nature of social support has been examined with great attention in social support research.

**Life Stress Perspective**

It is often observed that life is never free from stress. Every human goes through experiences, events and struggles that are usually followed by physical and psychological stresses; however, humans are born to survive and adapt to stressful situations. In later life, the elderly face new but rather expected life events such as retirement and decreasing health status.
Retirement from work is normally a planned life event. In the U.S., during the last several decades, the retirement trend of older people has been changing dramatically. From 1964 through 1990, U.S. labor participation rates for men aged 60 through 64 which includes the earlier age of eligibility for Social Security retirement benefits dropped from 80 to 56% (Quinn & Burkhauser, 1994). For men age 65-69, the decrease rate is 40%, and for 70 and over, the rate dropped 50%. For women of all ages, the labor participation rates are rising but the rates remain the same for aged women 60 and over. Since early 1990, these trends seem to be reversed. For 8 out of 10 individuals aged 60 and over, the labor participation rates for men were actually higher in 1990 than in 1985 (Quinn & Burkhauser, 1994).

Some old people may look forward to retirement, but some may retire reluctantly. In fact, many older adults are more likely to have a risk of being poor, and this tendency is getting worse with increasing age, especially for the oldest old segment (Holtz-Eakin & Smeeding, 1994). Life changes after retirement sometimes result in negative alterations in the old adults' life style and their relationships with family. The retirees might become dependent upon other family members because of their financial resources, and a large decrease in income after retirement might lead to chronic financial worries over the life course.

A chronic economic problem is a source of stress for many older persons. Although older adults have improved their economic status over the past decades, many still experience a large drop in their income level at retirement (Holtz-Eakin
This chronic stress after retirement has a great threat to older people's physical and psychological functioning.

Along with the retirement process, decreasing functional health with increasing age occurs for many elderly persons. Although elderly persons today are generally better off in their health and many older persons are healthy enough to be independent in their daily living activities, problems experienced by older persons are mostly related to their physical as well as mental status. In 1985, over 85% of the older population, aged 65 and older reported at least one chronic illness (Shanas & Maddox, 1985), and multiple chronic illnesses with disability usually become the cause of death (Manton & Stallard, 1994).

These chronic health problems are major stress-inducing factors. Stress has been generally defined as the discomforting responses of persons in particular situations (Mechanic, 1976). According to Pilisuk, Montgomery, Parks and Acredolo (1993), high stress is positively correlated with poor health. Campbell (1981) stated:

Poor health appears to have a peculiarly insistent ability to reduce one's sense of well-being, an ability which most people find impossible to resist. Not many people say they are dissatisfied with their health, about one in ten, but those who do show an impressive pattern of ill being are not very happy, dissatisfied with life and have high feelings of stress. (p. 210)

This statement clearly demonstrates poor health as a stress-inducing factor. Fry (1986) also discusses precursors and precipitators of stress in the aged. Among those factors, he documented health factors (e.g., multiple health problems, chronic conditions and disability), personal-social factors (e.g., gradually depleting
financial resources, sudden role loss through adverse change, retirement or
disability, and multiple social, economic or personal losses) and environmental
and ecological factors (e.g., environmental rejection combined with a concomitant
decline in physical and financial resources and decline in social support and
nurturing relationships). This research (Fry, 1986) reveals the importance of
stress-inducing factors particularly diminishing health and financial difficulties as
well as lack of social support for elderly individuals.

An interesting study reports that although retirement is considered a starting
point of adverse situations for elderly individuals, retirement itself does not have
traumatic and significant influence for the aged. Rather, chronic stresses are more
damaging than stressful life events (Avison & Turner, 1988). In that sense, rather
than a discrete retirement event, chronic financial stress and physical stress seem
to have greater influence on elderly adults. Indeed, these chronic stressors can
be viewed as products of stressful life-long processes for the elderly.

In sum, the three theoretical frameworks mentioned above are conceptual and
theoretical bases of a hypothesized model created in this study. These
frameworks are believed to be useful to apply and demonstrate causal
mechanisms of selected variables for the elderly subjects, and the following
section describes the hypothesized model with a logical explanation combining the
three frameworks.
Hypothesized Theoretical Model

This portion of the chapter introduces a proposed causal model and depicts it graphically to facilitate the explanation of the complicated relations among variables. A conceptual model that attempts to describe formal medical utilization for older adults is shown in Figure 1 (see also Figure B1 in Appendix B). The notation used in this hypothesized model is consistent with the notation developed by Jöreskog and Sörbom (1988). That is, $\xi_i$ represent latent exogenous variables and the $\eta_i$ reflect latent endogenous variables. The measured indicators used in this structural-equation model are not illustrated, but will be described in a following methods chapter.

The theoretical frameworks shown in Figure 1 is, as mentioned above, a unification of Andersen's model, direct and buffering models of social support and a life-long stress perspective. There are 14 latent constructs in the hypothesized model. Socio-demographic variables as predisposing factors in Andersen's framework are composed of older adults' education, age, gender, living arrangement and health insurance coverage, which represent exogenous variables, and financial stress as an enabling component and physical stress as a need factor are endogenous variables at Time 1.

The stress variables come into play with social support, mediating factors at Time 1. The contribution of social support in coping with stress has been the subject of considerable research (Cohen & Wills, 1985; Krause, 1986; Krause & Borawski-Clark, 1994; Krause & Markides, 1990; Revicki & Mitchell, 1990;
Figure 1. A hypothesized model.
Sarason, Sarason & Pierce, 1990). It is thought that social support may moderate the effect of negative life stress on health. In this dissertation, for the purpose of the study, i.e., how life stress at Time 1 impacts medical use via social support and health status at Time 2, social support is utilized as a buffer against life stress. Therefore, the buffering model suggests that social support can mediate the impacts of life stress upon health-related outcomes, in this study, formal medical use. Thus, the causal direction should be from life stress to social support (life stress \(\rightarrow\) social support) (Cobb, 1976; Cohen & Wills, 1985).

In this hypothesized model, a multidimensional construct is attempted for a more systematic investigation of social support. Four latent constructs reflect social support in this study; instrumental support, availability of support, quantity of interaction and geographic accessibility of support. These separate constructs are rather functional and quantitative types of social support. More detailed discussion will be presented in the literature review.

Following these connections, the paths link latent constructs, health status at Time 2 measured by perception of functional ability and actual illness level, and formal medical utilization at Time 3, consequently. It is one of strengths in longitudinal research that the effects of predictors and changes over time can be observed. In this model, perception of functional ability and actual illness level are used as mediating variables between Time 1 and Time 3 to see how these variables mediate the influences of life stresses at Time 1 on medical service use at Time 3.
In relation to the perception of functional ability, the older adults' perception of their health seems to be significant in anticipating their later health status. Idler and Angel (1990) found that self-rated perception of health predicted later mortality rates in their samples. It appears that when people are asked how they perceive their health, they are evaluating their health with significant prognostic value concerning their probability of survival (Rodin & McAvay, 1992). In that sense, self perception of functional health can be a somewhat reliable measure to predict changes in health level over time, and when changes in health level occur negatively, more use of formal medical services can be predicted. Actual illness level at Time 2 measured by illness symptoms that elderly persons experienced in their past also can predict their medical service use behavior at Time 3. It is anticipated that more severe health status at Time 2 can cause more frequent use of medical service at Time 3.

Additional direct paths are linked between life stress variables and perception of functional ability as well as actual illness level. These relationships imply that regardless of support provided by significant others, life stressors by themselves can have a great influence on older adults' later health status. In other words, life stressors such as financial stress and physical stress at Time 1 can directly influence later health status at Time 2. Therefore, those who visit doctors and utilize hospital services might seek help because of their health problems caused by their chronic stressors in old age, regardless of whether they receive social support from others or not.
A final outcome variable at Time 3 is formal medical utilization among elderly persons. Formal medical utilization is measured by two types of health behavior: physician visits and hospitalization. In the model, formal medical utilization is dependent on health status at Time 2, social support and life stresses. In other words, life stress influences formal medical utilization directly, and also indirectly through social support, health status at Time 2 in that time ordering. Krause (1988) observed that increased life stress was associated with greater use of medical care services, and that elderly people with strong social support were less likely to visit a physician in times of high stress.

Based on the conceptual linkages between variables that are stated above, the overall purpose of this model is to explain that life stress that older persons face not only has a direct influence but also indirectly affects formal medical utilization through social support provided by significant others, perception of functional ability and illness level in 1988. A secondary purpose of this study is to examine differences in age cohort as well as gender in medical behavior of older persons, and an additional analysis will be done to test inclusion/exclusion of variables to explore variance changes in the outcome variable.
CHAPTER II. LITERATURE REVIEW

This chapter reviews literature regarding sources of stress, social support, health status and formal medical utilization for elderly adults. First, As Andersen (1968) presented, there are many factors influencing formal medical use. In this section, studies on formal medical utilization and its relationships with some selected variables will be presented. Second, social support will be focused on extensively. The use of social support has been developed and changed over time methodologically and conceptually. Various dimensions of social support, especially relevant to this study, quantitative and functional aspects of social support will be discussed. Finally, relationships between stress, social support, perception of functional ability, actual illness level and formal medical service use will be reviewed based on previous studies.

Formal Medical Utilization

Formal medical utilization is defined as the use of traditional medical care provided by medical professionals such as outpatient physician services, emergency room services, and inpatient hospitalizations (Krause, 1990). Past research shows that persons over age 65 are the largest group and disproportionately heavy users of formal medical care services (Soldo & Manton, 1985). However, more thorough research reveals that not all elderly people are heavy users of formal services, and that a relatively small portion of elderly use a large part of formal medical services (Krause, 1990). Mossey, Havens and
Wolinsky (1989) argue that a substantial portion of the formal service utilization is because of the extensive demand generated by a relatively small subgroup, and that most elderly people are constant in terms of hospital and physician use rates.

Additional research by Verbrugge (1987) indicates that doctor visits for the elderly are likely because of chronic illnesses and it is also true for hospitalizations, though hospital use is mostly a result of life threatening illnesses. Many elderly with less severe illnesses utilize other forms of medical services rather than physician visits and hospitalization. According to some related studies, between 13 and 20% of older people do not use formal medical services at all (Branch & Nemeth, 1985; Mossey et al., 1989). Therefore, other forms of illness services have begun to be examined in various ways recently (Dean, 1986; Kart & Engler, 1994; Kart & Engler, 1995; Logan & Spitze, 1994).

Despite the evidences of low utilization rates, research on formal medical service use for the elderly continues to receive attention in the gerontological area. Generally, research on medical utilization shows that utilization behavior is contingent upon complex relationships between a health condition and various social, demographic, psychological and environmental factors (Wan, 1987).

Three broad approaches of research on determinants of health service utilization are described by Wan (1987) in his paper on disabled elderly. First, it is a social-psychological approach. In this approach, health perception variables are incorporated with social variables to explain medical utilization behavior. The health-belief model (Rosenstock, 1974), for example, suggests that the readiness
to initiate action for health service use is associated with perceived susceptibility, perception of a health problem and perceived barriers and advantages to taking action.

The second approach uses social-structural variables measured by organizational constraints (i.e., service availability, financing mechanism) and environmental barriers (community resources and values). In addition to these approaches, the third approach assumes that utilization behavior is influenced by individual and social determinants in that personal and environmental factors may influence directly and/or indirectly the propensity for use of formal medical services. Andersen's (1968) model is included in this analytical approach. In his behavioral model, variation in the use of formal medical services is determined by factors such as predisposing, enabling and need factors. In the next section of this chapter, those determinants of medical service use will be focused based on past literature.

Factors Influencing Formal Medical Utilization

This part of the literature review describes past research relevant to some concepts in the frame for the study of formal medical utilization. First, predisposing variables such as age, gender, education and living arrangement will be presented, and then the enabling variable, in this case, income level, which is also a source of chronic financial stress will be introduced. Finally, self-rated
health status as the need factor as well as a source of physical stress will be discussed in detail.

**Predisposing factor**  Predisposing factors used in this study are; age, gender, living arrangement, educational level and health insurance. Past studies using Andersen’s (1968) model have constantly tested the effect of predisposing determinants. The insignificant role of predisposing characteristics, however, has been a target of criticism, because the variance explained by predisposing factors in utilization of formal medical services is small and powerless (Wan, 1987). Nevertheless, studies on formal medical use have continuously attempted various combinations of independent variables as predisposing factors, and have not ignored the presence of those factors to formulate their frameworks to explain the use behavior.

**Age.**  Age is one of the most frequently used predisposing factors. It is considered to be related to illness patterns and formal medical use (Soldo & Manton, 1985). For example, disability which accompanies older age is generally associated with increased health service, and the elderly are most at risk of disability (Cornoni-Huntley, Foley & White, 1985). Hence, it is expected that formal medical use would increase with age. This hypothesis is supported by Bowling, Farquhar and Browne (1991) in the U.K. reporting that their three independent samples of elderly persons show higher utilizations of health services with increasing age. Shapiro (1983) also reported that the oldest elderly tend to consume a larger portion of hospital services than other elderly groups.
Meanwhile, interestingly, while a study done by Polliack and Shavitt (1977) found age of patients as an important predictor of hospital use and length of stay, Posner and Lin (1975) discovered that the effects of age on hospital use was not an important factor in explaining length of hospital stay. Another study on age differentials in hospitalization showed that very old patients tended to be sicker when admitted to the hospital and had longer stays than those aged 65 to 75 (Garnick & Short, 1985). Reviewed from previous research, general findings conclude that rather than age by itself, the combination of age and health status affects formal medical use more significantly because age alone accounts for little variance in medical use.

**Gender.** Gender appears to be related to formal medical use. Soldo (1985) found that single white dependent females utilized medical services more often than other groups. In general, women are likely to be more frequent users of physician services than men (Cleary, Mechanic & Greenley, 1982; Wan & Soifer, 1974; Wolinsky, 1978). Married women are more likely to receive formal care than are married men (Mutchler & Bullers, 1994), and females who are widowed, divorced and separated show greater use of medical services (Morgan, 1980). These findings are inferred by the fact that women tend to live longer than men and report poorer health (Verbrugge, 1985), and consequently, they need more medical assistance.

Another explanation as to gender differences in medical use centers around socialization between men and women. Women are taught to be more health
conscious and have a greater interest in health (Nathanson, 1980). Women are also regarded as homemakers, not wage earners, thus, have greater access to medical services with available time.

In relation to the elderly, previous studies have not revealed such consistent findings as women’s frequent use of services. Surprisingly, physician visits are about the same for men and women (Coulton & Frost, 1982; Wan, 1987; Wan & Arling, 1983), and older men are more likely to be hospitalized, given equal levels of disability and health status (Murtran & Ferraro, 1988). It is the nature of men’s illnesses (e.g., cardiovascular problems and respiratory disease), that leads to higher rates of hospitalization. In sum, the general belief as to women’s higher rates of health service use has not been proven for elderly individuals although it is confirmed by previous research among all women, in general.

**Living arrangement.** Living arrangement is whether the aged live alone or live with others. Empirical research reports that use of health services is greater among nonmarried (i.e. divorced, separated, widowed, unmarried) who live alone than among those who are married (Evashwick, Rowe, Diehr & Branch, 1984). Generally, it is believed that married people tend to have improved health status, thus use less formal medical services than do nonmarried. Lower use of health service for the married, also, can be explained by possible substitution of informal home care provided by persons with whom they live. In particular, the spouse is the primary source of helping during sickness, and next, is adult children (Hoyt, Peters, Babchuck, Kaiser & Iijima, 1987).
Wan (1987) found that living arrangement was an important determinant of social service use, but, not of physician services. Another study (Stoller, 1982) showed that elderly nonmarried persons who live with others had lower physician visits than their counterparts. Although results of living arrangements are often confused with those of marital status, research clearly shows that the effect of living alone on physician use is twice as significant as the effect of being married or widowed; therefore, it is possible to say that living arrangement is a better indicator of medical use than marital status (Wolinsky & Coe, 1984). This finding is supported by Cafferata (1987) who indicated that living with others may reduce the need for use of formal services because of the care service at home. Persons who are living with others are less likely to seek a doctor than those who are living alone, thus marital status had no significant effect on health service use when controlling for living arrangement (Cafferata, 1987). Hence, it is more a question about the influence of living arrangement on health service use than marital status.

As a summary, studies of living arrangement and medical use have produced consistent evidence of the effect of living alone as a strong factor predicting greater formal medical utilization. Despite the confounding effects between marital status and living arrangement, living arrangement appears to be a better predictor than marital status.

**Education.** Educational level often reflects individuals' status in society and influences their life style. It tends to be used as a proxy for life time earnings, and income level often comes into play with educational level. For the
elderly, education attainment may affect post retirement outcomes through
differential access to private pensions and ability to save money (Crystal, Shea &
Krishnaswami, 1992). Those with high educational status tend to work longer and
have better economic well-being.

Education also can be an indicator of people's attitudes toward medical service
use (predisposing factor) or their awareness of service availability (enabling factor)
(Logan & Spitze, 1994). Krout (1983) identified that education was a significant
predictor of use of medical services. Education was also related to an increase in
the number of doctor visits (Wolinsky & Johnson, 1991). Yet, in contrast, Mutran
and Ferraro (1988) found that the more educated elderly were healthier, and
accordingly, used less formal medical help, but education increased participation
in preventive health care activities. On the whole, research has demonstrated
inconsistent findings on the effect of educational level on medical use;
nonetheless, it generally shows a positive relationship between education and
income levels, thus, the higher education people receive, the more income they
make (Crystal et al., 1992).

Health insurance. Health insurance is the final exogenous
variable used in this study. Andersen and Newman (1973) mentioned this variable
as one of health service resources available to individuals. By using this kind of
resource, people experienced low medical care prices, hence, they tended to use
more medical services. Wolinsky and Coe (1984) assessed the effect of having
health insurance on physician and hospital utilization with a sample of
noninstitutionalized elderly adults, and found that private health insurance
coverage and Medicaid had significant impacts on physician visits. Wan (1982)
also reported the same finding as Wolinsky and Coe's (1984); health insurance
coverage positively influenced physician contacts.

Medicare and Medicaid programs have helped to reduce inequity between
poor and nonpoor groups in access to health care services since they have been
introduced (Muller, 1986). The narrowing gap of health care service use between
the poor and nonpoor elderly is a result of the nature of the Medicare and
Medicaid programs; Medicaid was designed for the low income individual of all
ages, while Medicare was introduced for old people 65 and over regardless of
income level (Wan, 1982).

A longitudinal study by Eve (1988) found that among health insurance
coverage, Medicaid coverage was strongly and significantly related to physician
utilization and hospital episodes. Therefore, in sum, the literature concludes that
health insurance coverage such as Medicaid, Medicare and private insurance
enables old people to use formal medical services frequently.

**Enabling factor**  
Income level is one of the enabling factors that Andersen
and Newman (1973) referred to in their study on the health behavioral model. It
can be also a cause of stress that elderly individuals develop in their later lives.
The effect of income on health service use seems to have changed over time: A
more detailed review of the influence of income is discussed below.
Income. Income is an enabling component that allows individuals to access health service use according to Andersen and Newman (1973). The variable of income has been used extensively as one of individual and/or family resources in social science research. Studies indicated that income was significantly associated with formal service utilization (Bass & Noelker, 1987; Krout, 1983), and that overall socio-economic status including income level significantly influenced health service use (Scott & Roberto, 1985).

In conjunction with income, poverty has been a persistent and important theme to policy makers in social services. It is obvious that as long as poverty exists, the issue of equity in health care is kept alive (Muller, 1986). Poverty is generally generated by low-paying jobs, unemployment, economic deprivation and chronic impairment. In Muller's review of 20 years of research on medical care utilization, for all age groups, the user rate remained higher for those who were nonpoor people in the U.S. and the same was true in the U.K. identifying less use by lower-income people. Moreover, children in-low income groups were less likely to see a doctor (Muller, 1986).

But because of the efforts to reduce the inequity of the health care system between poor and nonpoor for the elderly group, the gap between poor and nonpoor has narrowed indicating that the user rate of the poor increased and the rate for the nonpoor declined (Muller, 1986). It is true that many older adults experience a decline of economic status after retirement, and that those who are poor often face poor health status. Now, however, a variety of health care
services and insurance programs have worked and support this target group in receiving health care.

Criticisms of Andersen’s model suggest not only low predictive power of predisposing components but also that of enabling factors for the elderly. This phenomenon may indicate that now many health services (e.g., physician and hospital services) are commonly covered by private or public health insurance programs. In fact, older adults account for more than 35% of total health care expenditures (Wolinsky, Culler, Callahan & Johnson, 1994). Therefore, income does not seem to play a role as an enabling factor now but rather is a strong source of financial stress influencing health service use. As a brief summary, the effect of income on health services has been changing because of public health care concerns and various health-related programs available especially for people in poverty. Now studies provide little evidence of income as a powerful and positive enabling factor predicting formal service utilization particularly for older individuals.

Need factor Health status of the elderly, represented by physical stress in the hypothesized model, is a sole need component at Time 1, and health status in 1988, at Time 2 is the other need component used in the present study. There have been hundreds of studies with respect to health and health service use since Andersen (1968) proposed his behavioral model. In this section, only significant findings from previous research are covered.
Health status. According to Andersen and Newman (1973), need characteristics are a major cause for formal service use, and this finding has been consistent in many studies (Branch, Jette, Evashwick, Polansky, Rowe & Diehr, 1981; Eve, 1982; Mutran & Ferraro, 1988; Wan, 1987; Wan & Arling, 1983; Wan & Odell, 1981; Wolinsky & Coe, 1984). For example, multiple analyses of predisposing, enabling and need components used by Wolinsky and Coe (1984) identified 3.9% to 21.3% of the variance in physician use and 5.1% to 9.4% of the variance in hospitalization. Among these variances, need characteristics related to health status account for 56.8% to 66.7% of the variance explained in physician use and 74.5% to 77.7% of the variance explained in hospital use.

In another study, Wan and Odell (1981) reported that 18 variables included in the analysis of physician use explained only 9% of the total variance, and three health measures such as Activities of Daily Living (ADL), Instrumental Activities of Daily Living (IADL), and psychological symptoms were significantly related to the outcome variable. Additionally, Branch and his colleagues (1981) suggested that health care need factors such as poor health, limited physical activity and chronic conditions were positively related to use of physician services. All of the predisposing and enabling factors accounted for 27% of the variance, but the need factors alone accounted for 21% of the variance in physician use. As to hospital use, results show similar findings with regard to the powerful explanatory function of health variables. In analyzing hospital admission, significant variables were perceived health (Evashwick et al., 1984), ADL function (Wolinsky, Coe, Miller,
Prendergast, Creel & Chavez, 1983), and use of preventive services (Evashwick et al., 1984). As a matter of fact, health status measures are useful for explaining the variation in use of hospital services.

Meanwhile, critics of the small variance explained by the three factors, that is, predisposing, enabling and need, in formal service use have begun to pay attention to measurement issues of predictors and outcomes (Wolinsky et al., 1983). The most severe criticism regards the need measures; hence the measurement of need factors in the Andersen's model, commonly obtained from questions on perceived health status, chronic illness and symptoms, reflects complicated relationships with illness behavior (Mechanic, 1979). For example, in measuring need for care, symptoms such as headaches, tiredness and weakness (because of old age), commonly associated with psychological health may not be related to physical health as indicators. In fact, studies have attempted to develop more appropriate measures of need factors in various ways (Johnson & Wolinsky, 1993; Lichtenstein & Thomas, 1987).

Mechanic (1979) also criticized the use of cross-sectional data to measure the dynamic processes examining health service use. Currently, fewer longitudinal studies have examined medical use among elderly people. Yet, because more available longitudinal data are continuously being collected, there will be more opportunities to conduct longitudinal research. Although rare, in a review of longitudinal studies on medical service use, Eve (1988) analyzed data from the Social Security Administration's Longitudinal Retirement History Survey (N=1894)
to test medical service use among older women. Results indicated that measures of previous use of health care services were strongly correlated to current use of health care services. Addition of previous use and previous health status measures almost doubled the variance in physician visits and the variance explained in hospital use was increased by one-third. Thus, the advantage of conducting longitudinal studies has been proven to be helpful in explaining older adults' health service behavior.

One of need factors used in this dissertation is previous health status. There are two indicators to represent previous health status: self-rated health and health self-assessment. Self-rated health refers to a self evaluation of physical wellness. Despite various attempts to discover appropriate measures of health status, still, global self-rated health status is considered a reliable measure and is the most frequently used. Health self-assessment is the individuals' evaluation of their own health. It is anticipated that those who rate themselves as healthy and taking good care of their health, would be more likely to report less use of formal health services.

All in all, as a final summary, factors in relation to formal medical utilization have been reviewed in literature above. Despite inconsistent findings on the functions of the predisposing and enabling characteristics, it is obvious that the need characteristics associated with health status play a significant role in accounting for older persons' health service use.
After Andersen (1968) introduced predisposing, enabling and need factors predicting medical service uses, many researchers have tested his behavioral model, and some criticisms have been made in association with the three characteristics (Wolinsky et al., 1983; Mechanic, 1979). Therefore, in order to strengthen Andersen’s behavioral model, researchers have attempted to modify the model, and social support is one of characteristics that helps to describe the process of health service use behavior (Krause, 1988; Krause, 1990; Wan, 1982; Wan, 1987), thus, adding a more complete explanation for relationships among variables.

**Social Support**

In this section, literature on social support will be reviewed based on previous research. Some concepts and problems pertinent to the present study will be discussed, and later a relationship between social support and formal medical use among older adults will be examined.

**Definitions and Dimensions of Social Support Relevant to the Study**

Social support in this study is defined as the degree to which a person’s basic social needs are gratified through interaction with others (Thoits, 1982). In association with the definition of social support, there have been many studies to define social support, however, the imprecision of the conceptualization remains problematic. For example, Lin, Dean and Ensel (1981) described that social
support was support accessible to individuals through social ties to other persons, groups and large communities, and that social support identified the resources that were available to the individual in a crisis. Though understandable, it is not clear what resources and support mean, so a better clarification of the concept is needed. House (1981) suggested that social support was an interpersonal transaction involving one or more of the following: 1) emotional concern (e.g., love), 2) instrumental assistance (e.g., financial help, service), 3) information (about the environment), or 4) appraisal (information relevant to self-evaluation). Still, a variety of research on dimensions of social support has been attempted and developed.

Distinguishing social support as the quality and quantity of social support is one way of broadly categorizing the concept. The quality of social support is conceptualized as the subjective or perceived level of satisfaction with social interaction (Beckman, 1981), and as an emotional bond to a confident (Snow & Carpo, 1982). The quantity of social support is the actual amount of social interactions and contacts with persons who have close relationships. The quantity of social support with family network members often has been used as a measure of social support.

It is, however, a reasonable argument that neither quantitative or qualitative support can stand alone because there is a confounding relationship between them. For example, many adult children continuously make contact with parents out of affection and love for their parents and they voluntarily want to interact with
them. In this case, the frequency of contacts is a measure of the affective support for their parents or vice versa. In other situations, children contact parents out of a feeling of obligation. Then the measure of frequency is not a measure of affective support but of contact because that is the measure that is available. In this dissertation, the quantitative aspect of social support is tested to examine its usefulness as a measure of social support influencing formal medical use.

More specifically, four dimensions of social support used in the study are quantity of interaction, instrumental support, geographic accessibility and availability of support. Among them quantity of interaction, instrumental support and geographic accessibility are categorized in the quantity of support, and availability of support is included in functional support. The paper presented here intends to investigate not only relationships between stressors and these dimensions of social support but also the function of the social support as mediating factors between stressors and formal medical use.

Among the quantitative support variables, quantity of interaction between older adults and family members is still the most widely applied measure of social interaction. In fact, there is some evidence that quantity of social interaction of elderly parents with their adult children is positively related to morale and psychological well being (Morgan, 1976). In the present study, the two indicators of quantity of interaction used are getting together and talking through telephone measuring frequency of actual encounters.
Geographic accessibility of support, which is another dimension of social support, refers to geographic proximity to family networks accessible to providing help for the elderly persons. Proximity of family networks, in this study, their adult children, is considered a useful variable in understanding the role of social support on formal medical care use (Sallowway & Dillon, 1973). A study by Mutran and Ferraro (1988) indicated that there was a significant relationship between proximity of children and physician visits for elderly parents. Furthermore, rural elderly adults appeared more isolated than urban elderly individuals and tended to move to urban areas to receive health care services when family support was lacking in rural areas (Clifford, Heaton, Voss & Fuguitt, 1985). For rural parents, proximity of children was the most significant factor predicting parent-child relationship (Mercier, Paulson & Morris, 1989).

In the U. S., the majority of elderly adults maintain an independent living residence and have at least one child in close proximity within 10 miles of their residence (Lin & Rogerson, 1995). Also, many adult children as major caregivers live close to their parents (Himes, 1992). Therefore, it is expected that closer geographic accessibility can provide opportunities to receive more social support from family networks, thus, the closer the proximity of family members, the greater the social support from the family members.

Another dimension of social support presented in the current study is instrumental support, i.e., financial support. As described earlier in this study, for the elderly, life after retirement often is not financially easy which may cause
chronic financial strain. Some older persons may receive economic assistance from their family members and some may not. Krause (1987) reported that a direct effect of tangible support was found among elderly residents who experienced financial strain. Another study also demonstrated that low income rural adults reported a buffering effect of tangible support for the lowest-income group when instrumental support was available (Strogatz & James, 1986). These studies offer support for the idea that when chronic financial stress increases, receiving economic support from others helps to reduce financial stress for those who experience difficulties in finance.

Today's elderly, however, may avoid receiving financial support in spite of their low financial status. Contemporary American culture promotes the value of independence not only for the old but throughout the life span. Since dependence of adults tends to be negatively viewed, receiving economic help may lead to an adverse effect for older parents. Krause and Liang (1993) found that financial strain among elderly parents increased economic support from others, but caused the elderly parents to receive less emotional support. This finding implies that material support may increase financial resources but at the same time it diminishes the quality of relationship with significant others.

A final variable representing social support constructs is availability of support from significant others. As the population in the U.S. grows older, the degree of availability of caregivers has become a serious concern in recent years. Because of low fertility rates and an increasing life expectancy, present concerns on the
possible caregiving pool for older adults are focused on availability of adult children as caregivers. It is predicted that fewer adult children will be available to provide support for their aging parents, and possibly even grandparents in the near future.

Availability of support is included as a functional aspect of social support (Sarason, Sheavin, Pierce & Sarason, 1987). It refers to the perception of support believed to be available if needed (Dunkel-Schetter & Bennett, 1990). Availability of support also is considered as health protective (Heller, Swindle & Dusenbury, 1986). It is believed that the perception of available support influences general health, i.e., the perception that support is available has a great effect on health (Heller et al., 1986).

Among factors that influence the availability of support, the degree of intimacy of one's social relationships appears to be related to the functional availability of support. For instance, if persons view a relationship with family members as close and intimate, they will perceive that social support from the family members is available in the future. Additionally, based on past research, it is suggested that past experiences with support received from significant others are associated with the current perception of availability of support (Cutrona, 1986). It also is expected that the closer older adults live to their family members, the higher the possibility of perceiving their family members as available when needed (Sarason et al., 1987).
In sum, literature reviewed above has focused on some specific dimensions of social support such as quantity of interaction, geographic accessibility of support, availability of support and instrumental support. The next section will discuss these social support variables and their relationships with the outcome variable, formal medical service utilization (e.g., physician visits, hospitalization) based on past research.

Social Support and Formal Medical Utilization

Social support is a complex network of personal assistance from family and significant others referred to as informal support in more recent research. Researchers have recognized the relationship between informal support and formal support, and emphasized the need to be sensitive to the interplay between them (Wolinsky & Johnson, 1991). As a result, many studies have been conducted to investigate relationships between informal and formal support (Bowling, Farquhar & Browne, 1991; Cantor & Little, 1985; Kart & Engler, 1994; Krause, 1990; Logan & Spitze, 1994; Soldo, Agree & Wolf, 1989; Wan, 1987; Wolinsky & Johnson, 1991).

As stated earlier in this study, a small portion of elderly individuals utilize formal health services suggesting that the majority of older people maintain their health by receiving assistance provided by family and friends without using formal medical care. This phenomenon is related to rapidly rising health care costs and the fast growing oldest old population.
In explaining relationships between informal support and formal support, researchers have suggested several theoretical arguments. Some suggested that formal services is a substitution for informal care, which is the basis for Cantor's hierarchical compensatory model (Logan & Spitze, 1994). It is believed that formal service utilization is decreased by the informal support system. Cantor (1979) reported that for the elderly, kin was seen as the most proper supporter followed by significant others and lastly by formal services. When the health of elderly persons deteriorates, a spouse is often the primary caregiver, then adult children, siblings and other relatives in that order (Hoyt et al., 1987). The hierarchical compensatory model is supported by Coe, Wolinsky, Miller and Prendergast (1984) indicating that use of formal services was greatest among those who perceived low social support and who desired more. From these findings, it is suggested that a weak informal support is a sign of greater formal service need.

Critiques on Cantor's model propose the "dual specialization or complementary" model based on Litwak (1985)'s model. Litwak (1985) demonstrates that formal and informal support have different structures that make each suited for tasks that complement the other. According to Litwak (1985), formal service help is least suited to in-home care since family help is especially advantageous, but it is best suitable to sick people who need specialized training facilities. Hence, different service structures are needed according to different tasks for which each structure is best suited.
Another model suggested by Stoller and Pugliesi (1988) proposes a supplemental model viewing formal care as an adjunct to informal care. In this view, informal caregivers are involved in all kinds of assistance, and formal care services provide relief to the informal supporter. Lastly, informal support may act as a bridge between older persons and formal medical services connecting these persons with formal services (Sussman, 1976), thus, viewing informal support as an enabling role for formal medical services. Altogether, these conceptual approaches have tried to describe linkages between formal and informal support applied to elderly persons.

Although studies have made attempts to apply those approaches to link them, it is not clear to say that there is only one consistently appropriate approach. Johnson (1983) found that when an older individual lived at a greater distance from kin, increased use of formal services was reported. Scott and Roberto (1985) also indicated that the rural elderly poor tended to use less formal services, and formal medical service use was limited to situations of extreme need.

Gourash (1978) suggested that the social support network can influence health seeking behavior in a variety of ways. Family members as support givers can buffer the experience of stress, thus, reducing the need for help. They also can provide referral and screening roles to professional assistance. By influencing older adults’ values and attitudes toward formal medical services, they can encourage or discourage the use of formal health services. For example, elderly samples who had no family support network reportedly used emergency rooms 7-
30 times more frequent than those with family support (Coe, Wolinsky, Miller & Prendergast, 1985), and people who reported lots of network contact in earlier time tended to use less of formal health services at the time of later sickness (Berkanovic, Telesky & Reeder, 1981).

Briefly speaking, there has been an increasing number of studies on informal support and its relationship with formal health service use. Overall, previous research reports various findings, i.e., a contrasting relationship between informal service use and formal service use (the more informal service use, the less use of formal service), no relationship (different tasks demand certain types of health service use), and a mixed function of informal service facilitating or discouraging formal service use.

**Life-stress, Social Support and Health on Formal Medical Utilization**

Pertinent to the present study, relationships among life-stress, social support, perception of functional ability, actual illness level and formal medical use will be discussed in this section. As previously mentioned regarding the hypothesized model of this study, there are interlocking relationships among concepts suggested by some theories and previous studies.

Although some researchers have investigated relationships between stress, social support and psychological and physical health status (Arling, 1987; Caplan, 1981; George, 1989; Krause, 1987; Krause, 1991; Krause & Liang, 1993; Lin,
Dean & Ensel, 1986; Revicki & Mitchell, 1990; Schulz & Decker, 1985), less research has examined effects on formal service utilization (Horwitz, Morgenstern & Berkman, 1985; Krause, 1988; Krause, 1990; Wan, 1982). The main theoretical logic for these relationships lies in the direct and/or indirect (buffering) effects of social support in relation to life-stress influencing the outcome measure. Life-stress, indicated by financial and physical stresses, is believed to have an impact on formal medical use directly or indirectly through social support, perception of functional ability and actual illness level. To further explain the relationships, it is necessary to describe function of social support as a buffering role of stress.

Based on the literature review, stress levels have a positive relationship with formal medical use, thus, the higher levels of life-stress, the more use of formal services. But, some might complain that not all older people with high levels of life-stress experience more physician visits and hospital use. Some people may be able to use social and interactional resources to cope with their stressful situations, and consequently use fewer formal medical services. A stress-buffering model suggests that the advantageous effects of social support are most salient when high stress levels exist. It is because social support provided by close social network members enhances the perceived ability to overcome negative situations of those who suffer from life-stress (Cohen & Wills, 1985).

Related to this longitudinal study, perceived ability that is enhanced by social support is measured by perception of functional ability. Social support received at Time 1 bolsters older adults’ perception of their functional ability, and their positive
perception of functional ability influences actual illness level at Time 2 with each other, accordingly impacting less medical use at Time 3. Perception of functional ability, in this study, has three indicators: number of ADL (Activities of Daily Living), degree to which individuals perceive their functional status to allow them to perform ADL now, and degree to which they perceive that ability now compared to last interview (Time 1).

Lichtenstein and Thomas (1987) describes functional health as an assessment of physical functioning using an ADL scale or an IADL (Instrumental Activities of Daily Living) scale. According to the researchers, the self-reported functional health measure is suitable for investigating relationships between individuals' physical health status and specific health behaviors such as formal health service use (Lichenstein & Thomas, 1987). Their findings justify the use of the variable, perception of functional ability, in order to examine elderly individuals' health use behavior. Based on the literature review, it is expected that the increase of social support available for older adults may lead to a decrease of perception of ill health and functional incapacities.

In review of past research associated with stress, social support and formal medical utilization, Gourash (1978) found that social support diminished the effects of stressful life events, thus hindering the need for formal services. Wan (1982), although he did not show the mediating or buffering effect of social support in reducing stress from life events, reported that the primary role played by social support was preventive in nature, and that elderly people with greater social
networks also used the available formal support systems more effectively and were less likely to have a decrease in health.

An interesting work by Krause (1990) proposes a theoretical framework on illness behavior in later life. In the framework, the health behavioral model (Andersen & Newman, 1973) and the health-belief model (Rosenstock, 1974) are integrated into stress perspective. Outcome measures of the conceptual model are concerned with three types of illness behavior: self-care, informal care and formal medical care. A major theme of the model suggests that help seeking behavior for existing health problems is a function of complex relationships between stress, health belief in medical care and supportive others. Although empirical research for the model has not been conducted, the proposed model presents possible challenges for future research, and attempts to cover some insightful theoretical frameworks that have been often utilized in the area of illness behavior.

These studies mentioned above show complex and interesting relationships between stress, social support and formal medical use. Those cross-sectional studies, however, do not demonstrate vigorous processing mechanisms and relationship changes over time among those variables.

Summary

Up to this point, the discussion has focused on relationships among variables used in the study. A thorough review of the literature suggests that there are many
factors related to formal medical utilization among elderly individuals. In contrast to the idealistic theoretical framework by Andersen and Newman (1973), the influences of predisposing demographic factor appear small but can not be ignored. Past research also reveals that financial stress measured by income level predicts formal medical utilization, but not as an enabling factor mentioned by Andersen and Newman (1973) especially for the elderly group. Furthermore, previous health status as a need factor in the behavioral model is found to be a consistently strong predictor of formal medical utilization.

The dynamic and interesting relationships among stress, social support and formal medical use have not been examined much in longitudinal settings, yet more relevant processing variables such as perception of functional ability and actual illness level, in the present study, can explain those relationship changes in a more logical way. Taken as a whole, the overall hypothesis is that life-stress experienced by older people directly influences formal medical utilization, and indirectly affects it through social support, the older persons' perceptions of functional ability and later illness level.

**Statement of Hypotheses**

The following hypotheses are established based on the literature review.

1. Predisposing socio-demographic variables affect life stresses, that is, financial stress and physical stress (i.e., the higher the educational level, the younger,
the respondent being male, not living alone and having health insurance, the lower the life stress levels will be).

2. The higher the life stress levels, the more frequent use of formal medical services.

3. The higher the life stress levels, the more support older adults receive from their family networks.

4. The higher the life stress levels, the more negative the perception of functional ability rated by the older individuals and the more illness symptoms.

5. The more social support given by family members, the more positive the perception of functional ability assessed by older adults and the fewer illness episodes.

6. The more social support received by older adults, the less frequent use of formal medical service.

7. The more positive perception of functional ability, the fewer illness symptoms, thus, the less frequent use of formal medical services.
CHAPTER III. METHODS

This chapter discusses the methodology for the study. Methodological issues of the present study include a description of the sampling and data collection, and measurement of selected variables along with descriptive statistics. In addition to these issues, the statistical analysis of the data and research design are added.

Sampling and Data

The data for this study are taken from the LSOA (Longitudinal Study of Aging), which is a collaborative work of the National Center for Health Statistics (NCHS) and the National Institute on Aging (NIA). The LSOA is a follow-up of the National Health Interview Survey (NHIS) of 1984 with a special interest for those who were aged 70 and over in 1984. The LSOA was designed to offer mortality rates by demographic, social, economic, and health information, to measure changes in living arrangement and functional status, and provide information of health care use. This version of the LSOA, dated October, 1991, has data from interviews in 1984, 1986, 1988 and 1990 for the people who had been 70 years and older at the time of their first interview in 1984.

Sampling procedures are, first, in 1984, approximately 7527 individuals aged 70 years and older were selected, and then, follow-up interviews by telephone or by mail were conducted in 1986, 1988 and 1990. The 1986 sample was reduced in size, but 1988 and 1990 data collection expanded to trace all the original respondents 70 years and older. The number of samples, who participated in
interviews in 1984, 1986 and 1988 is 5151. Among 5151 elderly, only persons who completed the interview in 1990 were drawn, therefore a total of 4142 subjects was selected. For the purpose of the present study, only 2590 respondents who participated in all three interviews of 1984, 1988 and 1990, presently having living adult children, but not living with their adult children in the same household, take part in this research. As mentioned earlier in the hypothesized model, some relationships were drawn among variables at Time 1, Time 2, and Time 3. This is a longitudinal study to investigate the effects of stress, social support, and health status on formal medical utilization for elderly individuals.

**Measurement**

In this section, measures selected for the current study are presented. There are fifteen measures, which consist of exogenous and endogenous latent constructs used in this study. Later in this part of the section, the frequency distributions for selected sample background such as income, age and education will be described. The model of this study encompasses five exogenous variables (i.e. education, age, gender, living arrangement, and health insurance) and nine endogenous variables including the outcome variable (i.e. financial stress, physical stress, instrumental support, availability of support, quantity of interaction, geographic accessibility of support, perception of functional ability, actual illness
level and formal medical utilization). The outcome variable of the study is formal medical utilization as reported by older individuals.

**Exogenous Variable**

The exogenous variables are four latent constructs related to predisposing, socio-demographic characteristics of the samples. These are educational level, gender, respondents' age, their living arrangement and health insurance. Respondents' age which is a continuous variable, is assessed by individuals' chronological age as of the time when the first interview was made in 1984. Gender of the sample is a dichotomous variable coded 0 for males and 1 for females. Educational level is also a continuous variable, operationalized by the years of schooling that the respondents had completed.

Additionally, living arrangement is measured by whether the respondents live alone or with others. In this variable, living with non-relatives, spouse or relatives is coded 1 and living alone is coded 0. Lastly, health insurance is a dichotomous variable regarding whether the respondents have private health insurance that covers doctor and/or hospital use (1=yes having private health insurance, 0=no). These predisposing characteristics are taken from the data of the 1984 interview at Time 1. Frequencies of the selected exogenous variables are demonstrated later.
Endogenous Variables

The hypothesized model of this research includes endogenous variables: financial stress, physical stress, instrumental support, availability of support, quantity of interaction, geographic accessibility, perception of functional ability and actual illness level.

Life-stress related variables  Financial stress and physical stress are two distinctive dimensions of life-stress, which were discussed in the literature review chapter revealing that lower financial level and physical status are associated with stressors from which elderly parents suffer in their later lives. Financial stress is indicated by income level that was measured by actual amount of family income per year. Eight categories of income levels are from 0 (under $5000) to 8 ($50000 and more), so the lower the income, the higher the stress.

Physical stress is another latent construct measured by two indicators: general health status and health assessment. Among them, general health status is the individuals’ self-rated health status. Individuals were asked how they rated their own health status: 1) excellent, 2) very good, 3) good, 4) fair, and 5) poor. These were recoded inversely so high scores indicate better health status. The other indicator of physical stress is health self-assessment, that is, concerning how well the respondent is taking care of personal health. Possible codings are; 1) excellent, 2) very good, 3) good, 4) fair, and 5) poor. These were inversely recoded so higher responses indicated better health self-assessment. Based on the literature reviewed earlier, it is predicted that the lower the health status, the
higher the levels of life-stress. The stress related dimensions also utilize interview data from the first wave panel in 1984.

**Social support related variables** Four distinctive dimensions of social support (or informal support) are instrumental support, availability of support, quantity of interaction, and geographic accessibility of support. First, instrumental support is defined as financial or economic assistance from family members, in this study, adult children. Individuals were asked whether their children routinely gave them money or not. This tangible support has only one indicator coded 1=yes (receive money provided by adult children) and 0=no (do not receive money from their children). Actually, a small number of older parents in the original data reported financial assistance from their children.

Second, availability of social support is defined as the perception of support believed to be available if needed (Dunkel-Schetter & Bennett, 1990). It is composed of two indicators; short-term availability (care available for a few days) and long-term availability (care available for a few weeks), both coded 1 (yes), 0 (no).

Third, quantity of interaction has two indicators: getting together and talking on telephone, which represents frequency of social interaction with family networks. Responses are based on whether respondents got together with relatives in the past two weeks and on whether they talked on telephone with their relatives in the past two weeks. Responses are coded 1 (yes), and 0 (no).
Finally, geographic accessibility of support is the last dimension of social support, defined as geographical distance between older adults' residence and family members' residence, in this case, adult children's residence. Geographic accessibility is based on the respondents' reports on how quickly children can get there, ranging from 1 to 6, recoded 1=24 hours or more, 2=3-23 hours, 3=60-179 minutes, 4=30-59 minutes, 5=10-29 minutes, or 6=9 minutes or less. Higher scores indicate higher accessibility of support provided by family members, that is, adult children. Data measuring these social support variables are taken from the 1984 interview. For the purpose of this study, older adults with no adult children and those who live with adult children in the same household were excluded from the study since questions about instrumental support from adult children and geographic accessibility of support were not available for those excluded sample.

Health related variables Two distinctive latent constructs related to health level of the elderly respondents at Time 2 are perception of functional ability and actual illness level. First, perception of functional ability is defined as individuals' self evaluation of functional health compared to others where functional health is an assessment of physical functioning usually utilizing ADL or IADL scale. Respondents report their perception of their functional health in performing activities of daily living. Three indicators are included in this latent concept; number of ADL's with difficulty, perception of functional ability now, and perception of functional ability compared to last interview.
Number of ADL’s with difficulty are recoded ranging from 0 to 7; 0=no difficulty any ADL, 1=difficulty 1 ADL’s, no difficulty 6 ADL’s, 2=difficulty 2 ADL’s, no difficulty 5 ADL’s, 3=difficulty 3 ADL’s, no difficulty 4 ADL’s, 4=difficulty 4 ADL’s, no difficulty 3 ADL’s, 5=difficulty 5 ADL’s, no difficulty 2 ADL’s, 6=difficulty 6 ADL’s, no difficulty 1 ADL’s, and 7=difficulty 7 ADL’s. These categories were inversely recoded for the study showing that higher scores reported better functional health status.

Perception of functional ability now is obtained from a question on how much difficulty subjects feel they have now in performing each activity: dressing, eating, getting in and out of bed or chair, walking, getting outside, using toilet and bathing or showering. The indicator is measured by the sum of seven activity items, and the reliability coefficient for this measure is .91. This high reliability may lead to high factor loadings. Responses on perception of functional ability are: 1) some, 2) a lot, and 3) unable to do. These self-reported assessments are inversely recoded to show that higher scores represent better functional capability.

Finally, perception of functional ability compared to last interview is based on questions concerning the difficulty in performing the same seven items now compared to the last interview (1986). Those are coded as: 1=more difficulty now, 2=some difficulty now, and 3=less difficulty now. The indicator is measured by the summary score of seven items, and the reliability coefficient for the perception of functional ability compared with the past is .82. Data used for this latent construct are taken from the 1988 interview.
The other latent construct, actual illness level is defined as the number of illness symptoms that occurred to the elderly respondents in their past years. It is obtained from the participants’ self-reports of the occurrence of illness problems based on questions about whether they have ever suffered any illness conditions on 21 chronic as well as acute health problems. The 21 illness conditions included are: Osteoporosis, Arteries, Hip fracture, Hypertension, Heart related condition, Angina pectoris, Myocardial infarction, Aneurysm, Blood clot, Varicose veins, Falls, Arthritis, Cancer, Circulatory disease, Diabetes, Parkinson disease, Pneumonia, Stroke, Alzheimer’s disease, Rheumatic fever, and others not listed. Responses for each symptom are coded 1 (yes), and 0 (no), then the frequencies of summing up the 21 illness occurrences are used as a measure of actual illness level. Thus, the higher number, the more health problems the elderly participants experience.

Outcome Variable

Formal medical utilization is defined as the use of traditional medical care provided by medical facilities such as physician visits, emergency room service and hospitalizations (Krause, 1990). It is composed of two indicators; physician visits and hospitalization which are continuous variables measured by actual frequencies of these medical service uses. The frequencies were recalled by old respondents in relation to the number of doctor visits since a 12-month date a year ago and number of different times in hospital since that 12-month date a year ago.
The actual numbers are recorded ranging 0 to 25 for both indicators. Thus, higher frequencies demonstrate higher rates of formal medical use.

In this dissertation, only self-reported data were used. Some criticisms have been raised regarding elderly adults' recall data. Because of their health status, some might have a problem recalling frequencies since 12 months ago. In fact, in this study, some elderly respondents reported no use of formal medical services at all. Among those elderly, 1914 elderly respondents (about 75%) reported no hospital use, while 199 (about 8%) elderly recalled no physician visits.

**Sample Description**

Frequency analysis is used for the descriptive statistics for all involved variables. Results of frequency analysis among selected variables are summarized in Table 1. After sorting out necessary samples (such as subjects interviewed in all three waves, having adult children but not living with them), only 2590 respondents remained in the study.

Among them are 939 males and 1651 females. The average age of the total sample is 75 years old with 4.62 standard deviation ranging from age 70 up to 96 in 1984. In conjunction with educational level, 25 people (1%) had no education, 68.4% received 7 to 12 years of education and the rest (21.6%) had education over high school degree. Also, results show that 1067 elderly adults (41.2%) live alone, while 1523 respondents live with others (58.8%).
Table 1. Frequency distribution for selected characteristics

<table>
<thead>
<tr>
<th>Variables</th>
<th>Females (N=1651)</th>
<th>Males (N=939)</th>
<th>Total (N=2590)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N (%)</td>
<td>N (%)</td>
<td>N (%)</td>
</tr>
<tr>
<td>Age in 1984</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>70-75</td>
<td>946 (57.3)</td>
<td>604 (64.3)</td>
<td>1550 (59.8)</td>
</tr>
<tr>
<td>76-80</td>
<td>453 (27.4)</td>
<td>240 (25.6)</td>
<td>693 (26.8)</td>
</tr>
<tr>
<td>81-85</td>
<td>180 (10.9)</td>
<td>68 (7.2)</td>
<td>248 (9.5)</td>
</tr>
<tr>
<td>86-96</td>
<td>72 (4.4)</td>
<td>27 (2.9)</td>
<td>99 (3.9)</td>
</tr>
<tr>
<td>Mean</td>
<td>75.57</td>
<td>74.71</td>
<td>75.26</td>
</tr>
<tr>
<td>SD</td>
<td>4.74</td>
<td>4.34</td>
<td>4.62</td>
</tr>
<tr>
<td>Employment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No (0)</td>
<td>1527 (92.5)</td>
<td>755 (80.4)</td>
<td>2282 (88.1)</td>
</tr>
<tr>
<td>Yes (1)</td>
<td>107 (6.5)</td>
<td>178 (19.0)</td>
<td>285 (11.8)</td>
</tr>
<tr>
<td>Missing</td>
<td>17 (1.0)</td>
<td>6 (0.6)</td>
<td>3 (0.1)</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>1559 (94.4)</td>
<td>875 (93.3)</td>
<td>2435 (94.0)</td>
</tr>
<tr>
<td>Black</td>
<td>83 (5.0)</td>
<td>50 (5.3)</td>
<td>133 (5.1)</td>
</tr>
<tr>
<td>Other</td>
<td>9 (0.5)</td>
<td>13 (1.4)</td>
<td>22 (0.8)</td>
</tr>
<tr>
<td>Living Arrangement</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alone (0)</td>
<td>933 (56.5)</td>
<td>134 (14.3)</td>
<td>1067 (41.2)</td>
</tr>
<tr>
<td>With others (1)</td>
<td>718 (43.5)</td>
<td>805 (85.7)</td>
<td>1523 (58.8)</td>
</tr>
<tr>
<td>Health Insurance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No (0)</td>
<td>351 (21.3)</td>
<td>182 (19.4)</td>
<td>533 (20.6)</td>
</tr>
<tr>
<td>Yes (1)</td>
<td>1286 (77.9)</td>
<td>755 (80.4)</td>
<td>2041 (78.8)</td>
</tr>
<tr>
<td>Missing</td>
<td>14 (0.8)</td>
<td>2 (0.2)</td>
<td>16 (0.6)</td>
</tr>
</tbody>
</table>
Table 1 (continued)

<table>
<thead>
<tr>
<th>Income</th>
<th>Under $ 5,000</th>
<th>$ 5,000- 6,999</th>
<th>$ 7,000- 9,999</th>
<th>$10,000-14,999</th>
<th>$15,000-19,999</th>
<th>$20,000-24,999</th>
<th>$25,000-34,999</th>
<th>$35,000-49,999</th>
<th>$50,000 or more</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>266 (16.1)</td>
<td>207 (12.5)</td>
<td>265 (16.1)</td>
<td>506 (30.6)</td>
<td>168 (10.2)</td>
<td>102 ( 6.2)</td>
<td>80 ( 4.8)</td>
<td>30 ( 1.8)</td>
<td>27 ( 1.6)</td>
</tr>
<tr>
<td></td>
<td>39 ( 4.2)</td>
<td>77 ( 8.2)</td>
<td>116 (12.4)</td>
<td>336 (35.8)</td>
<td>146 (15.5)</td>
<td>71 ( 7.6)</td>
<td>88 ( 9.4)</td>
<td>40 ( 4.3)</td>
<td>26 ( 2.8)</td>
</tr>
<tr>
<td>Mean</td>
<td>305 (13.6)</td>
<td>284 (12.7)</td>
<td>381 (17.0)</td>
<td>842 (32.5)</td>
<td>314 (12.1)</td>
<td>173 ( 6.7)</td>
<td>168 ( 6.5)</td>
<td>70 ( 2.7)</td>
<td>53 ( 2.0)</td>
</tr>
<tr>
<td>Mean</td>
<td>11,024.00</td>
<td>14,925.00</td>
<td>12,260.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SD</td>
<td>8,152.50</td>
<td>8,020.00</td>
<td>8,217.50</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Marital Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Married with spouse</td>
</tr>
<tr>
<td>Widowed</td>
</tr>
<tr>
<td>Divorced</td>
</tr>
<tr>
<td>Separated</td>
</tr>
<tr>
<td>Missing</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 years</td>
</tr>
<tr>
<td>1-6 years</td>
</tr>
<tr>
<td>7-12 years</td>
</tr>
<tr>
<td>13 years (+)</td>
</tr>
<tr>
<td>Mean</td>
</tr>
<tr>
<td>SD</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of Children</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-2</td>
</tr>
<tr>
<td>3-5</td>
</tr>
<tr>
<td>6 (+)</td>
</tr>
<tr>
<td>Mean</td>
</tr>
<tr>
<td>SD</td>
</tr>
</tbody>
</table>
Regarding age distribution between males and females, the frequency distribution shows that more female elderly respondents than males are in all of the categories, and especially females aged over 81 nearly tripled males in that category. Therefore, it substantiates a contemporary social phenomenon that is the increasing oldest old female segment with their expanded life expectancy. Results also suggest skewed distribution of income with more females in low income categories, while males show normal distribution in their income. According to previous literature, women are more likely to be older and poor, and it surely is shown in this analysis of frequency distribution. Additionally most of the samples are white retired who received average 10.6 years of schooling. More detailed information is summarized in Table 1.

**Research Design**

The hypothesized model uses three time frames. The data for the exogenous variables (age, gender, education, living arrangement and health insurance), life-stress variables (financial stress and physical stress) and social support variables (instrumental support, availability of support, quantity of interaction and geographic accessibility of support) are based on wave 1 (in 1984). The data sources for perception of functional ability and actual illness level are from wave 2 (in 1988), and the data for formal medical use are taken from wave 3 (in 1990).

The research design used in this study is longitudinal. There are some criticisms of cross-sectional research that examines causal relationships among
variables. Variables measured at one point at a time may create difficulties in describing causal ordering between concepts. Particularly, concerning formal health service utilization, there have been rare studies using longitudinal design which is helpful to examine dynamic processes and relationships over a long period of time. By conducting longitudinal research, more logical and proper explanations on the mechanism by which related variables influence one another will be achieved in the area of formal health service utilization for the elderly.

Statistical Analysis

Several analyses are used in this study. Along with frequency distributions, Pearson product-moment correlations which help to determine the direction and strength of the relationships between paired variables, are computed for all variables in this study. Then, structural equation analysis using LISREL VII (Jöreskog & Sörbom, 1989) is used.

Structural equation models are advantageous to specify relationships in terms of cause-and-effect variables and their indicators. Causal inference should be based on evidences in which causal models are statistically evaluated. The cause and effect models of theoretical and hypothetical relationships are interpreted by showing the direction of causality among theoretical concepts and constructs.

The LISREL model consists of two parts: the measurement model and structural equation model. The measurement model describes how the latent constructs are measured in terms of the observed variables, and it specifies the
measurement properties (validity and reliability) of the observed measures. The structural equation model specifies the causal associations among the latent variables and demonstrates the causal effects and the amount of unexplained variance (Jöreskog & Sörbom, 1989).

There are some advantages in using LISREL methodology. First, error terms among variables are not required to be uncorrelated. Also, the measurement and causal model can take into account simultaneously the effects of the amount of measurement error that always exists in measured variables (Hayduk, 1987). In addition to these advantages, the method provides statistics of fit that help to understand the adequacy of the model in explaining variances to test a whole model (Bollen, 1989).

In this study, four different sets of analyses will be conducted. The first will test the measurement model. After achieving the valid measurement model, it is compared with the null model and the fully recursive model in the second analysis. Then the conceptually hypothesized model is examined in relation to goodness-of-fit indices; parameter estimation, and decomposition of direct and indirect effects for all the relationship linkages will be reported. Three ad hoc comparisons will be added to examine gender differences, age cohort differences and model variance differences.
CHAPTER IV. RESULTS

This chapter presents the results of the analyses in five parts. The first part of this chapter reports the correlations by a Pearson product moment correlation matrix among the variables used in the study. Then, the factor loadings of the measurement model are presented. The third section of the chapter compares the fit indices of the null model, fully recursive model, and modified models with those of the hypothesized model which is a theoretically interesting model for the study. Next, the analysis focuses on the hypothesized model, its regression model, fit indices and decomposition of direct and indirect effects along with handful graphs of the model. Finally, additional analyses related to gender, age cohort differences and variance changes in the model will be reported.

Pearson Correlation

The Pearson product moment correlation coefficients for all pairs of variables used in the proposed model were computed (see Appendix A). In the analysis, the outcome construct, formal medical utilization which was composed of doctor visits and hospitalization was significantly correlated to life stress related variables. The two indicators of physical stress, i.e., health status ($r=-.14$, $p<.01$ with doctor visits; $r=-.09$, $p<.01$ with hospitalization) and health self-assessment ($r=-.05$, $p<.05$ with doctor visits; $r=-.05$, $p<.05$ with hospitalization) showed significant correlations with the outcome construct. Indicators of perception of functional ability (number of ADL's with difficulty, perception of functional ability now, and perception of
functional ability compared to last interview) and actual illness level also were significantly correlated with formal medical service use ($r=-.12$, $p<.01$ for number of ADL; $r=-.10$, $p<.01$ for perception now; $r=-.12$, $p<.01$ for perception compared to last interview; $r=.13$, $p<.01$ for actual illness level). Furthermore, these life stress variables had significant correlations with perception of functional ability and actual health level reported at the later interview (see Appendix A). Therefore, it can be concluded that those who experience more life stress tend to have a less positive perception of functional ability and more illness symptoms, hence, more use of doctor visits and hospitalization.

Among the social support variables, instrumental support showed a negative relationship with financial stress ($r=-.09$, $p<.01$) indicating that older people with higher level of financial stress tended to receive more financial assistance than those with less financial stress. Availability of support was significantly associated with financial stress ($r=.11$, $p<.01$ for short-term availability; $r=.08$, $p<.01$ for long-term availability), quantity of interaction, i.e., getting together ($r=.18$, $p<.01$ for short-term availability; $r=.15$, $p<.01$ for long-term availability) and talking on phone ($r=.05$, $p<.01$ for short-term availability; $r=.06$, $p<.01$ for long-term availability), geographic accessibility of support ($r=.17$, $p<.01$ for short-term availability; $r=.15$, $p<.01$ for long-term availability), and perception of functional ability, i.e., number of ADL ($r=.07$, $p<.01$ for long-term availability), perception now ($r=.06$, $p<.01$ for long-term availability) and perception compared to last interview ($r=.06$, $p<.01$ for long-term availability).
Also, availability of support was significantly related to actual illness level ($r = -0.07, p < 0.01$ for short-term availability; $r = -0.08, p < 0.01$ for long-term availability). It is, however, interesting that availability of long-term support had a greater influence on perception of functional ability as well as actual illness level than did the availability for a shorter time. It suggests that those who perceive their long-term support as available are more likely to have positive perception of their health and to experience fewer illness symptoms.

All of the indicators for perception of functional ability variable, which were number of ADL's with difficulty ($r = -0.19, p < 0.01$ for doctor visits, $r = -0.12, p < 0.01$ for hospitalization), perception of functional ability now ($r = -0.15, p < 0.01$ for doctor visits, $r = -0.10, p < 0.01$ for hospitalization), and perception of functional ability compared to last interview ($r = -0.19, p < 0.01$ for doctor visits, $r = -0.12, p < 0.01$ for hospitalization) significantly influenced not only the outcome variable but also actual illness level ($r = -0.40, p < 0.01$ for number of ADL, $r = -0.34, p < 0.01$ for perception now, and $r = -0.40, p < 0.01$ for perception compared to last interview). Older adults' perception of their health particularly functional health strongly reflected actual illness levels. Therefore, it is possible to say that if a respondent perceived functional health as positive, he/she was less likely to suffer from health problems, thus, less likely to seek formal medical help.

Among predisposing exogenous variables, only health insurance was significantly correlated with both doctor visits and hospitalization. Health insurance, therefore, enabled older people to utilize more frequent formal medical
services. Interestingly, however, all of the predisposing variables (education, age, gender, living arrangement and health insurance) showed significant correlations with three indicators of perception of functional ability and actual illness level. These findings suggest that older adults who had higher levels of education, younger, males, living with others and having health insurance were more likely to have a more positive perception of functional health and fewer illness problems. The criterion of a significance level of $p < .05$ was employed in this correlation matrix, however, because of large sample size, in this study, correlations at the $p \leq .05$ level must be interpreted with caution.

**Measurement Model**

A structural equation model has two components: a measurement component and a structural or path component. A measurement model alone is a confirmatory factor analysis (CFA). A path model is a path analysis which tests directional and causal relationships between variables (Jöreskog & Sörbom, 1989). In particular, measurement is the process by which a concept is linked to one or more latent variable, and these are linked to observed variables (Bollen, 1989). In other words, a measurement model indicates how latent constructs are reflected in measured variables. It is also a test to confirm whether the variables selected to represent specific constructs reflect them adequately (Jöreskog & Sörbom, 1989).

The measurement model of the hypothesized model is indicated in Table 2. Factor loadings for each of the latent constructs and measurement errors are
Table 2. Measurement model of the hypothesized model (N=2590)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Factor loading</th>
<th>Measurement error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education (Time 1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>1.000</td>
<td>.000</td>
</tr>
<tr>
<td>Age (Time 1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>1.000</td>
<td>.000</td>
</tr>
<tr>
<td>Gender (Time 1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>1.000</td>
<td>.000</td>
</tr>
<tr>
<td>Living arrangement (Time 1)</td>
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<td></td>
</tr>
<tr>
<td>Living arrangement</td>
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<td>.000</td>
</tr>
<tr>
<td>Health insurance (Time 1)</td>
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<tr>
<td>Health insurance</td>
<td>1.000</td>
<td>.000</td>
</tr>
<tr>
<td>Financial stress (Time 1)</td>
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<tr>
<td>Financial stress</td>
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<td>.000</td>
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<tr>
<td>Physical stress (Time 1)</td>
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<tr>
<td>General health status</td>
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<td>Availability of support (Time 1)</td>
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<tr>
<td>Short-term availability</td>
<td>.909</td>
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<tr>
<td>Long-term availability</td>
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<td>.414</td>
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<tr>
<td>Quantity of interaction (Time 1)</td>
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<tr>
<td>Getting together</td>
<td>.891</td>
<td>.196</td>
</tr>
<tr>
<td>Talking on telephone</td>
<td>.543</td>
<td>.697</td>
</tr>
<tr>
<td>Geographic accessibility of support (Time 1)</td>
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<tr>
<td>Geographic accessibility of support</td>
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<tr>
<td>Perception of functional support (Time 2)</td>
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</tr>
<tr>
<td>Number of ADL's with difficulty</td>
<td>.975</td>
<td>.086</td>
</tr>
<tr>
<td>Perception of functional ability now</td>
<td>.897</td>
<td>.204</td>
</tr>
<tr>
<td>Perception of functional ability compared to</td>
<td></td>
<td></td>
</tr>
<tr>
<td>last interview</td>
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<td>.105</td>
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<tr>
<td>Actual illness level (Time 2)</td>
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<td>Actual illness level</td>
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<td>Formal medical utilization (Time 3)</td>
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<tr>
<td>Doctor visits</td>
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<td>.551</td>
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<td>Hospitalization</td>
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<td>.795</td>
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<tr>
<td>$\chi^2$ (df)</td>
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<td>(126)</td>
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<td>Goodness of fit index</td>
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<tr>
<td>Adjusted goodness of fit index</td>
<td>.962</td>
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</tr>
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</table>
shown in Table 2. These standardized coefficients are helpful in providing some preliminary information to check whether the hypothesized model is acceptable for analyzing. Factor loadings for each item are related to the reliability and validity of the observed indicators. Low factor loadings indicate less reliable and valid indicators, and should be reexamined before using. Liang (1986) proposes that factor loadings that exceed .400 are acceptable in social science research.

Data in Table 2 show that the factor loadings were all satisfactory (\( .432 \leq \lambda \leq .975 \)). Although two indicators had rather low factor loadings (\( \lambda = .432 \) for health self-assessment, \( \lambda = .453 \) for hospitalization), these were acceptable according to Liang (1986) and others (Bollen, 1989). Among observed indicators, three indicators of perception of functional ability (i.e., number of ADL, perception of functional ability now, and perception of functional ability compared to last interview) yielded particularly high factor loadings reflecting that these three indicators were highly correlated with each other. As shown earlier, correlation coefficients among the three indicators were all high. Table 2 also reports measurement error because nothing can be measured exactly (i.e., self-reported data and survey research). Higher measurement error implies lower reliability and validity of the observed indicators. The measurement errors in Table 2 are as low as .086 (number of ADL) and as high as .813 (health self-assessment). All of these coefficients, however, appeared reasonably good, indicating reliable and valid use of observed indicators.
Meanwhile, a structural equation model is said to “fit” if the relationships in a hypothesized model generate an estimated covariance matrix that closely matches the covariance matrix obtained from the sample data (Jöreskog & Sörbom, 1989). But a hypothesized model that fits may not be the only model that adequately reflects the data, and just because a model fits does not necessarily mean the original hypotheses are all confirmed (Jöreskog & Sörbom, 1989).

To evaluate a model, some statistical measures of fit such as the chi-square test, goodness-of-fit index (GFI) and adjusted goodness-of-fit index (AGFI) have been used in structural equation models. The chi-square test with p-value is the most common method which suggests statistically significant differences between covariance by a model and covariance by observed data. The result of the chi-square test of the measurement model was statistically significant ($\chi^2 = 454.17$, df=126, $p=.000$) indicating overall satisfaction of fit in the model. Goodness-of-fit index, according to Bollen (1989) is the relative amount of variance and covariance in a sample that is predicted by the model. Adjusted goodness-of-fit index adjusts for the degree of freedom of a model relative to the number of variables. Although there is no clear cut to limit model goodness-of-fit level, generally a value greater than .9 is regarded as a satisfactory fit (Bentler & Bonett, 1980). Goodness-of-fit (GFI= .977, $p=.000$) and adjusted goodness-of-fit (AGFI= .962, $p=.000$) suggest that the overall fit between the measurement model and the data is quite satisfactory.
An additional fit measure is the chi-square estimator divided by its degrees of freedom. Its justification seems to be that the expected value of a chi-square variate is its degrees of freedom (Bollen, 1989). The ratio of $\chi^2/df$ estimates goodness-of-fit of the model. There is no unanimity on what represents a good fit, however, generally ranging from ratios of 3, 2 or less (Carmines & McIver, 1981) to as high as 5 can be acceptable (Bollen, 1989). In this present study, the ratio between the chi-square and the degree of freedom (454.17/126 = 3.60) is acceptable.

The results of the investigation of the measurement model suggested that the psychometric properties of the measures and model fit indices were quite satisfactory. Therefore, without any modification of the model, this measurement model can be used as it is to test the hypothesized model of this study. In a following section, model comparison between the null model, fully recursive model, modified hypothesized models and the hypothesized model will be explored. This model comparison also tells how adequately the hypothesized model is established compared to other models.

## Comparing Models

In this section, different models are competed and compared to each other. Five models introduced are the null model, fully recursive model, hypothesized model, and two modified hypothesized models. The fit indices for the five models are assessed and shown in Table 3. The null model assumes no relationship at all.
among variables involved and each variable is totally independent without any relationship with other variables, which is the most restricted model. The fully recursive model (see Figure B4 in Appendix B) suggests all variables are associated with each other, which is the least restricted model (Bollen, 1989). Two modified models are compared, and in the first model (Model 2), gammas between health insurance ($\xi_5$) and health status at Time 2 ($\eta_7$ and $\eta_8$) and between health insurance ($\xi_5$) and the outcome variable ($\eta_9$) are released to see the influence of health insurance upon those variables (see Figure B2 in Appendix B).

In particular, research on health service use has frequently mentioned the significant role of health insurance. Originally, Andersen's model identified health insurance as an enabling component that was treated as one of health service
resources available to individuals. According to Andersen and Newman (1973), health insurance enables people to get access to formal medical services. By using this resource, people experience low medical care prices, thus, they are apt to utilize more medical services. Health insurance aids not only people needing some form of health assistance to utilize medical services but it also may help people prevent deteriorating health status by using frequent medical services for preventive care. In this model, by releasing the gammas, relationships between health insurance and health status at Time 2, and between health insurance and medical service use, are newly established and compared with others. In fact, the correlation matrix (Appendix A) supports significant associations among those variables.

In the other modified model (Model 3), gammas between predisposing factors and social support dimensions are freed up, therefore, relationships between predisposing factors and social support variables are constructed, which is less restricted than the first modified model (see Figure B3 in Appendix B). Social support, in this model, is viewed as being affected by predisposing characteristics of individuals in Time 1.

The results of the analyses indicated that the hypothesized model, or the theoretically interesting model $[\chi^2(126)=454.17, \text{GFI}=.977, p=.000]$ was a better fit than the null model $[\chi^2(190)=16591.14, \text{GFI}=.609, p=.000]$. Comparing the $\chi^2$ difference between the two models provided significant improvement in the fit of the hypothesized model over the null model $[\Delta \chi^2(64)=16136.97, p=.000]$. 
Additional comparisons are also shown in Table 3 between the hypothesized model and the modified hypothesized model 1, between the modified hypothesized model 1 and the modified hypothesized model 2, and the modified hypothesized model 2 and the fully recursive model.

According to Bollen (1989), the normed fit index, $\Delta 1$, provides information on how much improvement of a model can occur over another model using $\chi^2$ differences between models compared. For example, by assessing the normed fit index, it is possible to examine the degree to which the hypothesized model improved over the null model, the modified model 1 over the hypothesized model, the modified model 2 over the modified model 1, and the fully recursive model over the modified model 2. In other words, Bollen (1989) indicates “the $\Delta 1$ estimates the proportionate reduction in the fitting function or chi-square values when moving from the baseline to the maintained model” (p. 270), for instance, from the null model (M0) as the baseline model to the hypothesized model (M1). The formula for $\Delta 1$ is proposed:

$$\Delta 1 = \frac{\chi_0^2 - \chi_1^2}{\chi_0^2}$$

In this formula, $\chi_0^2$ is the chi-square value of the baseline model and $\chi_1^2$ is the value of the hypothesized model.

In case of comparing the hypothesized model (M1) with the modified model 1 (M2), the formula for $\Delta 1$ is:
\[
\Delta_1 = \frac{\chi_1^2 - \chi_2^2}{\chi_0^2}
\]

In this formula, \(\chi_0^2\) is the chi-square value of the baseline model (in this case, the null model), \(\chi_1^2\) is the value of the hypothesized model, and \(\chi_2^2\) is the value of the modified model 1.

In Table 3, the results show that there was nearly 97% proportional reduction in the chi-square from the null model to the theoretically interesting model. This comparison suggests that the hypothesized model was a much better model to explain the data than the null model. Also, there was a .01 difference in the reduction of chi-square from the modified model 1 to the modified model 2, and .01 difference in the reduction of chi-square from the modified model 2 and the fully recursive model, which were not sufficient to make an impact. Furthermore, the normed fit index (\(\Delta 1\)) comparing the hypothesized model with the modified model 1 was almost zero, which suggests nearly no impact of model change from M1 to M2. Therefore, the results conclude that the hypothesized model was the best and comparable model and fit the data well.

In sum, the overall fit of the hypothesized model was quite good and the model was proved as a better model to explain data than the null model, the modified models and the fully recursive model. Among the five models, although goodness-of-fit for the fully recursive model yielded a high percentage (99.4%), the incremental improvement in fit from the modified hypothesized model 2 was not significantly increased (i.e. normed fit index from M3 to M4 = .01). In contrast, the
incremental improvement in fit of the hypothesized model compared to the baseline model (the null model) showed a significant increase, thus, the hypothesized model fit the data the best.

Analysis of the Hypothesized Model

The hypothesized model showing completely standardized regression coefficients is presented in Figure 2. The path coefficients were decomposed into direct and indirect effects to investigate the strength of causal relationships among variables involved. To test the variables entered into the model, the criterion of a significant level of $p < 0.05$ was employed for each of the variables. In Figure 2, only significant path coefficients are revealed because of the visual complexity of the model description.

The model in Figure 2 shows significant path coefficients between predisposing socio-demographic variables and life stresses. More specifically, educational level ($\gamma = 0.376$ for financial stress, $\gamma = 0.201$ for physical stress, $p < 0.01$), age ($\gamma = 0.054$, $\gamma = 0.075$, $p < 0.01$, respectively), gender ($\gamma = 0.083$ for financial stress, $p < 0.01$), living arrangement ($\gamma = 0.301$, $\gamma = -0.156$, $p < 0.01$, respectively) and health insurance ($\gamma = 0.114$, $\gamma = 0.093$, $p < 0.01$, respectively) had significant influences on financial stress and physical stress. With a minor exception of gender effect ($\gamma = -0.031$ for physical stress), that is, no statistical significance between gender and physical stress, it is possible to state that the first hypothesis, predisposing variables significantly affect life stresses, was supported.
Figure 2. Completely standardized coefficient for the hypothesized model.
Interestingly, the relationship between life stress levels and formal medical services in the hypothesis 2 was not significantly supported by the results of the analysis. Financial stress and physical stress did not directly influence older adults’ physician as well as hospital use. It can be, however, predicted that strong mediating variables may inhibit their direct relationships with the outcome variable.

Also, results of testing the third hypothesis that the higher life stress levels predict the more support received by older adults demonstrated interesting findings in the analyses. Among life stress constructs, financial stress was significantly associated with all of social support variables, that is, instrumental support ($\beta=-.103$), availability of support ($\beta=.102$), quantity of interaction ($\beta=-.043$) and geographic accessibility of support ($\beta=-.183$). On the contrary, none of the social support variables was significantly affected by physical stress, and physical stress only had a significant relationship with financial stress ($\beta=.107$). It may be stated that physical stress had an impact on social support constructs through financial stress. Direct as well as indirect effects will be summarized later to examine these effects.

Among social support constructs, availability of support had statistically significant relationships with quantity of interaction ($\beta=.19$) and geographic accessibility of support ($\beta=.153$). The association between quantity of interaction and geographic accessibility was not significant but approached significance at $p<.05$ level ($\beta=.204$). From these results mentioned above, it is possible to say that those who had higher level of financial stress were more likely to receive
financial assistance from adult children, perceived less available support from significant others, had more frequent interaction with their family and lived close to their adult children. Related to social support variables, respondents who perceived that there was always somebody to take care of them when needed tended to have frequent contacts with their family and lived close to their children. These findings partially supported the third hypothesis in relation to financial stress, but physical stress did not significantly influence any of social support variables.

The fourth hypothesis was concerned with a relationship between life stress and health in later years, that is, the higher the life stress levels, the more negative perception of functional ability and the more illness symptoms. Findings of the analyses partially supported the hypothesis. More specifically, physical stress at Time 1 had a negative and significant relationship with actual illness level at Time 2 ($\beta=-.306, p<.01$), and a positively significant relationship with perception of functional ability ($\beta=.270, p<.01$). Financial stress also showed a significant impact on perception of functional ability ($\beta=.08, p<.05$), however, did not influence actual illness level significantly. These findings indicate that when a respondent experienced higher level of physical stress, the respondent was more likely to perceive his/her functional health more negatively and have more illness problems in later years. Meanwhile, if the person had had lower financial stress, he/she would have perceived his/her functional ability more positively but lower financial stress was not enough to affect actual illness levels subsequently.
The fifth hypothesis is related to the association between social support and health; the more social support received by older persons, the more positive health status in later time. Four different dimensions of social support demonstrated different findings in the analyses. Among them, three quantitative aspects of social support (instrumental support, quantity of interaction and geographic accessibility) did not have significant relationships with any of health status variables at Time 2. However, availability of support, which was a functional aspect of social support significantly affected both perception of functional ability ($\beta=.052, p<.05$) and actual illness level ($\beta=-.06, p<.05$). Hence, it can be stated that those who perceived support networks available when needed were more likely to have positive perception of functional ability, thus fewer illness episodes in later time.

As for the sixth hypothesis, results did not support the hypothesis. None of social support variables had a significant impact on formal medical use, however, some of the variables influenced the outcome measures indirectly, although not significant, via perception of functional ability and actual illness level. Finally, the seventh hypothesis was strongly supported by findings in this analysis. The association between perception of functional ability and actual illness level ($\beta=-.311, p<.01$) was significant, and the relationship between actual illness level and formal medical utilization was significant, too ($\beta=.273, p<.01$). There was also a strong relationship between perception of functional ability and formal medical use ($\beta=-.213, p<.01$). These findings indicate that the more positive perception of
functional ability, the fewer illness episodes, and, consequently the less frequent use of formal services in later time, which affirms the hypothesis.

As a summary, depicted in Figure 2, different dimensions of latent constructs function differently. For example, while none of four social support dimensions was strongly affected by physical stress, financial stress had a significant impact on all of them. Therefore, it is difficult to say that life stress levels are always significantly related to social support received by older persons. However, among the hypotheses, the second and sixth hypotheses, the significant and direct relationships between life stress and formal medical use and between social support and formal medical use were not supported at all by findings of the analyses. This might imply a possibility of strong moderating factors since the effect of physical stress became significantly reduced whereas the correlation between financial stress (measured by self-rated health and health self-assessment) and formal service use was significantly strong.

Additionally, as stated earlier, this hypothesized model had an adequate overall fit of $\chi^2(454.17, \text{df}=126, \text{p}=.000)$, goodness-of-fit (GFI=.977, p=.000), and adjusted goodness-of-fit (AGFI=.962, p=.000). In the next section, the complex relationships among variables are examined for direct and indirect effects among the variables.
Decomposition of Effects

From the analyses of the hypothesized model, calculation of effects was conducted to estimate the direct, indirect and total effects for all of the linked relationships in the hypothesized model. Path analysis distinguishes three types of effects: direct, indirect and total effects. The direct effect is that influence of one variable on another that is not mediated by any other variables in a path model. The indirect effects of a variable are mediated by at least one intervening variable. The sum of the direct and indirect effects is the total effects (Bollen, 1989). An effect is regarded as significant when estimates are at least twice as large as its standard error. Table 4 shows the results of the decomposition of these effects.

In the table, most of exogenous variables show significant effects on endogenous variables including the outcome variable. Respondent’s predisposing characteristics had impacts not only on life stress variables directly but also on most of the endogenous variables indirectly. In relation to perception of functional ability, surprisingly, financial stress had significant indirect as well as direct effects on perception of functional ability. As expected, however, physical stress had only a strong direct effect. Therefore, those who had lower physical stress tended to perceive their functional health more positively in later stage of lives. Findings of the decomposition of the effects also suggest that life stress, both of financial and physical stress were indirectly related to actual illness level via social support constructs and perception of functional ability. As already examined, physical stress also had a direct influence on actual illness level.
Table 4. Decomposition of direct, indirect and total effects

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* Significant when estimates are at least twice as large as its standard error.
The final outcome variable, formal medical use was indirectly related to five endogenous variables: financial stress, physical stress, availability of support, geographic accessibility of support and perception of functional ability. Among these five constructs, only perception of functional ability had a significantly strong direct effect on the outcome variable. Although social support constructs did not play large roles in the hypothesized model, availability of support and geographic accessibility of support showed indirect influences on formal medical utilization. Particularly, availability of support was the strongest predictor of perception of functional ability and actual illness level among social support variables, and it had a significant indirect effect on formal medical use through health status variables in a later time. This result informs that the effects of availability of support on formal medical use was mediated by later health status.

In addition, life stress variables had significant indirect effects on formal service utilization. Not surprisingly, a strong indirect effect was found for physical stress on formal service use, and indeed it accounted for 71% of the total effect, but physical stress did not affect formal medical use directly.

**Analysis on Gender Difference**

This part of the investigation focuses on gender differences in the mechanism by which life stress, social support and later health status interplay with each other affecting formal medical service use. Figure 3 and Figure 4 report the hypothesized model for males and females separately. In comparison of the
Figure 3. The hypothesized model for males.
Figure 4. The hypothesized model for females.
model between males and females, analysis shows similarities and differences in findings. For males, financial stress did not have any significant impact on instrumental support, however, for females, financial stress was significantly related to receiving money regularly from adult children.

Also, for females, the relationship between geographic accessibility and perception of functional ability was negatively significant, but it was not for males. Interestingly, those who reported higher physical stress were more likely to perceive that there were always available care takers if needed for males. Furthermore, for females, the role of financial stress was significant to both latent constructs of health status at Time 2, therefore, not only perception of functional ability was influenced by financial stress but actual illness level also was significantly associated with financial stress. However, for males, the result of the analysis showed that only actual illness level was significantly related to financial stress.

In terms of similarities for males and females, the strongest endogenous variables to predict formal medical use were health status at Time 2 variables, perception of functional ability and actual illness level. Life stress variables, rather than indirect effects via social support variables, directly affected later health status, and accordingly formal service utilization. Particularly, initial physical stress level was a strong predictor of health level at Time 2 for the two groups.

As for model fit indices between males and females, the chi-square for males was 370.69 (df=113, $p=.000$) and 297.04 for females (df=113, $p=.000$). In
addition, goodness-of-fit index (GFI=.95 for males, GFI=.974 for females), and adjusted goodness-of-fit index (AGFI=.916 for males, AGFI=.957 for females) indicate that the model for females appears fit the data better than that for males. However, goodness-of-fit, better than .9 for both groups suggests good fit of the model to the data.

**Analysis on Age Cohort Difference**

This section examines age effect on the hypothesized model. As mentioned earlier in the methods chapter, age of the sample in this study is 70 and older, and three age groups to be examined are; young-old (70-74 in 1984), middle-old (75-78 in 1984) and oldest-old (79 and over in 1984). First, for the young-old group, Figure 5 reports the hypothesized model indicating all path coefficients that are only statistically significant. As seen in the table, no direct path was drawn between formal medical use and life stress variables as it was in the overall hypothesized model for the whole sample. The strong predictors of formal medical use were perception of functional ability and actual illness level. The value of $R^2$ for formal medical use was 0.388, therefore, 38.8% of the variance of formal medical use was explained in this model.

Unlike the overall hypothesized model for the total sample, financial stress did not significantly influence perception of functional ability. Also, none of the social support variables had an impact on health status at Time 2 variables, thus, although financial stress was significantly associated with social support variables,
Figure 5. The hypothesized model for the young-old.
the effects of social support variables were not strong enough to influence later health level, and eventually formal medical use. In this model, for the young-old group, fit indices of the chi-square test, ($\chi^2=270.41, \text{df}=113, \text{p}=0.000$), goodness-of-fit index (GFI=.973, g=.000), adjusted goodness-of-fit (AGFI=.955, g=.000) and the ratio of $\chi^2$ to degrees of freedom ($\chi^2$/df=3.2) indicate an adequate overall fit of the model to the data.

The results from the second group (middle-old) showed little differences in the analysis compared to other groups (Figure 6). No gender effect on physical stress was found, and no relationship between financial stress and later health status was detected. However, surprisingly, instrumental support played a significant role; previous physical stress directly affected instrumental support and instrumental support significantly influenced actual illness level. Therefore, previous physical stress had an influence on later health status through instrumental support. Furthermore, physical stress was directly related to geographic accessibility, which reported the significant association of higher physical stress and closer geographic distance between older adults and their children.

The value of $R^2$ for medical use was .428, hence, 42.8% of variance in formal medical utilization was explained. To evaluate the overall fit of the model, the chi-square test ($\chi^2=203.04, \text{df}=113, \text{p}=0.000$), goodness-of-fit (GFI=.960, g=.000), adjusted goodness-of-fit (AGFI=.933, g=.000) and the ratio of $\chi^2$ to degrees of freedom ($\chi^2$/df=3.2) indicate an adequate overall fit of the model to the data.
Figure 6. The hypothesized model for the middle-old.
freedom ($\chi^2/\text{df}=1.8$) were reported, revealing that the overall fit of the model to the data was quite good.

The final investigation for the oldest-old (79 and over in 1984) suggested no gender effect, no relationship between financial and physical stress, and no significant impact of perception of functional ability on formal medical use (Figure 7). In addition, the role of availability of support was not as significant as in the overall hypothesized model for the whole population. Social support variables did not mediate the relationships between life stress variables and health status at a later time frame. Findings also indicated 15.4% of the variance of formal medical use ($R^2=.154$) was explained in the model. The chi-square difference test ($\chi^2=185.38$, df=113, $p=.000$), goodness-of-fit (GFI=.946, $p=.000$), adjusted goodness-of-fit (AGFI=.949, $p=.000$) and the ratio of $\chi^2$ to degrees of freedom ($\chi^2/\text{df}=1.64$) also suggested a satisfactory overall fit of the model.

Analyses on Inclusion/Exclusion of Health Status at Time 2

The purpose of this additional analysis is to examine the significant function of measures of health status in 1988 to improve variance explained in formal medical service use in 1990. Two models were compared by using LISREL method; the hypothesized model with health measures at Time 2 and without the measures. The model with the measures, which is the overall hypothesized model is shown in Figure 2, and the latter model is in Figure 8. For the latter model, the value of chi-square ($\chi^2=.348$, df=74, $p=.000$), goodness-of-fit (GFI=.981, $p=.000$), adjusted
Figure 7. The hypothesized model for the oldest-old.
Figure 8. The hypothesized model without health status at Time 2.
goodness-of-fit (AGFI=.966, χ²=0.000) and the ratio of χ² to degrees of freedom (χ²/df=4.71) also suggested an acceptable overall fit of the model.

In the model without health measures at Time 2, parameter estimates indicate none of social support variables was significantly related to the outcome variable, which imply a rather insignificant role of social support on formal medical use. The results of the analysis showed that R² was .135 (φ=√(1- R²)), therefore, approximately 13.5% of the variance in formal service use was explained by predictors. In the hypothesized model with the health measures in 1988, however, the value of R² was .344. About 34.4% of variance was accounted for when health measures In 1988 were included in the model. This finding highlights the significant role of inclusion of health status measures at Time 2. By adding those measures in the model, the variance explained in the outcome variable was significantly increased.
CHAPTER V. DISCUSSION AND CONCLUSION

This chapter is composed of discussion of the analyses, conclusion, summary, implications of the study, limitations of the study and future research. These discussions are based on findings from testing the hypothesized model and the additional models.

Discussion of the Hypothesized Model

In this study, seven hypotheses are empirically tested by using structural equation models (LISREL). Results show some significant findings to support or to reject those hypotheses. The first hypothesis that states that predisposing characteristics of respondents influence life stress constructs, is supported by the findings. Socio-demographic variables including education, age, gender, living arrangement and health insurance frequently have been used as predisposing determinants in relation to Andersen's model. Although previous studies using Andersen's model have consistently tested the effects of predisposing factors, no direct relationship is hypothesized between the predisposing components and the outcome measures in this study because of the small variance explained by the predisposing characteristics in previous research (Wolinsky & Coe, 1984; Wan, 1987).

Life stress constructs, however, are significantly influenced by those predisposing characteristics. Previous literature also supports these findings; a higher level of financial stress is associated with lower education (Crystal et al.,
1992), being older (Holtz-Eakin & Smeeding, 1994), being female (Blazer, Hughes & George, 1987), living alone (Scott & Roberto, 1985) and not having health insurance (Muller, 1986). As for physical stress, those who have a higher level of physical stress have lower education (Mutran & Ferraro, 1988), are older (Wan, 1987), live with others (Evashwick et al, 1984) and have no health insurance (Muller, 1986). Gender differences in physical stress, however, is not statistically significant. No difference is found between men and women in physical stress in their old years. The results from testing Hypothesis 1 demonstrate that certain predisposing characteristics of older persons including education, age, living arrangement and having health insurance are related to vulnerable life stresses.

The second hypothesis, the higher life stress, the more frequent the use of formal medical use is not supported. Financial stress, measured by income level which represents an enabling factor in Andersen’s model, has been shown to be directly associated with formal service utilization (Bass & Noelker, 1987; Krout, 1983). In fact, income as a source of resources has been used as an enabling component that allows people to receive formal health services. As noted in the literature review, however, since many public as well as private health care services and insurance programs have been more easily accessible in recent years, the function of income seems to have become weaker as an enabling factor. Indeed, in this study, almost all respondents report receiving Medicare benefits (91%), and a large proportion reported having private health insurance (78.8%). Therefore, regardless of income level, older persons in this study are
able to easily get access to formal medical services. Additionally, the direction of the relationship between financial stress and the outcome variable is negative implying that the higher financial stress (lower income) respondents experience, the more frequently they seek help from formal health services, contradicting past findings (Andersen, 1968; Andersen & Newman, 1973; Bass & Noelker, 1987; Krout, 1983).

Surprisingly, physical stress measured by previous health status at Time 1 which represents one of need factors in this study has no significant direct relationship with formal medical use, but does have a significant indirect influence on the outcome variable. The need component of health status has been found as a major and consistent cause of formal service use in previous studies that are mostly cross-sectional research (Mutran & Ferraro, 1988; Wan, 1987; Wan & Arling, 1983; Wolinsky & Coe, 1984). In this longitudinal study, although self-rated health status at Time 1 did not directly predict formal medical service utilization at Time 3 (but showed a significant indirect effect), health status at Time 2 variables (perception of functional ability and actual illness level) which also represent a need component are the strongest predictors of formal medical utilization. Therefore, it is possible to say that need factors in this study function significantly to predict formal medical utilization.

Furthermore, even though no significant and direct relationship is demonstrated between life stress and formal service use, results from testing Hypothesis 3, 4, and 5 support a strong indirect effect of life stress on formal
medical use through social support and health constructs at Time 2. The decomposition of effect supports this finding (Table 4). First, in connection with Hypothesis 3, among life stress latent constructs, all the social support variables have significant relationships with financial stress while none of them are significant with physical stress. This finding indicates a meaningful role of financial stress in relation to different social support dimensions which, in this study, characterize functional and quantitative support. Therefore, those respondents who have higher financial stress tend to receive more financial support from adult children, interact more with their family, and live close to adult children. However, interestingly, those who have higher income, thus, lower financial stress, are more likely to perceive support availability when needed.

The different dimensions of social support lend themselves to different interpretations in connection with financial stress. Respondents with higher financial stress report poorer health ($\beta=.107, p<.01$) and receive more economic assistance from adult children. Two contradictory interpretations regarding receiving financial help from significant others are explained by Krause and Liang (1993). The first view is the resource mobilization perspective which assumes that social support is stress responsive and that people who experience stress either actively seek or gratefully receive assistance from their significant others. Hobfoll (1988) also suggests that when people experience stressful events, they tend to lose resources, and immediately try to compensate for lost resources by receiving support from others. By receiving support from others, resources are increasing,
and the increasing resources result in positive outcomes. The other view suggests that receiving material assistance actually diminishes other aspects of social relationships (i.e., quality of relationship), therefore support from others actually do not lead to positive results (Krause & Liang, 1993). In the present study, although older persons accept economic help from their adult children, the economic assistance that older adults receive at Time 1 does not significantly influence their health status at Time 2.

Financial stress also has a significant relationship with availability of social support ($\beta = 0.102, p < 0.01$). Availability of support is the perception of support believed to be available if needed (Dunkel-Schetter & Bennett, 1990). Availability of support is often equally treated as perceived-available support (Barrera, 1986; Sarason et al., 1987) or available support (Tardy, 1985) or perceived support (Heller et al., 1986).

It is noteworthy that those who have higher level of financial resources (lower stress) perceive that they have more available social support from others. On the contrary, older individuals who have less economic resources perceive less available social support from others. Several possible speculations may explain the relationship between stress and availability of support. Resources such as income can be a proxy of how much power persons have and the status of the position they occupy in society. Experiencing diminishing resources might lead to persons’ lower self-esteem. Increasing financial stress might cause decreases in social competence, self-fulfillment and value of self. Their lowered self-esteem
might affect their perception of support believed to be available, hence, they tend to perceive that fewer people are available to take care of them when needed. Accordingly, they are less likely to feel loved, protected and esteemed by others. In contrast, if they have sufficient resources, i.e., lower stress, they perceive that they have power, feel valued and cared about by others.

Sarason et al. (1990) suggest that the support comes from what that indicates to the recipient about the relationship rather than from what is actually done. In that sense, perception of available social support has a meaning that is not based on what is done by others but on how the recipient perceives the relationship with others.

Another explanation of the relationship between financial stress and availability of support is associated with the discrepancy between support-expected, and support-received (Dunkel-Schetter & Benet, 1990). People who have reliable social networks may be dependent on support that will be forthcoming when stress occurs, and they may think there are some people available always to care for them. Research shows, however, that during chronic stressful life situations, support is not always as plentiful as people believed it would be (Coyne, Wortman & Lehman, 1988). Therefore, perhaps the amount of support expected is not met with that of support given by close persons in a time of stress. This discrepancy, especially when greater crises occur can cause a lowered perception of availability of support. This functional aspect of social
support, i.e., availability of support is found to have significant relationships with health variables at Time 2.

Results also show a significant association between financial stress and quantity of interaction and geographic accessibility of support indicating that when respondents have higher levels of financial stress, they tend to have more social interactions with family members and live closer to their adult children. Particularly, in relation to geographic accessibility, high financial stress measured by income level can be an important mobility factor; adult children from high income families have greater chances for higher education and occupational mobility than those from lower class families (Warnes, 1986). Elderly parents with greater resources often have had greater geographical separation from their adult children (Lin & Rogerson, 1995). While those with fewer economic resources tend to live close to their children for intergenerational support (Worobey & Angel, 1990).

As shown in Figure 2, a careful examination can find meaningful associations among social support variables: Functional support has significant relationships with the quantitative aspects of social support, both quantity of interaction and geographic accessibility of support. Therefore, the higher the perception of availability of support networks, the closer the proximity between older persons and their adult children, and the more frequent contacts are exchanged. These results are supported by past research (Lee, 1980; Lin & Rogerson, 1995).
In this study as in earlier research, functional support and quantitative support influence one another, and especially geographic proximity plays an important role in the areas of functional support and quantitative support. Intergenerational interaction has been an important research concern in family relations, and in particular, geographic proximity between old adults and their family members is the fundamental predictor of the relationship and the interaction between them (Crimmins & Ingegneri, 1990; Dewit, Wister & Burch, 1988). Hence, when older individuals live closer to their family networks, elderly adults feel that somebody is always there to take care of them when they need help. They feel secure, esteemed and valued by others, and ultimately, their perception of availability of support significantly influences their health status in later years.

It is, however, noted that none of the quantitative aspects of support make a significant impact on health status variables in later years. In this study, the decomposition of effects demonstrates indirect influences of quantitative support on health status at Time 2 through functional social support. Therefore, the significant role of functional social support to health status in 1988 is emphasized in this analysis. As shown in the analysis, the perception of available support strongly influences older adults' health status, and a possible reason may be that the effects of social support on health in general may operate through a psychological or cognitive process rather than through quantitatively tangible support (Gottlieb, 1988).
Health status at Time 2 which is composed of perception of functional ability and actual illness level, is not only significantly affected by functional support but also by the life stress variables. Financial stress, measured by income level as a source of resources, has a great impact on older individuals' psychological functioning, their perception of functional health, but is not strong enough to influence later health status. Not surprisingly, physical stress experienced in the previous time frame is a strong predictor for perception of functional ability as well as actual illness symptoms in the later time frame.

In connection with the outcome variable, findings from the analysis in this study, indicate direct and indirect predictors for the outcome construct. Perception of functional ability and actual illness level are the strongest predictors of formal medical utilization. Life stress has strong indirect effects rather than direct effects on formal service use through social support and health status at Time 2. As mentioned earlier, previous research using a cross-sectional design that consistently emphasizes the importance of need components has been criticized in relation to the small variance accounted for by need characteristics (Wolinsky & Coe, 1984). To investigate the more dynamic processes involved in formal service use, in this study, a longitudinal design is attempted adding longitudinal measures of two predictors; perception of functional ability and actual illness level. As expected, the two measures are the most significant determinants of formal medical use.
This finding highlights the need for longitudinal studies in the area of health behavior research. By adding the two variables, not only can the process of health service behavior for older persons be more clearly explained but they add more explanatory power to the model in terms of an increase in variance accounted for by predictors involved. The overall process of formal health service behavior can be summarized in that initial life stress is buffered by social support, especially functional support, and consequently influences health status at a later time frame and formal medical utilization.

Additional Models

Gender Effect

One of inquiries in the present study is to examine gender differences in the process of health service use behavior. First, the overall goodness-of-fit between two groups appears a better fit for females ($\chi^2=297.04$, GFI=.974, AGFI=.957, $p=.000$) than males ($\chi^2=370.69$, GFI=.950, AGFI=.916), but both of the models explain the data well. Regression coefficients among relationships in the model require somewhat different interpretations between the groups. The effect of functional support as a mediating factor is weakened for both models compared to the overall model for the total sample. For both genders, the availability of support is not an influence on health status at Time 2. Instead, geographic accessibility is a strong predictor for perception of functional ability, but the relationship is
negative. For females, those who reside closer to adult children are the ones who do not have a positive perception about their functional health.

Particularly in the sample, a large number of females report living alone. Past research has indicated enduring relationships between aging mothers and their adult children especially daughters (Rossi & Rossi, 1990). Also, adult children are major caregivers for frail elderly (Brody, 1985), and when spouse is no longer available, adult children provide the most help (Hoyt et al., 1987; Cantor, 1983). Many adult children as major caregivers live close to their parents (Himes, 1992). Therefore, older adults whose adult children live in close proximity are more likely to be the ones who need help and have substantial health problems.

Furthermore, the variance in formal medical use that is explained by predictors is greater for females (R²=.376) than for males (R²=.288). In this study, variables involved such as life stress, social support and health status at a later time frame explain health service use behavior better for females than for males. Previous research indicates that women with increasing age are more likely to be poorer (Holtz-Eakin & Smeeding, 1994), have more health problems (Verbrugge, 1985) and receive more formal medical help (Cleary et al., 1982; Mutchler & Bullers, 1994). In addition, men are more independent and reluctant to seek help from others, while female role characteristics facilitate the support process, including the development and maintenance of supportive relationships and providing and receiving support (Vaux, 1988). These findings may aid in understanding why the
process of formal service behavior in the model appears to explain better for females than males.

**Age Cohort Effect**

Three hypothesized models are compared based on age cohort differences. The results of the analysis suggest an adequate fit of the models among the three age cohorts. But, the variance explained in formal service use for the middle-old cohort (75-78) is the largest; therefore, about 42.8% of the variance is accounted for by predictors in the model. Most models suggest direct influences of life stress on health status at Time 2, and consequently formal service use.

An interesting result is found in conjunction with instrumental support for the middle-old group; respondents who have higher physical stress tend to receive more financial assistance, and not only does the effect of financial assistance influence health status in later years but instrumental support moderately affects formal service use. These old persons report more health problems and use formal health service frequently. As a final comment, it is noted that with increasing age, older persons’ health service use behavior is generally independent of social support provided by their families, but rather past history of health status for elderly individuals is more directly related to formal health service use.
Inclusion/Exclusion of Variable Effect

A comparison of the hypothesis model with health status variables in later time frame, and the model without the variables is conducted to examine changes in variance in the outcome variable. The results of the analysis reveal that inclusion of health variables in the later time frame, perception of functional ability and illness level at Time 2 almost triples the amount of variance explained by predictors in frequencies of health service use. Without the variables, the strongest predictor is physical stress measured by previous health status and health self assessment ($\beta=-.264$) and total variance in formal medical use is approximately 13.5%. However, the addition of the variables significantly increases the variance explained in subsequent formal medical use behaviors by 20.9% ($R^2=.344$). The strongest predictors are perception of functional ability and illness level at a later time frame.

These findings of the analysis first, emphasizes the importance of using a longitudinal study to investigate causal mechanisms of health service use behavior by increasing variance in outcome measures. Second, the significance of health-related variables cannot be ignored, and more carefully designed health-related variables should be developed. In the present study, the effect of previous physical stress became less significant to formal service use when health variables of a later time frame are introduced in the model, and the influence of health variables at Time 2 becomes the most significant predictors.
A possible speculation concerning the findings is that rather than global self-rated health alone, which has been regarded as a reliable measure of health status, more specific measures of health such as functional health (usually measured by ADL assessment) and actual illness level (measured by illness symptoms) may be more useful in exploring health service use. Another important finding is the significance of the previous developmental history of an individual's health and its effect in increasing older adult's formal health service use. It is logical to predict that old adults receive help from formal health service because of their continued health problems over years.

Conclusion

Results in this study show how initial life stress influences older adults' formal health service use behavior. Different aspects of social support function in different ways to affect health service behavior. Quantitative aspects of social support do not play a direct role in influencing health service use; however, their roles can not be ignored because the quantitative social support variables can make a sufficient contribution to affect functional aspects of social support. Functional support, i.e., availability of support, in this study, plays a critical role; the perception that somebody is always there to care for them bolsters the older persons' perception of functional health as well as actual illness levels.

Results also emphasize the necessity of development of health measures in the area of health service behavior in a longitudinal setting. Physical stress
(measured by previous self-rated health and health self-assessment), perception of functional health (measured by number of ADL, perception of their health now, and perception of functional health compared to the last interview) and actual illness level (measured by the number of reported illness problems), help to explain a more dynamic and specific process of health service use behavior than was previously described in the literature, mostly cross-sectional research. Most importantly, however, this study suggests that health behavior research for older individuals can focus on chronic life stress and its dynamic mechanism with social interactional contexts that combine to affect older persons' later physical status.

Summary

This study examined the relationships between life stress, social support and health on health service utilization from old adults, 70 years and older. Data from Longitudinal Study of Aging (LSOA, N=2590) were analyzed by using LISREL.

Based on literature review, seven hypotheses were established and tested. The first hypothesis that predisposing characteristics of respondents influence life stress constructs, was supported. The results from testing Hypothesis 1 demonstrated that certain predisposing characteristics of older persons including education, age, living arrangement and having health insurance were related to vulnerable life stresses.

The second hypothesis, the higher life stress, the more frequent the use of formal medical use was not supported. Financial stress measured by income level
and physical stress measured by previous health status at Time 1 had no significant direct relationship with formal medical use. Although no significant and direct relationship was demonstrated between life stress and formal service use, results from testing Hypothesis 3, 4, and 5 supported a strong indirect effect of life stress on formal medical use through social support and health constructs at Time 2. The decomposition of effect supported this finding (Table 4).

First, as for Hypothesis 3, all the social support variables had significant relationships with financial stress while none of them were significant with physical stress. Therefore, those respondents who had higher financial stress tended to receive more financial support from adult children, interacted more with their family, and lived close to adult children. However, interestingly, those who had higher income, thus, lower financial stress, were more likely to perceive support availability when needed.

It is, however, noted that none of the quantitative aspects of support made a significant impact on health status variables in later years (Hypothesis 5). In this study, the decomposition of effects demonstrated indirect influences of quantitative support on health status at Time 2 through functional social support. Therefore, the significant role of functional social support to health status in 1988 was emphasized in this analysis.

In connection with Hypothesis 6 and Hypothesis 7, findings from the analysis in this study, indicated that although social support was not a significant predictor for the formal medical service (Hypothesis 6), perception of functional ability and
actual illness level were the strongest predictors of formal medical utilization (Hypothesis 7). Also, the decomposition of indirect and direct effects showed that life stress had strong indirect effects rather than direct effects on formal service use through social support and health status at Time 2. The overall process of formal health service behavior can be summarized in that initial life stress was buffered by social support, especially functional support, and consequently influenced health status at Time 2 and formal medical utilization at Time 3.

**Implications**

The results of the present study have several implications for research on formal health care of the elderly. First, the specification of social support should be taken into consideration. Specific dimensions of social support function differently. Not all social support provided by family networks leads to positive health-related outcomes. Different dimensions of social support buffer differentially the effects of life stress measures on health service use behavior. Therefore, using multidimensional characteristics of social support appears to be useful in understanding the complex interrelationships among life stress, social support and health service use for elderly individuals.

In this study, among social support variables, dimensions of quantitative and functional social support were investigated. Recently, little attention has been focused on quantitative aspects of support and there has been doubt about the need for using quantitative support. This present research clearly shows the
function of quantitative support and its influences on functional support. Particularly, the relationships between financial life stress and quantitative measures of support are noteworthy, however, these quantitative dimensions did not function strongly enough to have a buffering effect on health related outcomes.

An important point that should be made concerns research using longitudinal data. In the area of health service use research, previous studies often have employed cross-sectional survey data, thus, it was not possible to determine the direction of hypothesized causal effects among variables. By using LISREL, even reciprocal relationships among variables can be investigated. In this study, this longitudinal design was also helpful to highlight the importance of health need measures by specifying their time ordering causal relationships in the research on health service behavior.

**Limitation of the Study**

In the process of examining the issues raised, it is also important to specify some of the limitations that are inherent in this study. First, selection of variables at appropriate time frames should be taken into account. Because of inconsistent questions being asked in survey interviews overtime, in these data, health status measures were selected from 1988 interviews, four years after data on social support were collected. Perhaps, the time period involved between measures of social support and health status in a later time frame was too long and it was difficult to detect immediate effects of social support on health at a later time and
consequently formal health service use. If social support were tested with shorter
time intervals between interviews, the predictive power of social support to the
outcome measures could be possibly increased.

Second, methodologically the data measured were taken from self-report, thus,
there may be some measurement errors involved in this study. Some older people
might not report data accurately because of a decreasing memory function. To
reduce measurement errors, the use of multiple reporters is increasingly employed
for health service use behavior and illness problems. For example, in relation to
illness level and formal medical use variables, data could be collected not only
from older adults but also from medical professional records, which may be more
accurate. Furthermore, the recall period used in this study was 12 months when
measuring hospital use and physician visits. Shorter periods of time intervals, for
example, six months, would be better to reduce measurement error in obtaining
more reliable recall data from elderly adults.

Third, because elderly people who participated were noninstitutionalized and
interviewed in all three waves, there might be some limitations of sample in
generalizing the findings. One of disadvantages in longitudinal studies is
concerned with attrition of samples. Perhaps, a substantial portion of dropouts are
institutionalized elderly, therefore, those who need help the most because of their
health problems. It is possible to say that the health model would be better
explained if only the dropouts were tested. This inevitable dropout may cause a
problem of generalizability of the findings.
Finally, because this study used secondary analysis of existing data, the selection of variables was limited and it was not possible to get some important variables that may affect the dynamic mechanisms of health service use. For example, health beliefs and attitudes on medical use and previous tendency to use medical service could have been included in the model as significant predictors of formal health service use. Another consideration concerning predictors of formal medical use is related to the service use for the preventive health care purpose. Regular health check-ups without serious health problems could be assessed in measuring frequencies of physician visits and hospital use in this study. A more careful distinction of formal service use, whether it is for preventive health care or for illness problems, should be taken into consideration.

**Future Study**

Future research should, first consider having multiple reporters for the data especially for the health and health service use behavior variables. As described earlier, self-rated data may cause possible measurement error, and in order to decrease measurement error, data from multiple reporters can be gathered for future investigation. For example, in this study, self-recalled frequencies of hospital use and physician visits may not as accurate as health professional reports would be. Future research may include multiple reporters of health professionals for more accurate data.
For improvement of the present investigation, more dynamic and appropriate variables can be added. Future research can include measures of health attitudes and beliefs, previous formal health service use and preventive health care use to examine the process by which these variables influence each other and subsequently formal health service use. Not only formal health services as outcome variables, but health self-care, informal care as outcome variables can be also explored by using the health behavioral model.

Although, this research examined the effects of functional and quantitative measures of social support, employing qualitative dimensions of social support is worthwhile to investigate for future research. However, careful measures of qualitative support should be devised, and specific dimensions of qualitative social support should be tested because dimensions of social support function differentially. In this study, functional social support played a significant role as a mediator of life stress on formal health service use. Future research needs to specify more diverse aspects of functional support and its relationships with quantitative support influencing health service use behavior.

Finally, studies on health service behavior need to employ older persons who are institutionalized. These people tend to experience problematic health symptoms and they might be the ones who need help the most from physicians and hospitals. Research using Andersen’s health behavior model may be the most suitable to these needy people.
APPENDIX A

PEARSON PRODUCT-MOMENT CORRELATION MATRIX
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APPENDIX B

ADDITIONAL FIGURES
Figure B1. A hypothesized model (M1).
Figure B2. A modified hypothesized model (M2).
All predisposing variables are related to all social support variables (20 paths).

Figure B3. A modified hypothesized model 2 (M3).
All predisposing variables are related to all social support variables.
All predisposing variables are related to all health status at Time 2 variables.
All predisposing variables are related to formal medical utilization.

Figure B4. A fully recursive model (M4).
REFERENCES


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Special thanks are expressed to my parents, Ilboo and Jeongsoon Lee, for their unconditional love and prayer, and my husband, Inmok, who combines the brain of Joshua and the charms of Abraham for his constant support and love throughout my entire school life. My two treasures, Joshua and Abraham have been so patient to wait until Mom joins Daddy when Mom no longer stays up at night.
Lastly, I give my sincere thanks to the Lord for his abundant love and strength that he allows me to have. He is always with me and constantly reminds me that I am not alone in this wild world.

“The Lord is my Shepherd. I shall want nothing. He makes me lie down in green pastures. He leads me beside still waters. He restores my soul and guides me in paths of righteousness for his name’s sake. Even though I walk through the valley of the shadow of death, I will fear no evil, for you are with me …” (Psalm 23)