The Effects of Family Support, Expectation of Filial Piety, and Stress on Health Consequences of Older Adults with Diabetes Mellitus

by

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Approved by Margaret Dunbar
Chairperson of Supervisory Committee

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Abstract

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The primary purpose of this study was to test a theoretical model that proposed that the health consequences could be predicted by three key concepts: family support, expectation of filial piety, and stress. The health consequences studied were well-being and glycemic control. The secondary purpose of this study was to explore the meaning of well-being in order to develop a concept of well-being that is culturally specific.

This study used a cross-sectional, correlational design with a causal modeling approach. A convenience sample (N=150) of older Taiwanese with Non-Insulin Dependent Diabetes Mellitus (NIDDM) was used. Subjects completed four instruments indexing the four major theoretical concepts: family support, expectation of filial piety, perceived stress, and well-being. The other major concept, glycemic control, was indexed by biological marker: glycosylated hemoglobin. Multiple regression analysis and a path analysis were used for data analysis. The theoretical model was tested first using the whole sample and then by gender and educational subgroups. The qualitative data were collected in in-depth interviews with 12 subjects who were recruited from the 150 subjects, and stratified on gender and educational level. As predicted, in the path analysis of total sample, family support showed direct effects (B =.50) and indirect effects through perceived stress, on well-being (R^2 = .48) in reduced empirical model. Expectation of filial piety had no relationship with well-

being. Gender had interactional effect on the relationship between family support and glycemic control. In men, the higher family support the better glycemic control. In women, the higher the family support, the worse the glycemic control. Content analysis of the qualitative data revealed that parents adjusted their expectation of filial piety to protect themselves from disappointment with filial care. This adjustment of expectation of filial piety helps explain why expectation of filial pity was not a significant predictor of well-being in the model. In addition, content analysis showed well-being consisted of five attributes: family support, finish all family obligation, sense of dignity, self-reliance, and extra familial support.

Family support predicted well-being and glycemic control of the older adults with NIDDM in this study. This added further evidence of the importance of family support to the health of older adults. The findings suggest that clinical nursing interventions that facilitate family support and the adjustment of expectation of filial piety may improve health consequences of older adults with NIDDM. The effects of gender on the relationship between family support and health consequences require further investigation.

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THE EFFECTS OF FAMILY SUPPORT, EXPECTATION OF FILIAL PIETY, AND STRESS ON HEALTH CONSEQUENCES OF OLDER ADULTS WITH DIABETES MELLITUS

CHAPTER I

INTRODUCTION

Statement of the Problem

The percentage of the aging population has increased rapidly in the last decade in Taiwan (4.3 % in 1981, 7.1 % in 1993 for age 65 and over, Ministry of Internal Affair, 1994). It is estimated that persons age 65 and over will constitute 8.3 % of the older population in the year 2000. Many health problems of older adults are becoming evident and drawing more attention from the health workers and the society.

Individual characteristics and environmental factors both play important roles in adaptation to health and illness (Lazarus & Folkman, 1984). Family support has been identified as an important environmental factor which affects the well-being of the elderly in health and illness (Dimond, 1979, Li, 1993). In a study about the social support network of Taiwanese cancer patients (Linsey, Dodd & Chen, 1985), the authors found that Taiwanese patients, especially the elderly, are much less likely than the American elderly to list individuals who are not family members in their social support network. On the other hand, the scarcity of the formal support systems in Taiwan has resulted in family support becoming even more important for the elderly.

The spouse, family members, and other relatives are perceived to be the predominant and almost sole resources of social support for Taiwanese.

Most Taiwanese parents expect their adult children to be financially and emotionally supportive and responsible for them in later life. Traditional Chinese cultural norms and vigorous national efforts to preserve certain cultural values, has created a system in which not only is filial piety a highly revered social value, but parent care is also a legal responsibility of adult children (Chuang & Yang, 1991, Huang, 1980). Filial piety is a central theme of parent-children relationships in the Taiwanese family. Therefore, the effects of the expectation of filial piety on the subjective well-being of the elderly is an important aspect requiring further research.

In modern society, most acute or infectious diseases have been well controlled. Chronic illness becomes a leading cause of elderly disability and mortality. Diabetes mellitus, especially Non-Insulin Dependent Diabetes Mellitus (NIDDM or type II diabetes), has been a major chronic illness in older persons. It is the fifth leading cause of death in Taiwan (Department of Health, Republic of China, 1990). The prevalence rate of diabetes had been steadily increasing since 1970. One survey shows the prevalence rates in 1970, 1979, and 1986 were 5.05%, 7.1%, and 8.17 % respectively (Tai et al., 1987_a). In the older population, the increasing mortality from diabetes is particularly significant. It was found that the morbidity rate was higher in females than in males, and higher in urban dwellers than in rural dwellers (Lin & Lee, 1992). In the order of ages 50-59, 60-69, >70, the prevalence rate of diabetes in urban dwellers was 7.42%, 10.89%, and 12.57% (Tai et al., 1987_b). Diabetes mellitus tends to cause multiple physical complications, and to change the individual's psychological, social and economic condition. In trying to cope with these hardships, the elderly may encounter disadvantages, such as: multiple chronic diagnoses, complex treatment regimen, limited

reserve function of organs, lack of social support, and a less effective coping style (Dimond & Jones, 1983; Hesse & Campion, 1983; Hesse, Campion, & Karamouz, 1984). In daily life, older persons also encounter various daily hassles which may cause stress and further tax their resources and well-being. Empirical evidence has shown that stress is a critical factor which influences physical and psychological well-being in diabetic patients (Konen, Summerson, & Dignan, 1993; Goetsch, Wiebe, Veltum, & Dorsten, 1990).

To date, the limited physiological functions resulting from aging or disease are generally considered nonmodifiable factors. The primary concerns of older patients with chronic illness, their families and health care providers are to achieve good health consequances. Health consequences in patients with diabetes primarily include psychosocial well-being, as indicated by subjective evaluation of quality of life, and glycemic control, evidenced by blood sugar control and complication prevention. If the positive effects of family support on well-being, the negative effects of expectation of filial piety on psychological well-being, as well as the negative effects of stress on well-being of older adults with NIDDM are validated, then therapeutic measures can focus on strengthening the patient's family support and modifying subjective perceptions of the stressful experiences or expectation of filial piety can be developed, tested, and implemented.

Purpose of the Study

The purpose of this study is (a) to validate the predicted relationships among the variables which are proposed in the causal model and to identify the predictors of well-being of older adults with NIDDM, and (b) to examine the subjective concept of well-being on older adults with NIDDM. Expectation of filial piety (parent's expectation of

filial responsibility), perceived family support, and the perception of daily life stress are the independent variables. Psychological well-being and glycemic control of older adults are the dependent variables. It is hypothesized that perceived family support, perception of stress, and expectation of filial piety are significant predictors of well-being of older adults with NIDDM. The research question for the second purpose is "How do the older adults with NIDDM define wellbeing?"

Significance of the Study

A study which hypothesizes the relationship of expectation of filial piety and family support on stress and patients' well-being is valuable in the following aspects. First, it enriches knowledge about the effects of the individual's personal characteristics and family support on the adaptation of older adults with chronic illness. The empirical data to verify the influence of family support and expectation of filial piety of the elderly on their well-being is especially important for nurses supporting the development of interventions to help the elderly or motivate families to provide adequate support. Second, it validates the theory of social support, and the theory of stress-adaptation, with a salutogenic approach in a non-western sociocultural context. Few related studies have been done in the Taiwanese aging population. The family system, care of the elderly, and value orientation in Chinese culture is quite different from that found in western society. Before these theories, which are deeply rooted in western philosophy, can be applied to a different sociocultural context, the work of validation is essential. Third, this study acquires knowledge about the nature and quality of perceived family support of the older person. This knowledge may serve as a basis for the health care professional to enhance patients' support or their perception of being supported. Fourth, it acquires the knowledge about expectation of filial piety of older adults and its effects on their adaptation in a drastically changing society. Lastly,

it generates knowledge about the health care of older adults in Taiwan and to culturally sensitize the health care professional.

Summary

This chapter introduces the problems that motivate the conduct of this study Further knowledge on the effects of family support , expectation of filial piety, and stress on well-being; and the understanding of the meaning of well-being can assist health professionals in their service for and research of older adults with NIDDM. The next chapter addresses the theoretical model and literature review of this study.

CHAPTER 2

THEORETICAL FRAMEWORK

Chapter 2 includes four major parts. The first part presents the theoretical framework upon which this study is based. The derivation of this theoretical framework is also addressed. The second part describes five key concepts in the theoretical model: well-being , glycemic control, stress, family support, and expectation of filial piety. The third part is a review of previous studies of non-specific populations that test the relationships between the five variables to provide evidence for establishing the link in the theoretical model. The chapter concludes with a critical review of 11 studies that focus on the specific population of adults with diabetes mellitus to test the social support theory .

Theoretical Model

The theoretical model is represented by a causal model consisting of three stages showing the relationships among the five concepts (Figure 2.1). The stages and arrows present the causal sequence and the direction of effects between the concepts. The positive sign denotes that the predicted concept would change in the same direction as the predicting concept in previous stage changes. A negative sign denotes that the predicted concept would change in the opposite direction as the predicting concept changes. It is proposed that the psychological well-being of Stage 3 is predicted by the perceived stress of Stage 2, also predicted by the expectation of filial piety and the family support of Stage 1. The glycemic control of Stage 3 is predicted by the perceived stress of Stage 2 and the family support of Stage 1. The perceived stress of Stage 2 is predicted by the family support of Stage 1.

Research Questions and Hypothesis

The research questions that were investigated by this study were the following:

1) Does family support affect stress in older Taiwanese adults with NIDDM ?

2) Does stress affect psychological well-being and glycemic control in older Taiwanese adults with NIDDM ?

3) Does family support affect glycemic control, and psychological well-being in older Taiwanese adults with NIDDM ?

4) Does expectation of filial piety affect psychological well-being in older Taiwanese adults with NIDDM ?

5) What is the subjective meaning of well-being for older Taiwanese adults with NIDDM?

The fifth question was answered with descriptive, qualitative data, no hypotheses were formulated. According to the first four research questions, the following statements were hypothesized:

1) Family support has an inverse effect on stress in older persons with NIDDM.

2) Family support affects psychological well-being positively in older adults with NIDDM.

3) Family support affects glycemic control positively in older adults with NIDDM.

4) Expectation of filial piety affects psychological well-being negatively in older adults with NIDDM.

5) Stress affects psychological well-being negatively in older adults with NIDDM.

6) The stress affects the glycemic control negatively in older adults with NIDDM.

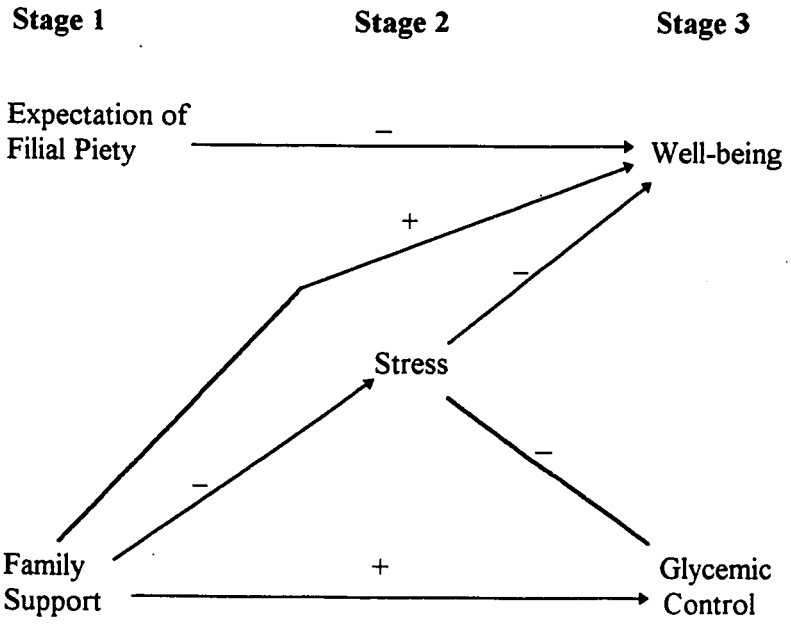


Figure 2.1. Theoretical Model of Predictors of Health Consequences in Older Adults with NIDDM

Description of the Theoretical Framework

The adaptation theory proposed by Dubos (1965, 1978) provided the primary theoretical foundation for the theoretical framework of this study. Human beings live in a constantly changing world. Although change is an inevitable part of normal life, some unexpected or dramatic change may act as an irritating stimulus to individuals. These irritating stimuli could threaten the balance of the internal biological milieu and the balance with the external environment of individuals. These threats are referred to as stress by other researchers (Cohen, Kamarck, & Mermelstein, 1983). To survive or live a better life, individuals are required to respond to change creatively (Dubos, 1978). The process of creative responses, consisting of adjustment of self and /or modification of the environment which leads the individual to a state of person-environment fit, is called adaptation. Adaptability is a human trait that allows individuals to adapt to unforseeable threats. In other words, individuals respond creatively and simultaneously in biological, psychological, and social aspects to achieve health and a state of well-being. The traditional concept of health, defines health as the absence of disease, is insufficient to embrace the concept of adaptation, especially when a person with chronic disease is considered (Pollock, 1986). In such cases, health consequences are the outcome of adaptation composed of a combination of physiological equilibrium, social acceptance, psychological integrity , and happiness (Dubos, 1978). Health is a state that involves the integration of body, mind, and environment.

Health may be promoted through personal modification of cognition, attitude, and behaviors. Based on this proposition, the link between health consequences and perceived stress and the expectation of filial piety is derived. It is hypothesized that the

level of stress and the individuals' interaction with the environment can be modified via change of individual's perception or expectation. Health consequences may also be enhanced through manipulation of the external environment. This proposition is the basis from which the link between family support and health consequences is derived.

Description of the Major Concepts in the Model

The concepts that are important in the current study, well-being, glycemic control, stress, family support, and expectation of filial piety, are described in this section. In the theoretical model, glycemic control and psychological well-being are referred to as dependent variables. Stress, family support, and the expectation of filial piety are referred to as independent variables. Then, the changing environment of family caregiving for older adults in Taiwan is addressed to provide a sociocultural context for this study.

Concept of Well-Being

In this section, the conceptualization of well-being for this study will be discussed and followed with a review of literature on the subjective meaning of psychological well-being.

Conceptualization of Well-being

In health care situations, the goal of the elderly care is to achieve an optimal state of well-being. Although hundreds of studies have been done in the name of well-being, few have clearly provided a definition of well-being. Some researchers designated well-being as a solely subjective perception of quality of life (QOL). Lawton, Moss and Glicksman (1990) maintained that subjective perspective of life is a necessary component of QOL. "Only the person can provide the last word on concepts like satisfaction, enjoyment, or pain" (p.26).

Campbell, Converse, and Rodgers (1976) defined QOL as the degree of satisfaction with present life circumstances. They postulated that a discrepancy between aspirations and real experiences determines this level of satisfaction. They emphasized that QOL should be a subjective perception. QOL was defined as a multidomain cognitive assessment of how much one was satisfied with his/her own life experience. The level of satisfaction was determined by the evaluation an individual makes against his/her own frame of reference. Therefore, QOL could not be objectively measured, even though many objective indicators may have heavy influence on the individual's judgment of his QOL. For these authors, QOL was conceptualized as a multidomain concept of subjective satisfaction with one's own life, and was determined by the difference between one's aspiration and performance (or experience).

What are the attributes of well-being? Is there necessity to make well-being a construct which consists of an individual's health indicators, social indicators and subjective perception of living experiences? Can we integrate these indicators into a composite which represent the construct of well-being? If yes, how should each indicator be weighted? Is it best to use "satisfaction" to measure the subjective perception of a person's own quality of life? Do we need to find other indicators, rather than using "level of satisfaction" to measure QOL? It is evident no agreement has been obtained.

Different perspectives of well-being has been proposed in an attempt to answer the above mentioned questions. Other researchers have defined well-being as a two dimensional concept: objective well-being and subjective well-being. Alexander and Willems (1981) emphasize well-being as the reciprocal relationship between persons and their environments. They contend that minimum requirements for measuring well-being should include objective measures of actual functioning along generic

dimensions. In other words, the level of physical and psychological function should be measured while subjective perception was assessed. Some social scientists have used objective social indicators such as education, material goods, income, living conditions, or level of social support as part of a measure of well-being. Furthermore, physiological markers such as the level of blood glucose has been adopted as an objective indicator by other researchers (Lundman, Asplund and Norberg, 1990). Including objective indicators confounds the definition of well-being with indicators of health and socioeconomic status.

In this study, well-being is defined as psychological well-being based upon the older persons' own evaluation of their present or past life, their satisfaction, or their happiness (Neugarten, Havighurst, & Tobin, 1961). The assumption is that people themselves are the best judges of their subjective well-being. The value judgment of the investigator can be minimized.

Perception of Well-Being in the Older Adults

It is important to build knowledge on how older adults perceive their well-being subjectively for future development of pertinent research and better health care. In order to identify the attributes of the concept of psychological well-being (life satisfaction) and compare them cross-culturally, Thomas & Chambers (1989) conducted a phenomenological study of life satisfaction with a group of older British men and a group of older Indian men. Researchers found that the content and value the subjects were concerned with in their lives were different. The main themes with which English men were concerned were the fear of incapacitation, of becoming useless and dependent, dissatisfaction with present life, loss of a significant other, concern for health, and the importance of family. The authors indicated that these themes seemed not to show much joy of life and the tone was somewhat somber.

Nonetheless, subjects claimed no less satisfaction than their Indian counterparts did. The authors termed these English men's response "stoic acceptance". In contrast to English men, Indian men were satisfied with the duty they had done to society and family. They felt at peace. They were not as threatened by the possibility of incapacitation or declining power. Three themes that emerged from their interviews were: the importance of family, the salience of religious belief, and their satisfaction with the present life situation. It is evident that elderly men of Britain and India live in different psychological and social worlds with different values and concerns. Using Life Satisfaction Index A (LSIA, Neugarten, et al., 1961) to measure the level of their life satisfaction, however, revealed that the total mean scores of LSIA of English and Indian men were very close.

What does well-being mean to the Chinese elderly? A Chinese ancient classic, "The Book of History" states that there are five blessings in old age consisting of longevity, wealth, health, virtue, and a peaceful death (Tsai, 1991). It is asserted that if people have these five blessings, they must be satisfied and happy about their life. In ancient times, life was threatened often by disease, wild animals, and natural disasters. Nature was perceived as an unconquerable power against which it was no use to fight (Lin, 1982). Aging and death were considered as part of nature. A long life was considered special blessing from God. Furthermore, moral cultivation was highly valued in old age. Confucius stated "growing old with no virtue is equated to a thief". He also depicted the picture of moral development, " at 50, I know the will of heaven, at 60, I was ready to listen to it, at 70, I could follow my heart's desire without transgressing what was right" (cited in Sher, 1984, p.9).

In a study of meaning of health, Y.L.D. Chen (1991) discovered that health, happiness and self-reliance were considered major attributes of health in a group of

foreign-born Chinese-Americans. Chronic disease was not considered to be a negative indicator of health in these subjects. They believed that as long as the present disease did not hamper a person's ability to take care of himself/herself and the individual was living a satisfactory life, he/she was healthy. In addition, harmonious family life was a major source of happiness for older Chinese people. The meaning of health revealed in Chen's study (1991) was very similar to the findings of subjective perception of life satisfaction in Thomas and Chambers' study (1989). It is unclear whether a difference really existed between the concept of health and well-being in the older person's perspective. Other literature maintains that the joy of having children with filial piety and the joy of playing with grandchildren are the most desirable experiences for most older Chinese people (Yang ,1991). As a whole, health, self-reliance, family, and satisfaction with present life seems to be generally valued by the older adults even though some differences exist cross culturally.

In summary, researchers are still far from reaching a consensus about the definition of well-being. Cultural differences are found in the perception of psychological well-being. In the current study, life satisfaction was designated as the indicator of psychological well-being.

Glycemic Control

This section introduces the chronic disease Non-Insulin Dependent Diabetes Mellitus (NIDDM) to provide background information for the studied sample and the variable of glycemic control. Glycemic control and its indicator glycosylated hemoglobin (HbA1c) are then discussed.

Non-Insulin Dependent Diabetes Mellitus

NIDDM is the result of insulin resistance and/or insulin deficiency which causes disruption of the balance between beta-cells of the pancreas and their target tissue. The

diagnostic criterion of NIDDM is a level of plasma glucose elevated to ≥ 140 mg/dl in fasting or ≥ 200 mg/dl with any measurement of plasma glucose. Either insulin deficiency or insulin resistance can be primary and is sufficient to cause NIDDM (DeFronzo, Bonadnna, & Ferrannini, 1992). Studies showed most patients with NIDDM had an increased resistance in the body's response to insulin first, followed by an increase of pancreatic insulin secretion to counteract the insulin resistance. Plasma glucose was able to maintain a normal level as long as the increased insulin level and insulin resistance remained balanced. With time, the beta-cell failed to keep a high enough secretion, glucose tolerance was impaired and diabetes mellitus appeared (DeFronzo, Bonadonna, & Ferrannini, 1992).

NIDDM seems to be a metabolically more stable disease than Insulin-Dependent Diabetes Mellitus (IDDM). Patients with IDDM used to draw more attention from health professionals because they tend to have less stable blood sugar and more complications. Therefore, research on diabetes control had been almost exclusively focused on patients with IDDM prior to the 1980's. However, evidence indicated a high percentage of patients with NIDDM remained hyperglycemic even with treatment. A population-based survey in Wisconsin reported the mean HbA1c was 10.2% in patients on diet control or oral hypoglycemic drugs and was 11.8% in those on insulin (Klein, Klein, Moss, Davis, & DeMets, 1988). Research that explored the predicting factors of glycemic control in patients with NIDDM has increased in past decade. Further research is needed, however.

Concept of Glycemic Control

Research suggests that poorly controlled NIDDM could result in an increase of a variety of symptoms and complications (Rouff, 1993). Short-term complications such as hyperosmolar hyperglycemic non-ketotic syndrome (HHNK), infection, and

hypoglycemia could place the patient's survival at risk. Long-term complications consisting of macrovascular complication (coronary artery disease, claudication, and stroke) and microvascular complications (retinopathy, neorupathy, and nephropathy) are the major causes of death in the older population (Rouff, 1993, Klein, et al., 1988). It is suggested that patients with NIDDM should control their level of blood sugar to as normal as possible to prevent complications (American Diabetes Association, 1994). Good control of blood sugar is a major goal of patients, families and health care providers. Major treatment of NIDDM consists of life style changes such as diet control and exercise; promotion of self care ability such as foot care and blood sugar monitoring; as well as medications such as oral hypoglycemic agent and/or insulin. Glycemic control refers to the outcome of these treatments, which is indicated by the level of blood sugar. Clinically, the level of blood sugar (or glycemic level) is measured in terms of one or more of the following: fasting blood glucose, two-hour postprandial blood glucose, and glycosylated hemoglobin (American Diabetes Association, 1994). The measures of fasting blood glucose and postprandial blood glucose represent the short-term state of blood glucose. They are used as a referential indicator for clinical treatment and are easily manipulated by the patients through adjustments of dietary or medication intake. The glycosylated hemoglobin is a long-term indicator that is less likely to be manipulated by patients and often used in research to indicate the outcome of glycemic control (Scientific Communication, 1993). In the current study, glycemic control is defined as the level of glycemic control that can be objectively measured by the percentage of glycosylated hemoglobin (HbA1c).

HbA1c is a product of the glycosylation process which forms a ketoamine linkage between HbA and blood glucose. Hemoglobin A (HbA) composes 90% of the hemoglobin of adults. Since the ketoamine linkage is quite stable, HbA1c exists in the

red blood cell through its 120-day life span (Gabbay, Hasty, Breslow, Ellison, Bunn, & Gallop, 1976). A study that examined diabetic patients with discontinuation of oral hypoglycemic agents for 8 weeks (Boden, Master, Gordon, Shuman, & Owen, 1980) found that the level of HbA1c rose rapidly in one week, reached a plateau in 3 weeks and slowly fell back to prestudy level after 8 weeks of reinstitution of therapy. HbA1c reflects the average level of blood glucose for the past 4 to 12 weeks and is useful in monitoring diabetic patients during periods of stable and rapidly deteriorating control. Because it is not reflected immediately when the plasma glucose is dropping, it is not a good indicator to detect the rapid improvement of glycemic control. In summary, HbA1c is a retrospective , objective index of glycemic control for both IDDM and NIDDM patients but cannot be used as the sole reference to make a treatment plan . The normal range of HbA1c is 4 to 6%. Patients that have an HbA1c level of less than 6% are identified as having excellent control, 6 to 8% are in good control, 8 to 10% are fairly controlled, higher than 10% are in poor control (Lin, 1992).

Concept of Stress

Stress has been a topic of much interest in many disciplines as well as in the general public in this century. However, it is a vague concept for most people. Chrousos and Gold (1992) claimed that the concept of stress has evolved over the past two thousand years. The concept of stress originated in the physical sciences in which stress is defined as "the ratio of the internal force to the area over which the force acted" (Lazarus & Folkman, 1984, p.2). The term "stress" was first borrowed by Hans Selye (1956) from physics and set to mean a series of tissue responses to noxious stimuli. Since then, it has drawn much attention and effort from scientists. Researchers have worked painstakingly to find real meaning, the source, and the effects of stress. The concept of stress has undergone continuous modification. Previous literature has

provided a variety of definitions of stress. These can be classified into three main categories: stimulus definition, response definition, and relational definition (Lazarus & Folkman, 1984).

Stimulus Definition

Stimulus definition mainly refers to noxious agents or major life events in the environment such as trauma, marriage, divorce, loss of a loved one, unemployment, natural disasters etc. It is assumed that certain conditions are universally stressful. Based on this definition, researchers have developed various measurements to assess global or specific stress. For example, a special scale has been developed to measure unemployment stress (Gore, 1978), and the Social Readjustment Rating Scale (SRRS, Holmes & Rahe, 1967) may be used to measure general stress. Measurements derived from this definition have some advantages. First, the events may be objectively counted which may reduce the measurement errors caused by subjective biases in the perceptions and reporting of events. Second, data collection on stress may become simpler (Kasl, 1987). The subjects are only required to report whether certain events occurred in the past six or twelve months. In some cases, some events are obvious and there is no need to ask. For example, unemployed workers who has just been laid-off by a company can be supposed to experience the stress of unemployment. The pitfall of stimulus definition is that individual differences and factors of person-environment interactions are not taken into consideration in defining stress. For example, the divorce event may be noxious stimuli (stress) to most people but may be a relief to a long abused spouse. For this spouse it may be inappropriate to count divorce as a major stress. Furthermore, the most heavily weighted items on all life events listed involve loss of social ties due to the loss of a job, divorce or death . The loss of social ties also cause a decrease of social support (Schaefer, Coyne & Lazarus, 1981). Thus,

the measurement of stress could be confounded with the measurement of social support.

Response Definition

Response definition originated from Hans Selye's work. Stress is defined as a universal reaction of a living organism to environmental demands or noxious agents. It is a state within an organism that results from the interaction of the organism with demands. Selye (1956) depicted stress as General Adaptation Syndrome which consisted of gastric erosion, adrenocortical hyperplasia, and structural changes in some organs. Stimuli that cause these nonspecific reactions are referred to as stressors. This definition is often adopted by researchers in biological and medical science. In a review paper, Chrousos and Gold (1992) defined stress as "a state of disharmony, or threatened homeostasis" (P.1245). It is assumed living organisms are continuously facing challenges from intrinsic or extrinsic stressors that can disturb the state of homeostasis and be a threat to their survival. The efforts that living organisms make when reacting physically and mentally to counteract the effects of stressors and reestablish homeostasis are referred to as adaptive responses. Consequently, the meaning of stress and adaptive response are not clearly differentiated. In addition, it is hard to ensure whether a physiological response is induced by a stressor. For example, a stressful encounter may speed the heart rate. But, increased heart beat can not always be attributed to a stressor.

Relational Definition

Stress is defined as "a particular relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being" (Lazarus & Folkman, 1984, p.19). In the relational definition stress is conceived as a cognitive perception and a product of

person-environment encounter. Stress exists only when people perceive a stimulus or have an encounter that will tax or exceed their resources or ability to cope. Evidently, this definition is limited to living experiences which induce a process of cognitive appraisal.

The theoretical basis of relational definition of stress is the multicausal theory of illness which has dominated health science since the 20th century. Diverting from the previous single cause theory of illness, multicausal theory contends that an illness occurs only after a pathogen impinges upon a susceptible organism. Living organisms actively interact with their environment. The susceptibility of the living organism could be affected by a variety of factors of the environment. Not only could the environment affect their behavior and their internal biological state, the environment is changed by the living organisms via their direct actions or via changing their perception of the environment (Dubos, 1965). These interactions play an important role in the health and illness of living organisms. The person-environment interaction concept is therefore introduced to the concept of stress to clarify the definition of stress. According to the relational definition, the process of stress consists of four components, stimuli (stressor), cognitive appraisal (stress), mediators (coping, social support), and response (manifestation of stress) (Lazarus & Folkman, 1984).

Research of stress has consistently shown that stress is predictive to illness but the predicting power of stress is modest (Dorian & Garfinkel, 1987). Researchers have noticed that stress alone is not always sufficient to cause illness. To develop a stress-related illness, other factors such as the vulnerability of the host or inadequate coping strategies must play a role in the pathogenic process. People may perceive the same kind of event guite differently. The cognitive function comes into play in assessing whether the event is a threat, whether they have enough resources to deal with the

problem, and how they could act on the problem. Therefore, cognitive appraisal and the coping response heavily influence the final consequences of a stressful encounter (Pearlin & Schooler, 1978; Pearlin, Menaghan, Lieberman, & Mullan, 1981).

Based on this relational definition, some measurements of sociopsychological stress have been developed. Some researchers have modified the Social Readjustment Rating Scale to include the subject's assessment of the events as positive or negative events. Others have developed scales such as the Global Measure of Perceived Stress (Cohen, et al., 1983), the Daily Hassle Scale (Kanner, et al., 1981), and the Survey of Recent Life Experiences (Kohn & Macdonald, 1992). It is reported that the stress-health outcome relationships are stronger when using these scales to measure stress. However, critics have reported that some items in Daily Hassle Scales are confounded with items of health consequences of stress . For example, "smoking too much" and "use of alcohol" could be a manifestation of stress rather then hassles of daily life.

Some researchers have integrated a relational definition into biophysiological research on animals and human subjects (Konarska, Stewart, McCarty, 1990, Jacobs, Mason, Kosten, Wahby, Kasl, & Ostfeld, 1986, Mason, Giller, Kosten, Harkness, 1988, Schedlowski, et al., 1993). Studies suggested that two hormonal systems, the hypothalamic pituitary adrenal system (HPA) and the sympathetic adrenal medullary system, usually respond together in acute stress reactions. Urinary catecholamine output and urinary or plasma cortisol are usually used as biological markers of stress by these researchers. Schedlowski et al. (1993) studied 45 first time parachutists ranging in age from 19 to 39 years using a pre-post quasi-experimental design to compare the plasma stress hormone before and after jump. Plasma levels of cortisol and catecholamine were analyzed in samples of 10-minute intervals from 120 minutes before to 60 minutes after jump with a sample during the jump. Subjective fear was

also measured at every 10-minute intervals using graphic rating scales (indicator of psychological stress). Number and activity of natural killer cells were measured 2 hours before the jump, immediately after, and 1 hour after the jump to determine the immunological function of white blood cells. Findings showed that subjective fear, level of epinephrine, norepinephrine, number and activitity of killer cells all increased gradually reaching their peak during the jump. All indicators except killer cells dropped back to baseline value within 30 minutes after jump. Number and activity of killer cells dropped to a level significantly lower than baseline values. This study focused on acute stress that was uncommon to ordinary people. The application to the relationship between stress and health could be more indirect. Jacobs et al. (1986) studied 39 recently bereaved subjects who had lost their spouse in past two months, and 20 subjects whose spouses were hospitalized and dying (non-bereaved). Two months after the death or final hospitalization of a spouse, the subject was interviewed and psychological distress was measured using a self-developed scale that focused on grief. Twenty-four hour urinary catecholamine output was assessed on three successive days after the interview. The findings showed that subjects in both groups had levels of catecholamine more than twice that of unstressed people. However, no difference was found between the goups of bereaved and non-bereaved subjects. No relationship was found between the score of stress and catecholamine. However, a measure of psychological stress focused only on grief may not be a good indicator of life stress. In this study, the hypothesis that the level of reaction of stress hormone would be associated with the level of psychological stress was not confirmed. After reviewing a series of studies of stress responses, Henry (1992) proposed a plausible explanation to connect the psychological stress and its physiological responses. He contended that living organisms responded with different patterns of neuroendocrine activation when

they perceived a stressor differently. In a challenging or stressful encounter, if people perceived the condition was under their control, the sympatho-medullary system would be activated and release more norepinephrine. Hence, norepinephrine may be called the fight hormone. As long as they felt in control, the hypothalamic pituitary adrenocortical (HPA) system was not aroused and the corticotropine releasing hormone stayed at a low level. If people perceived they were threatened or about ot lose control, an increased production of epinephrine was elicited. If the uncontrolled situation continued, the HPA system would be aroused and the corticotrophin releasing hormone level would rise. Prolonged arousal of the HPA system might lead to a certain pathophysiological disease state (Henry, 1992). In fact, the relationships between central neurotransmitter systems and hormonal systems are still poorly understood. Further studies are needed to validate the propositions which relate stress and pathophysiological responses.

In summary, the literature contains three distinct ways of defining stress: stimulus definition, response definition, and relational definition. In this study, I have adopted the relational definition of stress. Stress is considered as a cognitive perception of threat to the individual that arises when individuals perceive an encounter to be taxing or beyond their resources or ability to cope. Furthermore, perceived stress is operationalized as the extent of an individual's exposure to daily hassles (Kohn & Macdonald, 1992). The level of stress is determined by the severity of disturbance from daily hassles.

Concept of Family Support

Family is the major provider of social support for older adults (Linsey, et al., 1985). Family support is a kind of social support. This section introduces the concepts of social support first followed by a description of characteristics of support from

family. Social support has been a concept of interest to a wide variety of researchers including anthropologists, nurses, physicians, psychologists, and sociologists. The focus of their research varies widely. The unit of analysis may be the individual, the family, the community, or the entire society. Furthermmore, social support has been defined in a variety of ways and we are far from reaching a common definition. It is neither possible nor practical to develop one measure of social support that would meet all needs of every researchers. Three categories of definition of social support are found in the literature: social network, perceived social support and received social support (Antonucci, 1990, Hermalin, Chang, Lin, Lee, & Ofstedal, 1993; Thoits, 1982). Following is the discussion of these three ways of defining social support.

Social networks are usually defined in terms of structural properties such as size, density, stability, connectedness, homogeneity and durability (Antonucci, 1985; Cohen, 1988). These structural properties have been used as indicators of social support in many studies (Berkman & Syme, 1979, Dimond, Lund, & Caserta, 1987).

Perceived social support is defined as the perception of the individual of the amount and quality of support received from his/her social network (Kahn and Antonucci, 1980). Measurement of perceived stress focuses on interpersonal transactions within the social network (Dimond ,1985). Support is based upon the supportive attributes derived from social relationships that are embedded in the social network (Antonucci, 1985). Some researchers have identified the attributes of supportive interpersonal transactions as aid, affect, or affirmation (Kahn and Antonucci, 1980). Drawing on Weiss' (1974) work, Wienert and Brandt (1987) described social support as a concept with five dimensions: (a) provision for attachment/intimacy, (b) social integration, (c) opportunity for nurturing behavior, (d) reassurance of worth as an individual and in achievement, and (e) the availability of

informational, emotional, and material help. They also assume that reciprocity is an important element of social support because they believed that only receiving and being unable to reciprocate will hamper the perception of support. Others have argued that the elderly are not able to maintain reciprocal relationships due to decreasing personal resources. Furthermore, cross-cultural differences pertaining to reciprocity in various social relationships must be considered. Rules of exchange in the family differ in different societies. For example, the American endorses a linear model, where older people always give to younger people, while Japanese and Chinese endorse the curvilinear model, within which both young and old receive from the middle aged (Antonucci, 1990). Measures of perceived social support which are adapted to particular social norms may assess the sources, quantity, or quality of specific designated dimensions.

Received social support is measured through objective quantification of the help and aid people receive from their social network (Hermalin, et al., 1993). Although the perceived social support has stronger predicting power for the effects of social support on coping or adaptation than the measure of received social support does (Antonucci, 1985), the measure of received social support provides good information for assessment of policy implications or service provision (Hermalin, et al., 1993).

Individuals receive their social support either from members of their family or the individuals outside of their family. Put in other words, social ties can be classified into either familial or extra familial relationships. Potential difference between intrafamilial support and extrafamilial support is a topic worth exploring. Little literature ia available which deliberately differentiates the role of family support from extrafamilal support in individual's life (Lyon, Perrotta, Hander-Kvam, 1988; Procidano & Heller, 1983).

The family is a basic unit of society. Family members comprise a primary social group. Family researchers refer to the family as a system which provides not only an environment for socialization and a source of stress, but also a system capable of giving tremendous support to its family members (Casey, 1989). Most people acquire their major portion of the social support from their family, especially in the aspects of material/financial aid and care of activities of daily living (Berkman & Syme, 1979, Ofstedel, Hermalin, & Chang, 1993). Caplan (1982) maintains that professionals should learn to appreciate the salutogenic potential of natural interpersonal support and find ways to foster and promote those relationships which provide support. He conceptualizes family as a support system which is defined as "continuing social aggregates (namely, continuing interactions with another individual, a network, a group, or an organization) that provide individuals with opportunities for feedback about themselves and for validation of expectations about others, which may offset deficiencies in these communications within the larger community context" (Caplan, 1982, p.200). Family plays its supportive roles for the individual as (a) a collector and disseminator of information about the world, (b) a feedback guidance system, (c) a source of ideology, (d) a guide and mediator in problem solving, (e) a source of practical service and concrete aid, (f) a haven for rest and recuperation, (g) a reference and control group, (h) a source and validation of identity, and (i) a contributor to emotional mastery. Most of these functions depend on adequate family integrity and a significant level of intactness, stability, and integration in family (Caplan, 1982). It seems appropriate to say that the following four functions are more likely to be provided by the family system than the individuals through extrafamilial relationships: (a) to provide material and financial aids, (b) to provide care of activities of daily living,

(c) to function as a source of validation of identity , and (d) to offer a place for rest and recuperation.

In summary, family support is a multidimensional concept. The family network is the source from which family support is derived. Family size, family type, living arrangement of the family, and frequency of family contact are the characteristics of the family network. Referring to the perspective of the family system and the perspective of social network, family support is composed of the following attributes: emotional support, physical and psychological recuperation, monetary and tangible aids, informational exchange, affirmation and integration. In the family, reciprocity is oriented to long-term exchanges. It is different from reciprocity in most other social relationships which are more focused on short-term exchanges. Intergenerational reciprocity is built on long term rather than short term relationships. In the current study, family support is defined as perceived family support that is an individual's evaluation of his/her extended family from the perspective of from whom and to what extent he/she receives emotional support, tangible aid, or informational support from family members. The members of the extended family will be defined in terms of the respondent's definition of who is a member of his/her family.

Filial Piety

The first part of this section introduces the traditional concepts of filial piety in Chinese culture to provide a sociocultural background for the concept of the expectation of filial piety. Then, the concept of the expectation of filial piety is discussed.

Concept of Filial Piety in Chinese Culture

Filial piety is a central theme in the parent-child relationship in the Chinese family as it is in other east Asian societies. Filial piety is considered to be the primier

virtue of all virtues, and its influence in Chinese society is pervasive across all aspects of interpersonal relationships. In traditional Chinese culture, filial piety originated from Confucian teaching. The Book of Rites and the Book of Filial Piety (Confucius, 1982) are the two earliest books and the fundamental literature for the concept of filial piety in Chinese culture. The three important elements for filial piety in the Book of Rites are: respecting and loving parents, bringing no dishonor to parents, and taking good care of parents (Sung, 1990). The concept of filial piety also dominated Confucius' theory of five cardinal interpersonal relationships: sovereign-subject, father-son, older brother-younger, husband-wife, and friend-friend. The father-son relationship is mostly filial piety. A contemporary Chinese philosopher Yutang Lin (1982) has postulated the reason for the special emphasis on filial piety in Chinese culture. He claims that parental love is an inborn, and natural affection. Therefore, there is no need for special emphasis. However, filial piety may not happen automatically. The affection for parents and grandparents (or ancestors) is "something that stands more in need of being taught by culture" (Lin, 1982, p.94). Some changes have been made on the Confucius concept of filial piety through the long progress of Chinese history. The demands of filial piety on children became rigid, absolute, and sometimes inhuman behavioral regulations during the East Han Dynasty (A.D. 25-A.D. 221, Huang, 1980). Obedience and loyalty were emphasized in these formalized rules, which remained in force untill the fairly recent past.

Even though filial piety is an important concept related to parent care and socio-psychological research, researchers did not pay much attention to the conceptualization and measurement of filial piety until recently. Analyzing the 817 stories of the winners of filial piety prize in Korea, Sung(1990) described the most salient dimensions underlying filial piety as respect, responsibility, family harmony and

sacrifice. In developing a measurement of filial piety, K. S. Yang, Yeh, and Huang (1988) defined filial piety as a parent-oriented attitudinal-behavioral complex that is composed of four levels: cognitive, affective, intentional, and behavioral. The filial piety of children can be measured in terms of their filial beliefs, filial affects, filial intentions, and filial behavior. They described the content of filial piety with 15 dimensions which are: respect the parents, obey the parents, serve the parents, give advice to the parents, care for the parents when they are old, love self for parents' sake, make parents happy, honor the parents, fulfill parents expectation of your career, don't increase parent's worry, accompany the parents, procreate offspring, properly bury and worship parents after they die. A further factor analysis synthesized these 15 dimensions into four subconcepts: (a) respect the parents, (b) give obedience to parents, (c) take care of parents, (d) protect and glorify parents.

A literature review has been done comparing and contrasting the concept of filial piety between Chinese and Anglo-American culture (Dai, 1994). It reveals that both similarities and differences exist. The content of filial piety in both cultures included respect for parents, care for parents, honor for parents, and take responsibility for parents. Filial piety in Chinese culture expected more financial assistance, submission, self-sacrifice of children to their parents, however. The practice of filial piety was enforced and strengthened by the legal responsibility of taking care of old parents. The major difference in practicing filial care derived from the individualism of American culture and the family-oriented concept in Chinese culture.

Expectation of Filial Piety of Parents

Expectation of filial piety is defined as the expectation that older parents have regarding the duties or obligations of their offspring toward them. Therefore, it is a parent's attitude or belief about how the children should treat or care for them in

present and future life. Parents may set their expectation of filial piety based on their own concept of filial piety, their experiences, and their relationships with children. The whole conception of life in Chinese culture has been based on mutual help and interdependence within the family (Lin, 1982). This conception laid the foundation for the moral ideal for Chinese filial piety. It is assumed that elderly parents should be respected and cared for since the parents have suffered to raise a new generation and contributed to their family and society in the past. Parents should have this right and the offspring are obligated to carry it out.

Traditionally, Chinese parents usually expect their children to respect, support and take care of them when they grow old. However, some societal trends such as the growing aging population, a greater number of frail elderly with serious disability who live longer, the declining birth rate, the tendency to live at greater distance from each other, the competing demands from adult children's own children, and the fact that more women are entering the job market, all make the caregiver role of the adult-children more stressful. Even when adult-children believe filial responsibility is valuable, facing many competing obligations and the impact of modern individualism, adult-children may perform their filial duties differently from the expectation of their parents (Chang, 1983; Haman & Blieszner, 1990; J. Hsu, 1985; Ikels, 1983). The inquiry related to filial piety is highly needed. To conclude and summarize this section, the conceptualization, definitions of constructs and concepts in the theoretical model of the current study are presented in Table 2.1

Table 2.1 Definitions of Constructs and Concepts in a Theoretical Model

Constructs	Concepts	Definitions
Stage I Social Support		The amount of aid, affect, affirmation etc. an individual receive from others in his/her social network.
	Family Support	The perceived amount of tangible aid, emotional support, affirmation, information sharing, security etc. an individual received from his/her family.
Filial Piety		A set of social values and teaching involving how children should treat their parents, including: respecting and loving parents, obedience to parents, take care of parents, protecting and glorifying parents.
	Expectation of filial piety	The expectation which parents have regarding the duties or obligations of their children toward them.
Stage II Stress		A particular relationship between the person and the environment that is appraised by the person as taxing or exceeding his/her resources and endangering his/her well-being (Lazarus & Folkman, 1984).

Table 2.1 continued

	Perceived stress	The perceived amount of annoyance or bother that was generated from the demands of his/her daily life experience and environment.
Stage III Health Consequences		The state of psychological health and physiological equilibrium
	Psychological Well-being	The level of satisfaction to one's own past and present life.
	Glycemic Control	The level of control of one's blood sugar.

Changing Environment of Family Caregiving for the Older Adults in Chinese Family

Characteristics of the Traditional Chinese Family

Traditionally, the concept of family ('Chia' in Chinese term) refers to an economic unit. The family is "a unit consisting of members related to each other by blood, marriage, or adoption and have a common budget and common property. Both the persons staying together and those temporarily absent are included. After family division, parents , children, brothers or other relatives cease to be members of the same family" (Lang, 1946, p.13). According to the degree of intimacy, there are two more extensive systems, kin and clan, which consist of the outer concentric circles of the family. The kin system is the middle circle and the clan system is the outermost circle.

The structure of the Chinese family demonstrates great variations. There are three main types of family: the nuclear, the stem, and the extended (or joint) family. The nuclear family consists of two generations: husband, wife , and children. The stem

family consists of parents, unmarried children, and one married son with his wife and children. The joint family consists of parents, their unmarried children, their married sons (more than one) and sons' wives and children. Both the stem and extended family may have more than three generations. Contrary to what people have usually believed, the popular type of family throughout the Chinese history is the stem family rather than the extended family (Chu, 1981). For an older person, the boundary between family and kin can be fluid. Usually, the older person will include all the members in his sons' nuclear family as his family members because he is supposed to have authority over all his sons and he can decide in which son's home he would prefer to reside.

Throughout life, the family stands as the closest social institution to a Chinese person (F. L. K. Hsu,1985). The distribution of power is based on generation, age, and gender. Each member has a clear role and position in this hierarchic power arrangement of the family. Family solidarity and loyalty are emphasized. The boundary between the family and outsiders is clearly delineated (King & Bond, 1985). In this study, the family is defined as a group of people who are related and either live together and/or share their finances.

The Impact of the Changing Family Environment on the Elderly Care in Taiwan

The following aspects of family environment are discussed in regard to their impact on the function of caregiving of older family members: the change of family size, family type living arrangement, and the changing family relationships .

The Impact of Changing Family Size. The size of the family is considered to be an indicator of potential family resources for care of the elderly. The average number of family members in Taiwan started decreasing from 5.55 in 1960 to 4.86 in 1979 after remains stable for the 10 years previous(Chu, 1981). However, the average

number of children, especially sons, can be the better indicator for estimating the family resources for parent care because the adult sons are expected to share filial responsibility. Presently, the average older person over 60 has more than four children, 46.4% have five children, 13.9% have four children (Chiang, 1988). On average, half of the children are sons. We may estimate that most elderly have at least one or two sons. However, the total fertility rate has rapidly decreased from 5.10 in 1964 to 1.9 in 1985 since the family planning program has been implemented in the 1960s (Department of Health, 1990). We can expect that 20 years from today an older person might have fewer than one son on average. The potential manpower and resources for providing parent care will be markedly reduced. In order to maintain the productivity of society, the Institute of Family Planning has started to relax its two children policy.

A series of surveys of women age 20 to 39 revealed that the number of young women who expect to depend on their children in old age is decreasing over time. Fifty percent of the respondents expected their children would support them in old age in 1973; the rate has decreased to 30 % in 1985 (Chang & Ofstedal, 1993). These findings indicate that the younger generation is changing its expectation of filial care. Clearly, it is important to know what the respondent's adapting action is to this changing expectation. How are the respondents preparing for their living in old age? These data will be valuable for decision making on future social policy.

The Impact of Changing Family Type and Living Arrangement of Older Adults. The establishment of large-scale industry created a shift of the labor force and spurred migration from rural to urban areas. A study (Devoe, 1987) in a rural area of Taiwan found that 79 % of the married males still have at least one brother living in or near their family home. The author named these families the "compartment family",

referring to the family as formally divided, "yet it remains physically close, offering its members the degree of individual freedom possible in a smaller family unit, while at the same time also offering the economic and social advantages, as well as the security of a large family" (p.6). These families maintained a high degree of social and ceremonial unity. The parents may live with one married son or with all sons in a rotation. The study also found that 40 % of the married men had siblings who had migrated to urban areas. In some cases, parents preferred to stay in their hometown even when all of their children had moved to the city. Because there are few formal extra familial support systems in Taiwan to help the less independent elderly stay at home on their own as they grow older and less independent, elderly parents normally move into son's house. If the parent is reluctant to move, the situation can become difficult for both parents and children. The urban population in Taiwan has increased from 29% in 1962 to 52% in 1985 (Chang & Ofstedal, 1993). This migration can reduce or weaken many social supporting relationships with kin or friends. Research on how these migrating families maintain their supporting relationships or how they adapt to the change is important.

Different living arrangements of the elderly may affect their well-being. A national survey (Directorate-General of Budget, Accounting, and Statistics, 1992) reported 93.6 % of Taiwan's elderly live with one son constantly (fixed dweller), the other 6.4 % live in each son's home in a rotation for a period of one to twelve months (rotated dweller). For the fixed dweller, 89.38 % were satisfied with their living arrangement. For the rotated dweller, only 61.99% were satisfied. The significant discrepancy in satisfaction invites further investigation of those elderly who are rotated dwellers. Other empirical studies have verified the ill effects of relocation on the older person, especially to those who are relocated involuntarily (Burnette, 1986). It is

important to know how the health condition of these rotated dwellers has been affected. Identifying the causes of dissatisfaction, and the family's and individual's method of coping with the frequent moving is also vital. Who makes the decision for their living arrangements? Is it a family resolution for sibling rivalry or a sign of overload of family caregiving?

Many social and anthropological scholars in Taiwan have advocated maintaining the stem family system (Chu, 1981, Tang, 1978, Tsai, 1990). It is believed that the stem family has advantages over both the nuclear and extended family. However, the change of family structure has moved in the opposite direction from what scholars have advocated. Survey data shows a tendency of decreasing number of stem and extended families. The national statistical data of the co-residing rate of older persons over age 60 with their children (Directorate-General of Budget, Accounting, and Statistics, 1992) shows that the rate was 70.24% in 1986 and 62.93% in 1991. This figure was decreasing at an average rate of 1.46% annually. Eighty-seven percent of co-residing older persons claimed they were satisfied with their living arrangement.

In terms of the older persons' beliefs of ideal living arrangement, 73.07% of the respondents agreed that living with adult-children is an ideal way of living in 1991 (Directorate-General of Budget, Accounting, and Statistics, 1992). In contrast to the actual co-residing rate of 62.93%, in 1991, there is a 10.14% discrepancy. For those who were not living with their children, 63.39% of them wished that they could live with their children. Therefore, the expectation of the living arrangement was not met in many older persons. What do these survey data mean? We can get more questions than answers from these data. Is it a reasonable idea to advocate co-residence without putting forth efforts to strengthen the family? Does society provide adequate urban housing for a family with three generations to live under one roof? What are the

advantages and problems for the three generation household for the family as a unit? Why could not the older persons live with their children as they liked?

It has been noted that the old-old is the fastest growing population in the United States (Shanas, 1984). With the extension of life expectancy in Taiwan, the family with four or five generations will be more frequent, and the possibility of having more than one frail elderly person in a family may increase. The changing family organization can create another stress to the family. People in their sixties or seventies who expect to be free from family responsibility become responsible for their parents. This creates an ambiguity in the role of grandparents and extra demands on their declining personal resources and functions (Shanas, 1984). This situation could cause additional stress on the life of the elderly.

The Impact of Changing Family Relationships. The tremendous social change which has occurred in Taiwan has caused significant changes in family relationships. Traditionally, the family is dominated by father-son relationships. Parents have considerable control over their children. A cohort comparison study of married women in Taiwan (Thornton, Chang, & Sun, 1986) found that parents were having less control over their children. The young women had more education, or while working away from home had more power to decide upon their marital partner. They were more likely to live away from their husband's parents when they got married. The researchers suggested that the increased freedom and autonomy of the younger generation may be associated with the infusion of western ideas and values. The Western ideals reflected in certain family-related views such as husband-wife relationships, family size, and living arrangements (Thornton, et al., 1986).

K. S. Yang (1992) stated that the relationship that dominates the family has been shifting from father-son tie toward the husband-wife tie. He argued that the

degree of shifting in family relationships is related to the degree of modernization of the family members. The change of power authority in the current family may cause confusion and conflict in intrafamilial interactions. The family encounters many decisions such as: How close should the family live to relatives? Should the parents be consulted when buying a new house? How much should the family pay for a younger sibling's education? etc. The family must make efforts to negotiate and adjust, since new rules for interactions need to be established. Generally, the egalitarian relationships between husband and wife have been increasing. Some elements in traditional intergenerational relationships, such as intergenerational co-residence and strong emphasis on filial obligation are changing more slowly.

Studies (Ofstedal, et al., 1993, Li, 1993) about the provision of and satisfaction with family support in older persons in Taiwan demonstrates that older persons receive more support in instrumental activity of daily living (IADL) and financial aspects than their counterpart in the US. Also, they were mostly satisfied with their support. Only five percent of older persons need personal physical care. However, the least satisfaction was reported on support for physical care. Sons were the primary providers for financial and material support. Daughters-in-law were the major supporters for IADL and physical care. Spouses were the primary supporters of the emotional needs and secondary providers for tangible support. Western literature often emphasized the significance of reciprocity in parent-adult children relationships. The finding in Taiwanese subjects did not support this assumption. Ninety percent of older persons did not provide any tangible support to their children. There were no prior data available to compare whether the reciprocity has been ever changed in the changing power orientation in the family.

Seven to nine percent of older Chinese persons reported they were not satisfied with certain aspects of emotional support (Li, 1993). The evidence also indicates that older persons tend to be more enthusiastic about providing emotional support to their families than their family did to them. In another survey of Taiwanese, 55.70% of older persons reported they were playing a consultant role in their family (Chiang, 1988). The meanings of the consultant and emotional support were not clear, because the measurements in both studies did not clearly define the role of consultant. To the elderly, do terms such as care, concern, and consultation mean the opportunity to give many suggestions to their offspring? To the younger generation, this approach may create distancing from parents in order to avoid conflicts if they do not agree with their parents' ideas. On the other hand, since 53.1% of older persons depend on their children for major financial support (Li, 1993), we may question if the hypothesis "the financial strain may elicit economic support at the same time it erodes emotional support" (Krause and Liang, 1993), is adequate to explain the phenomenon of unsatisfied emotional support. Psychological well-being is an important factor for older persons to feel healthy (Chen, 1991). Further research on psychological well-being and intrafamilial relationships with an ecological approach is highly needed.

Interactions between the elderly and their family as well as the family and society are important factors that influence the utilization of the potential resources. A study of the Taiwanese family with a member who had suffered a stroke (Dai, Chao, & Lian, 1990) found that families with higher socioeconomic status (SES) tend to adapt better during the acute stage. However, three months after discharge, the functional status of the patient rather than the SES became the major predictor of the family's functional status. Also, there was evidence showing that the relationships in some families were changing for the worse after the patients were discharged. The finding suggested that

during the acute stage, the family with higher SES might be better able to mobilize their potential resource to deal with the crisis. Once the crisis was over, higher disability resulted in higher care burden on the family and became an important predictor of family function. To provide chronic care, cooperation and harmony among family members may be more effective than SES in solving long term care problems in the family.

Empirical Basis for the Hypothesized Relationships in the Theoretical Model

This section first reviews the general studies that investigate the relationship between the five major variables in the theoretical model: family support, expectation of filial piety, perceived stress, glycemic control and psychological well-being to provide evidence for the hypothesis. A further understanding of the studies that investigate the subjects with diabetes mellitus would provide more relevant evidences to the current study. Thus, in the second part of this section, a critical review on the studies of social support theory that limit the subjects to adult patients with diabetes mellitus is presented.

Family Support, Stress, and Well-being

Literature suggests that family support is a positive factor to health and adaptation (Holahan & Moos, 1987, 1991, Simons, Klein, & Simons, 1977). Simons et al. (1977) reported that perceived family closeness positively related to the physical, social and occupational adaptation of kidney transplant patients. In a series of stress-depression studies, Holahan and Moos (1991) verified their hypothesis that higher family support predicts a lower level of depression over a four year period, especially for persons with less stressful life events. For persons under high stressors, family support functions as a coping resource which, in turn, relates indirectly to future psychological health (Holahan & Moos, 1987, 1991). These findings indicate that

social support has a direct effect on psychological well-being and an interactional effect with the stress.

However, some authors argue that inappropriate support or overprotection of the family may impede patients' motivation of rehabilitation and prevent them from resuming their normal social roles (Hesse & Campion, 1983; Hyman, 1971). In short, if support is provided inappropriately harmful effects may ensue. Chinese family members usually show their affection to their elderly member through taking actual care of their physical needs (J. Hsu,1985). Whether this traditional method of caring would hinder the active participation of the Chinese elderly in responding to their own health problems and reduce the effectiveness of their coping as suggested in western literature is unknown Further investigation is required to reconcile this issue about the effects of family support on the adaptation of the elderly with chronic illness.

A comprehensive review by Norris and Murrell (1984) suggests that the possible functions of social support to the individual can be divided into two categories that consist of six functions. The two categories are damper function and buffer function. Each category is comprised of three sub-sets: events, stresses, and symptoms. Damper functions are the direct or main effects of social supports on events, stresses, and symptoms. It is assumed that social support may prevent the negative events from occurring in daily life, lessen the stressfulness of life, or improve health in general. The buffer functions assume an interactive (or moderating) effect of social support with events, stress, and symptom. It is hypothesized that social support exerts its functions on the relationships between the event and stress (event-stress buffer), the event and symptom (event-symptom buffer) or the stress and symptom (stress-symptom buffer). In the current study, the hypothesis of the damper function of social support to lessen the stress of life and to improve the well-being is tested.

Drawing on Paynes and Jones' (1987) work, the Lazarus stress model, and social support model, the relationships among family support, perception of stress, and health are integrated in Figure 2.2. It is hypothesized that family support has direct effect on well-being and glycemic control. In addition, it is assumed that family support can help the individual solve problems, provide information, help make better decisions, reduce role ambiguity, and in turn lessen the perception of stressfulness of the events. These family resources would convince the individual that the stressors are not really exceeding his/her resources or endangering his well-being (Caplan, 1982; Payne, & Jones, 1987). Stressors are inevitable aspects of life. It is hypothesized that how the stress impacts on an individual's well-being depends on how the individual draws upon his/her personal and family support.

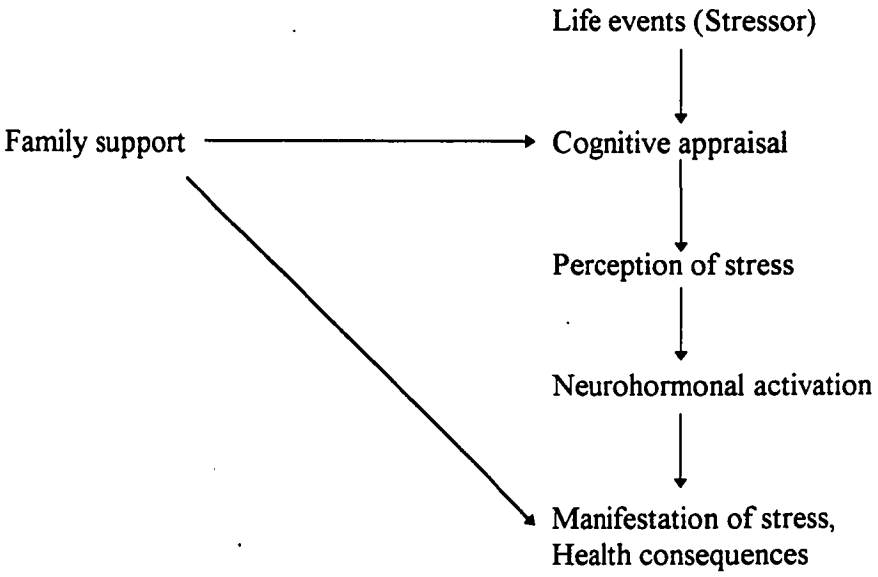


Figure 2.2. The Effects of Family Support on Stress and Health Consequences

In summary, I hypothesize that family support has an impact on the individual's cognitive appraisal of the stress. The person with more family support tends to perceive the life situation as less stressful than that of the person with less family support. As a consequence, the person who perceives life to be less stressful will have a higher state of well-being. Family support exerts an indirect effect on the individual's health consequences via its effect on perception of stress. In addition, family support also exerts a direct effect on the health consequences of the individual.

Expectation of Filial Piety and Well-Being

Most filial piety related studies have focused on the adult-children's beliefs about filial piety. Few have explored what the elderly parents' expectation of their adult-children's filial behaviors are, and what the effects of the expectation of filial piety on elderly parent's health and adaptation might be. Research has indicated that parents' concepts of filial piety can affect the parent-child relationship (Huang, 1980). Huang (1980) examined the filial concept of the children (high school and college students) and their parents and the effects of the intergenerational difference of filial concept on the level of harmony of parent-child relationship. Findings concluded that (a) the higher the education, the less traditional filial concept the respondent would hold, the greater the parent-child difference on the filial concept, the less harmony of the parent-child relationship, (b) that children rather than the parent had the higher tendency to agree that the traditional filial concept should be modified, and (c) a small but significant difference on filial concept existed between different genders. Females rather than the males held more closely to the traditional filial concept.

Western literature indicates that responding to higher parental needs may result in negative feelings of children and may erode their emotional bond with parents (Quinn, 1983). In addition, a high expectation of filial piety may result in a tendency toward

dependency which impedes the individual's drive to cope actively (Hesse, et al., 1984). Seelbach and Sauer (1977) found that levels of expectation of filial piety were significantly and inversely associated with parents' morale, even when the variables gender, age and marital status were controlled for. On the other hand, higher parental demands may produce a strain on intergenerational relationships. However, this evidence of the relationship between the expectation of filial piety and parents' well-being is weak and not well-established by rigorous studies. In consideration of the cultural difference in the expectation of filial piety of older Taiwanese from their western counterparts, the relationship between the expectation of filial piety and the well-being in older Taiwanese parents may vary. On the basis of the traditional Chinese saying and findings of a recent study of Chinese elderly, a similar finding might be expected. A Chinese maxim says "Long disease wears away a child's filial piety", implying that the stress arising from giving long term care to the elderly with chronic illness could result in a decrease of caregiving to the parents. If the parents maintain their expectation of filial piety unchanged, the gap between expectation and performance would increase. Yang & Chandler (1992), investigating the intergenerational relationship of older Chinese with their adult children in Province Zhejiang of China, found that the increased gap between expectation of filial piety and performance can result in intergenerational conflict, grievance, self-restraint, anger, frustration, and in turn, become detrimental to the well-being of old parents.

Although the authors did not refer this phenomenon to any theory, the proposition of relative deprivation theory seemed corresponded well to this situation. Relative deprivation refers to "a negative discrepancy between legitimate expectations and actuality" or "the gap between expected and achieved welfare" (cited in Crosby, 1982, p.18). Relative deprivation theory postulates that people tend to develop a

feeling of relative deprivation when they are deprived of something that they feel they are entitled to it. The feeling of relative deprivation generates a sense of grievance or dissatisfaction. Much research has examined the preconditions of relative deprivation and the social and political effects of relative deprivation. To date, this theory has not been applied to filial piety-related research. Based on the relative deprivation theory, it is assumed that expectations of filial piety can be used as criteria. The parents may compare the filial care they receive against their own set of criteria (expectation of filial piety). The parents with higher expectations of filial piety tend to feel they deserve more filial care. If they feel that they do not get the support they deserve, a feeling of relative deprivation (grievance) may arise. The feeling of grievance is a negative factor of psychological well-being. Along this line, it is hypothesized in this study that parents with more expectations of filial piety are more likely to develop a feeling of relative deprivation, in turn, more likely to experience less psychological well-being.

Effects of Stress on Glycemic Level

The effects of stress on the glycemic level has been investigated extensively. However, no definite causal relationship has been established. In normal individuals, artificial short-term stress reportedly resulted in the rise of insulin, glucagon, cortisone, epinephrine, and blood glucose (Álvarez, Portilla, Gonzalez, & Ezcurra, 1989). It has been suggested that increase of catecholamine may decrease insulin sensitivity and induce the rise of blood glucose level (Henry, 1992; Supiano, Hogikyan, Morrow, et al., 1993). Other correlational studies showed that individuals with a high level of perceived job stress had a significantly higher level of glycosylated hemoglobin (HbA1c, Kawakami, Araki, Hayashi, & Masumoto, 1989). Inconsistent with these findings, one study found that after a short period of stress in laboratory, the subjects had a significant increase in plasma level of insulin while the level of growth hormone

and blood glucose were unaltered (Naliboff, Cohen, & Sowers, 1985). The stress hormones assessed in these studies were not identical. The mechanism of effects of stress on blood glucose was not delineated. Therefore, whether the stress can be said to cause the increase of blood sugar was not certain.

Regarding the effects of stress on the glycemic control of persons with diabetes, researchers found a strong correlation between glycosylated hemoglobin and stress scores in a group of patients with NIDDM who were undergoing an oral hypoglycemic drug trial (Demers, Neale, Wenzloff, Gronsman, & Jaber, 1989). The findings suggested that sustained stress may contribute to poor glucose control in individuals with diabetes. Changes in the level of blood glucose were not checked longitudinally, however, and the relationship between stress and blood sugar level were less convincing. To further validate the effects of stress, Goetsch, et al. (1990) studied six adults with NIDDM. Blood sugar level was examined after the participants were put under brief stress in the laboratory. Then, stressful events were monitored and recorded at home for 12 days. Diet and activities were controlled to prevent their effects from being confounded with that of stress on blood sugar level. Findings demonstrated that stress has hyperglycemic effects in the laboratory setting and in the natural environment. The mechanism by which stress affected the level of blood sugar or diabetic control was not clearly identified in these studies however.

It was speculated that the level of blood glucose may be altered by affecting the internal milieu (stress hormone), and/or the patient's behavior, e.g. dietary or self care behavior.(Naliboff, et al., 1985, Barglow, Hatcher, Edidin, & Sloan-Rossiter, 1984). Empirical findings on the effects of short term stress, though, were inconclusive. Some findings imply that stress and its hormonal consequences might precipitate and exacerbate metabolic disequilibrium. The different measures of stress and the small

samples of most studies may also contribute to the inconsistent findings. The findings of the two studies on the hyperglycemic effects of long-term stress were consistent. However, well-designed studies are still needed to confirm the hyperglycemic effects of stress. The duration and strength of the stress necessary to disrupt glucose metabolism have yet to be determined.

Review of Empirical Testing of Social Support Theory on Adults with NIDDM

The purpose of this review is to identify what has been studied on adults with diabetes mellitus using the theory of social support and to further examine the evidence of the relationship between social support and well-being in the specific population. From computer searches and bibliographies attached to relevant papers, the research articles which met the following criteria were sampled: (a) having social support (or family support) and health consequences as main variables, (b) having subjects who are adults with non-insulin dependent diabetes (NIDDM) and/or insulin dependent diabetes (IDDM). Eleven research studies published in journals during the past ten years (1985-1994) that investigated the relationship between social support and health consequences were reviewed and analyzed. In the following, a brief summary of the eleven studies will be briefly summarized (Table 2.2) to provide background information for further analysis followed by a critical analysis on the conceptual framework, design, sampling, measurements, analysis, and findings of these 11 studies will be presented. In this section,, to minimize the complexity of multiple citation of studies, reference to more than one study will use the digital number rather than citing the authors' names and year of publication. The numbers cited in parenthesis behind a mentioned study corresponds with the study indicated by that number in the column of "authors" of Table 2.2.

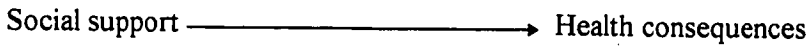
Conceptual Framework of the Studies

All studies have hypothesized that social support will benefit health consequences of adults with diabetes. The concept of social support has been defined either as general social support or as family support. Among the reviewed studies, four types of conceptual models can be identified if we put demographic variables aside (Figure 2.3).

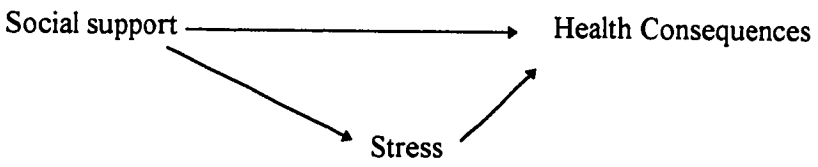
In model one (Figure 2.3), social support was designated as the only predicting variable. The hypothesis was that social support may influence health consequences of adults with diabetes directly and positively (5, 1, 10). In Model Two (Figure 2.3), stress was added as another predicting variable. It was hypothesized that social support may buffer the impact of stress. In the Model Three (Figure 2.3), locus of control was added as another dimension in attempting to increase the predicting power of the model (9, 6). The hypothesis in these studies is that adults with an internal locus of control may exert more control on self and better care to self. In the Model Four(Figure 2.3), disease-related variables were added to predict the health outcome. To test this model, one study (O'Conner, Crabtree, & Abourizk, 1992) reported that the baseline level of blood sugar and duration of diabetes were the only two significant variables associated with the outcome variable--glycemic control.

Glycemic control was referred to as outcome variable (health consequence) in ten of the eleven studies. Change of body weight and change of level of social support were designated as outcome variables in two intervention studies (11, 7). As a whole, physiological and social measurements were the major indicators of outcome variables. Psychological indicators such as psychological well-being have not been included as an outcome indicator in these studies.

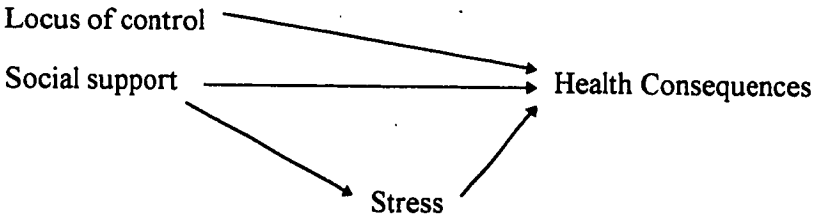
Model 1. One predictor, two stage model



Model 2. Two predictors, three stage model



Model 3. Three predictors, three stage model



Model 4. Biopsychosocial Model

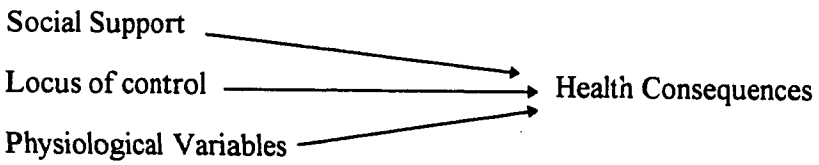


Figure 2.3 Four Conceptual Models for Testing Social Support Theory

Design of the Studies

All eleven studies were quantitative in nature. Among them, seven were non-intervention studies (1, 3, 4, 5, 6, 9, 10), the other four were intervention studies (2, 7, 8, 11). In the non-intervention studies, no specific or standardized care program was

provided to the subjects. The routine care received by the subjects was not treated as variable of interest and was not part of the research analysis. In the seven non-intervention studies, four had cross-sectional design (1, 4, 5, 9), the other three had longitudinal prospective data (3, 6, 10)with an observation period that ranged from three months to one year. One of the limitations of the cross-sectional design was the causal relationship in the model which cannot be established with certainty. Theoretically, the longitudinal design can identify causal effects with more confidence based on prospective data. However, in some studies, it is assumed that the level of social support measured in Time One would effect the glycemic control in Time Two. The optimum interval of the effect for social support was not discussed in any studies. Each study set a different time lag between the first and second observation. The theoretical basis for setting a time lag needs further exploration.

Of the four intervention studies, two were observational studies in which a standardized intervention program was provided but no control group was used to compare the intervention effects (2, 8). The other two studies were conducted with a quasi-experimental design in which subjects were randomly assigned to a control or a treatment group (7, 11). Social support improving strategies were incorporated as part of an intervention program in two studies in which an increased level of social support was hypothesized to improve the patient's life style or body weight loss.

Sampling Method and Sample Size of the Studies

Convenient sampling was utilized in all of the reviewed studies. The outpatient clinic of a hospital and the diabetic care center were the major locations for recruiting subjects. Three studies recruited only adults with NIDDM (2, 7, 11). The other eight studies recruited both the adults with NIDDM and IDDM (1, 3, 4, 5, 6, 8, 9, 10). Interestingly, differences did exist in pathophysiology, age of disease onset, and the

psychosocial conditions between IDDM and NIDDM patients. Therefore, the effects of social support on health consequences in these two groups may differ. In fact, one study (Konen, Summerson, & Dignan, 1993) reported that stress, family functioning and locus of control were not associated with glycemic control in adults with IDDM. Nonetheless, an increased level of stress did associate with higher fasting blood sugar and glycosylated hemoglobin in adults with NIDDM. The question about whether a single model is adequate for both patient populations needs to be confirmed through further research.

Sample size in these studies were mostly small. Only one study (Konen, et al., 1993) had sample size over 200 (N=407). Beside this, the average sample size of the other ten studies (1, 2, 3, 4, 5, 6, 7, 8, 10, 11) was 85.8 (SD=40.02). The convenience sampling and small sample size have been the common limitations of these studies. Inevitably, these limitations have constrained the external validity which prevented an extensive generalization of the research findings to other populations.

Measurements of the Studies

Reliability and validity are the essential psychometric properties of psychosocial measurements. The review on measurements here will be focused on social support measurements. Twelve different social support scales were used in the eleven studies. Four of them were newly developed by authors. Others were adapted from existing measurements. Three of the eleven studies had reported reliability data acquired from the study samples. The data of psychometric properties from previous literature was provided in the other three studies. In the remaining five studies, none of the psychometric data was reported. It is apparent that not enough effort has been made on the assessment of reliability and validity by most of these investigators. Existing measurements with reported sound psychometric properties may not have the same

reliability and validity when it is adapted to another population. Lack of assessment on psychometric properties on the study sample has taxed the credibility of the research findings.

Analysis Procedures of the Studies

Chi-square, t-test, ANOVA, and bivariate correlation were the main procedures used in six of the eleven studies (2, 3, 4, 5, 7, 10). With bivariate correlation, the causal relationship and the unique contribution of a predicting variable to the variance of dependent variable could not be specified. Limitation on inference was evident.

The other five studies (1, 6, 8, 9, 11) have utilized some form of multivariate regression analysis. No investigator has specified the predicting variables into stages based on theory to delineate the time series of causal relationships. A causal relationship can be further specified among the exogenous and endogenous variables in the model for future study.

Research Findings of the Studies

Research findings are the foundation upon which a rejection or confirmation to hypothesis, suggestions for further research, and implications for better health practices can be based. The findings on relationships between social support and stress and health outcomes will be discussed first. Then, the effects of intervention on social support will be examined. Finally, the effects of demographic data on the relationship between social support and health outcomes will be reviewed.

All studies except one (O'Conner, et al., 1992) reported some form of effects of social support on health outcome in adults with diabetes. Three studies claimed social support was positively correlated with glycemic control (Chang, Chiou, Shin, & Tsai, 1991; Konen, et al., 1993; Edelstein & Linn, 1985). One study (Tyan, Chie, Chang, & Chang, 1988) reported a negative association between level of family participation in

diabetic care and glycemic control. Three studies (Erikson & Rosenqvist, 1993; Kaplan & Hartwell, 1987; Wing, Marcus, Epstein, & Jawad, 1991) found social support exerts differential effects on glycemic control and body weight loss between male and female subjects. One study claimed (Griffith, Field, & Lustman, 1990) social support exerted interactional effects on the relationship between stress and glycemic control. One study (Schwartz, Coulson, Toovy, Lyon, & Flaherty, 1991) reported no relationship between the level of social support and glycemic control in Time One and Time Two respectively, but a decrease of social support at Time Two predicted a worsening glycemic control. These findings showed a lack of consistency. However, a trend indicates that social support was positive but modestly associated with health outcomes ($r \leq .36$). The relationship between social support and health consequences in these studies was built upon statistical analysis. The mechanism of the effect was not delineated. The evidence of causal relationship was not fully established.

The effects of stress on health outcomes were concurrently investigated in four of the 11 studies. The findings of these studies were not consistent either. One study showed life stress was negatively associated with glycemic control in adults with NIDDM, but found no association in adults with IDDM (Konen, et al., 1993). In another study (Tyan, et al., 1988), illness-related stress was found to be positively related with glycemic control. These contradictory results may be attributed to the different operational definition of stress. Based on these findings, it may be hypothesized that daily life stress can worsen the glycemic control. In addition, deteriorating glycemic control may serve as a stressor which further heightens the illness-related stress.

A major challenge facing the health care professional is to find ways to improve diabetic care and promote the patient's well-being. It is important to know how

effective a particular intervention program has been for improving social support and health outcomes for subjects. Wierengna (1994) provided five weekly 90-minute group sessions to the subjects in treatment groups. The subjects was encouraged to modify their life style by choosing one behavior pattern to modify, and to find source of support. The author found that the intervention failed to increase the level of social support in her subjects. This attempt to increase social support only by helping the subjects find a source of support in treatment group was neither a theoretical based or a well-planned intervention. Wing .et al. (1991) reported that increasing social support by including the spouse in the diabetic care program resulted in a greater weight loss in the female than in the male. In other words, male subjects did better when treated without their spouse along. Investigators did not evaluate why the strategies to improve social support were not effective. A novel program such as using environmental approach instead of using traditional individual consultation may be more effective in helping the subjects elicit potential support from their social network. Further research is clearly needed.

The role of demographic variables has not been examined in most of the studies. Five study (2, 4, 5, 7, 10)did consider some demographic variables, however. One study (Griffith, et al., 1990) reported that age, gender, education, marital status were not associated with glycemic control. Chang et al. (1991) found that family structure of the Taiwanese subjects was associated with glycemic control. Subjects who lived in a extended family had better glycemic control than those who lived in a nuclear family. Gender was the variable which was examined most often. Kaplan and Hartwell (1987) reported that high social support benefited glycemic control for women but worsened glycemic control in men. This study also found that men with a larger social network had poorer control. To the contrary, Erikson and Rosenqvist (1993) found that men

but not women benefited from social support in glycemic control; however, the supported female benefited more in body weight control. Another study (Wing, et al., 1991) also supported the notion that the female did better in weight control when support was provided. Reasons for the differential effects of social support for men and women remain speculative.

In summary, these studies, although inconsistent in findings, provide valuable evidence on the relationship between social support, stress, and health consequences of diabetes. Based on what is reported in the literature in these studies, the following problems requiring further research are identified. Firstly, the relationship between the social support and the glycemic effect was not built on the basis of well-controlled experimental study. It should not be treated as a causal effect. The mechanism of the effects of social support on the level of blood glucose has yet to be delineated. In addition, for the correlational studies the theory-based specification of the model was not clearly delineated in most of these studies. Variables included in the models were various and not well-specified. The control of confounding variables were not rigorous enough. Secondly, the operational definition and measurements for the predicting variables are different in each study. The reliability and validity of measurements do not appear to have been a serious concern of most investigators. The uncontrolled measurement errors can cause unreliable findings. Lastly, the samples were convenient and the size were small in these studies. The data show a lack of stability and have a high standard of error. Concerns and efforts on these aspects should be addressed to strengthen related research in the future.

Several strategies were implemented in the design of the current study to minimize the limitations identified in previous studies. For example, causal modeling was utilized to develop a well-specified theoretical model. To reduce the confounding

variables, the subjects were recruited on the basis of a series of sampling criteria. The sample size of 150 subjects was decided in advance to meet the minimum requirement of multiple regression analysis. The measurements were tested in a pilot study in advance to ensure appropriate psychometric properties. The interpretation of causal relationship between the independent variables and dependent variables in the model was strengthened by using triangulation in the methodology. The methodology of the current study is described in the following chapter.

Summary

The theory tested in the current study was presented in a three stage theoretical model. The purpose of the theoretical model was to predict the concepts in Stage 3 that were glycemic control and psychological well-being. The predicting concepts included family support, expectation of filial piety in Stage 1 and stress in Stage 2. Literature that related to the testing of the links between the independent variables and dependent variables of the theoretical model of the current study was reviewed. Based on the knowledge from the conceptualization and literature review the methodology of the current study was developed. Chapter 3 describes the methodology of the current study.

Table 2.2 Summary of Studies Testing Social Support Theory on Adults with Diabetes

Authors	Purposes & Design	Independent Variables	Dependent Variables	Sampling & Sample	Measurements	Analysis & Findings
1 Edelstein, J. & Linn, M.W. (1985)	To determine the role of family environment in the metabolic control of adult diabetic men. NIS*, CS *design	Family functioning	Metabolic control; HbA1, fasting blood sugar, triglyceride, cholesterol.	Convenient sampling. 97 male who were on insulin and lived with family. Age, 55±7.5.	Moos's Family Environment Scale	Stepwise regression analysis. Findings: Family function was positively associated with glycemic control.
2 Kaplan, R.M. & Hartwell, S.L. (1987)	To test if social support has direct effects on metabolic control and whether social support has differential for different gender. IS*, L.*design	Social support Social network Gender Intevention: Provide group intervention to facilitate life style change.	Glycemic control, lipids, body weight.	Convenient sampling. 76 adults with NIDDM. Mean age, 55.	Social support questionnaire (SSQ)developed by Sarasons and associates: Satisfaction score (SSQ-S) & network score(SSQ-N)	Bivariate correlation. Findings: SSQ-S was positively correlated with HbA1c in male. SSQ-N was positively correlated with Blood sugar, HbA1c, and Cholesterol. SSQ-S was negatively correlated to glycemic control in female.

Note. NIS= Non-intervention Study, IS= Intervention Study, CS design=Cross-sectional design, L. design= Longitudinal design.

Table 2.2 continued

Authors	Purposes & Design	Independent Variables	Dependent Variables	Sampling & Sample	Measurements	Analysis & Findings
3 Tyan, M., Chie, W.J., Chang , C.J. & Chang , C. (1988)	To examine the effects of diabetes-related stress and family support on patient's glycemic control. NIS, CS.	Illness-related stress Family support	Glycemic control	Convenient sampling. 42 adults with NIDDM or IDDM.. Age, 59.4±7.9.	Family support: Family APGAR (Adaptation, Partnership, Growth, Affection & Resolve), Scale of family participation in diabetic care developed by authors. Diabetes-related stress scale developed by authors Fasting blood Sugar and HbA1c	Bivariate correlation. Findings: Illness-related stress was positively correlated with glycemic level. APGAR score did not correlated with glycemic level. Family participation was positively correlated with glycemic level.

Note. NIS = Non-intervention Study, IS = Intervention Study, CS = Cross-sectional design, L = Longitudinal Design.

Table 2.2 continued

Authors	Purposes & Design	Independent Variables	Dependent Variables	Sampling & Sample	Measurements	Analysis & Findings
4 Griffith, L.S., Field, B.J. & Lustman , P.J. (1990)	To examine the relationships between life stress, social support, and glycemic control in adults with diabetes. NIS, CS.	Social support Stress	Glycemic control	Random sampling from a diabetes center. 79 adults with NIDDM or IDDM. Age, 40±15.2.	Single-item visual analogue social support scale. Holmes and Rahe Social readjustment scale (SRRS) HbA1.	Two-way ANOVA Findings: Neither social support nor stress was independently associated with HbA1. Under conditions of high stress, patients with low social support had higher HbA1 than those with high social support. All demographic variables were not associated with HbA1.

Note. NIS = Non-intervention Study, IS = Intervention Study, CS = Cross-sectional design, L = Longitudinal Design.

Table 2.2 continued

Authors	Purposes & Design	Independent Variables	Dependent Variables	Sampling & Sample	Measurements	Analysis & Findings
5 Chang, F.T. Chiou, C.J. Shin, S.J. & Tsai , J.H. (1991)	To examine the effects of family support on knowledge, attitude, compliance, and glycemic control of adults with diabetes. NIS, CS.	Family support	Knowledge, attitude, and compliance to diabetes treatment. Glycemic control: HbA1c, fasting blood sugar, postprandial blood sugar.	Convenient sampling. 126 adults with NIDDM or IDDm. Age, 53.98± 8.9.	Diabetes family behavior checklist. Family APGAR Scale of knowledge, attitude, and compliant behavior .	Bivariate correlation. Findings: Family support was positively correlated with knowledge, attitude, compliance, and glycemic control. Family APGAR was not correlated with knowledge, attitude, compliance, and glycemic control. Patients with non-nuclear family have higher family support and better glycemic control then those with nuclear family.

Note. NIS = Non-intervention Study, IS = Intervention Study, CS = Cross-sectional design, L = Longitudinal Design.

Table 2.2 continued

Authors	Purposes & Design	Independent Variables	Dependent Variables	Sampling & Sample	Measurements	Analysis & Findings
6 Schwartz, L.S. Coulson, L.R., Toovy,D., Lyon, I.S., & Flaherty, J.A. (1991)	To examine the relationship among recent life stress, social support, locus of control, and glycemic control in male patients. NIS, L.	Social support. Stress. Locus of control	Glycemic control: fasting blood sugar (FBS), HbA1c.	Convenient sampling. 102 male adults with NIDDM or IDDM. Mean age: 63	Social support network inventory. Paykel scale of recent life events. Rotter locus of control scale.	Bivariate correlation and multiple regression analysis. Findings: High stress was associated with higher HbA1c at time 1 and time 2. External locus of control was associated with high FBS at time 1. Social support has no association with HbA1c of FBS at both time points. A decrease of social support at time 2 predicted a worsening glycemic control.

Note. NIS = Non-intervention Study, IS = Intervention Study, CS = Cross-sectional design, L = Longitudinal Design.

Table 2.2 continued

Authors	Purposes & Design	Independent Variables	Dependent Variables	Sampling & Sample	Measurements	Analysis & Findings
7 Wing, R. R., Marcus, M. D., Epstein,L. H., & Jawad, A. (1991)	To test the effectiveness of a family -based weight reduction program for obese diabetic patients. IS, L.	Treat alone of treat together with spouse Intervention: 20 weeks behavioral weight control program	Body weight . Glycemic control: HbA1, fasting blood sugar (FBS)	Convenient sampling. 42 obese adults with NIDDM. Age range: 30-70 attrition rate: 14 %	Social support: Dyadic adjustment scale	Patients in both treat alone and treattogether with spouse groups showed significant time effects for weight and glycemic control , but no group difference. Female did better when treated with their spouse. Male did better when treated alone.

Note. NIS = Non-intervention Study, IS = Intervention Study, CS = Cross-sectional design, L = Longitudinal Design.

Table 2.2 continued

Authors	Purposes & Design	Independent Variables	Dependent Variables	Sampling & Sample	Measurements	Analysis & Findings
8 O'Conner, Crabtree, & Abourizk (1992)	To identify the predictors of response to diabetes education and care program. IS, L. design	Family support. Health status. Locus of control . Diabetes related knowledge. Duration of disease Initial level of HbA1c Intervention: 4-day diabetic education and care program	Glycemic control: HbA1c	Convenient sampling. 169 adults with IDDM or NIDDM. Age: 55.2±1.2. Attrition rate: 38%.	Family function scale. Duke-UNC health profile. Locus of control scale. Rand knowledge of diabetes scale.	Multivariate logistic regression. Findings: 40 % of subjects had improved glycemic control. Family function and other psychosocial variables were not predictive of glycemic control. Duration of diabetes and baseline HbA1c predict glycemic control.

Note. NIS = Non-intervention Study, IS = Intervention Study, CS = Cross-sectional design, L = Longitudinal Design.

Table 2.2 continued

Authors	Purposes & Design	Independent Variables	Dependent Variables	Sampling & Sample	Measurements	Analysis & Findings
9 Konen, J.C., Summerson, J.H., & Dignan, M.B. (1993)	To examine the role of family function, stress, locus of control, on predicting and distinguishing the good and poor glycemic control in adults with diabetes. NIS, CS.	Family function. Stress. Locus of control	Glycemic control : HbA1c, Fasting blood sugar . Self-reported perception of glycemic control.	Convenient sampling. 407 adults with IDDM or NIDDM. Age: 53 ± 16.	Family function: Family APGAR, FACES III (family adaptability and cohesion evaluation scale) Brief encounter psychosocial instrument. Affect balance scale Multidimensional health locus of control.	Krustel-Wallis analysis of variance & multivariate discriminant analysis. Findings: For the independent variables, only stress was predictive to glycemic control of adults with IDDM. Adults with NIDDM in good control had lower family cohesion. For adults with IDDM in better control had higher family cohesion, less negative affect than those in poor control.

Note. NIS = Non-intervention Study, IS = Intervention Study, CS = Cross-sectional design, L = Longitudinal Design.

Table 2.2 continued

Authors	Purposes & Design	Independent Variables	Dependent Variables	Sampling & Sample	Measurements	Analysis & Findings
10 Erikson, B.S., Rosenqvist, U. (1993)	To test the influence of social support and gender difference on glycemic control. NIS, L.	Perceived social support. Demographic variables.	Glycemic control: fasting blood sugar. Body weight.	Convenient sampling. 76 adults with NIDDM or IDDM. Age: 60.6 ±11.1.	Social support scale developed by authors.	Chi-square, t-test, ANOVA. Findings: High supported males had lower blood sugar than high supported female. High supported women reduced more weight than high supported men.

Note. NIS = Non-intervention Study, IS = Intervention Study, CS = Cross-sectional design, L = Longitudinal Design.

Table 2.2 continued

Authors	Purposes & Design	Independent Variables	Dependent Variables	Sampling & Sample	Measurements	Analysis & Findings
11 Wierengna , M.E. (1994)	To test the effectiveness of a community based weight control program on adults with diabetes. IS, L.	Intervention program: 5 weekly 90-min group sessions for modifying eating and exercise pattern.	Social support. health status. health practice. body weight.	Convenient sampling. 66 adults with NIDDM. randomly assigned to control and treatment group. A five-week program was provided to the treatment group. Age range: 30-80 years. Attrition rate: 27%.	Personal resource questionnaire (PRQ). Knowledge of diabetes test. Diabetes health status scale.	Bivariate correlation & multiple regression analysis. Findings: Social support, health status, body weight were not changed in treatment and control group. The change in health practice was higher in treatment group than in control group. Social support was not a predictor of health status.

Note. NIS = Non-intervention Study, IS = Intervention Study, CS = Cross-sectional design, L = Longitudinal Design.

CHAPTER 3

METHODOLOGY

The purpose of this study was to (a) examine the effects of the family support, expectation of filial piety, and perceived stress on the two dependent variables: psychological well-being and glycemic control; (b) explore the subjective meaning of well-being of the older adults with Non-Insulin Dependent Diabetes Mellitus (NIDDM). This chapter describes the research method used in the current study. It includes ten sections. The first section provides a general description of the research design. The second section is a discussion of the clinical setting where the data were collected, followed by an introduction of sample selection and recruitment. The fourth section is a discussion of the data collection protocol. In fifth section, a pilot study in which the revision of the Filial Piety Scale and Recent Life Stress Scale and psychometric properties of the revised scales are presented. The sixth and seventh sections describe the measurements for quantitative data and instrumentation for qualitative data respectively. The analysis plan for quantitative data and analysis plan for qualitative data are described in eighth and ninth section. The last section describes the protection of human subjects.

Design

This study utilized a cross-sectional, correlational design with causal modeling approach to test the theoretical model that was proposed in Chapter 2. With this design all the variables are measured at one point in time and the variables are not intervened or manipulated (Asher, 1983, Spector, 1981). The correlational design with a causal modeling approach is used to "verify the theory that has already been developed , not to produce theory from a group of measured variables" (Munro & Sexton, 1984, p.97). Building a sound theoretical model and having valid and reliable

measures to test the model are the most important parts of this design. Based on the relationships identified in the literature and previous studies, the research hypothesis are represented with an arrow diagram that indicates causal process between the variables of interest. It provides a heuristic way to increase understanding of complex social behavioral phenomenon. The causal relationships are hypothesized based on the inferences from the existing literature. This design uses a set of assumptions and statistical rules to justify the required conditions of causality: concomitant variation between cause and effect variables (covariation), time ordering, and control of the confounding variables. The covariation can be easily measured with statistical procedures. The time ordering between the variables (i.e. staging the variables) is specified by imposing the order of the variables by making causal inference base on the findings of previous studies. The control of confounding variables is achieved by control the variance of the confounding variables statistically using multiple regression analysis. Statistical control is more problematic because for a complex social or behavior phenomenon, it is difficult to assure whether we had correctly chosen the confounding variables. These rules and assumptions can not assure any particular causal explanation is accurate because the real data are not collected on time sequence, the confounding variables are not controlled in real situation. However, this does provide a valuable and systemic way to build cumulative evidences for the theory that will eventually be used to provide the basis for nursing intervention in this population.

Setting

The data were collected in the diabetic specialty clinics of the outpatient department in National Taiwan University Hospital (NTUH), Taipei, Taiwan. Affiliated to National Taiwan University, NTUH is a 1500-bed, general, teaching hospital. Although most patients come from the vicinity of Taipei city, the hospital also

receives patients from the whole island of Taiwan. Most diabetic patients in the special clinics visit their physician once every four to twelve weeks regularly. In the outpatient department, there were total of 13,550 diabetic older patients (>65 years old) during the period of January, 1992 and December, 1992. There were about 1,000 diabetic patients who regularly visited diabetes special clinics (National Taiwan University Hospital, 1993). Patients in diabetic specialty clinics are referred by physicians from other departments of NTUH or other health care institutions and cared for by a multidisciplinary diabetes care team. This diabetes care team consisted of five attending physicians, one nurse educator and one dietitian. Professionals in this team are all specialized in diabetes. Every Monday, Tuesday, and Thursday, four offices are opened for patients with diabetes from 1 to 5pm. One nurse educator and three of the five physicians are each in charge of one office . Usually, the physician sees the patient first and refers the patient to the nurse educator or dietitian if there is a need for patient to see her. Patients usually receive nursing service at the same day but are required to make an appointment with the dietitian if they need dietary service. Each physician has one staff nurse to work with. The nurse's role in physician's office is to key in physician's orders to an on-line computer, give treatment-related instructions to patients, and coordinate with other departments such as laboratory, pharmacy, department of radiology etc. when needed. Diabetic specialty clinics are located in the outpatient department of NTUH. There were always one or two offices unoccupied during clinic hours. The investigator was able to use the unoccupied offices as interview rooms.

Sample

The sample for this study was drawn from the setting mentioned above. For the first part of data collection, convenience sampling was utilized to select the diabetic patients who fit the following criteria:

1. 50 years or older, and have adult children.

2. Diagnosed as having NIDDM and under the treatment of non-medication therapy and/or oral hypoglycemic agent and/or insulin injection.

3. Have been treated in the clinic for more than three months (supposedly, the patient will learn something about self care and the physician will have established treatment at this time).

4. Have functional cognitive-mental status, and can express personal perception well.

5. No serious disease or diabetic conditions that may confound diabetic control or HbA1c value such as acute infections, surgery, renal disease, liver dysfunction, and low hemoglobin.

The patients who met these criteria were invited to participate in the first interview to collect the quantitative data. One hundred fifty subjects were expected to be recruited. To recruit the potential respondents for the semi-structured interview for collecting qualitative data, stratified sampling was done on 150 respondents who have finished the first questionnaire. Patients with different socioeconomic status and gender may live quite different experiences with diabetes and value their life differently. Based on the patients' gender and education, the number of participants designated in the following table was recruited.

Table 3.1 Subject Number Recruited under Each Educational Category for In-depth Interview.

	Male	Female
Elementary school or less	2	2
High school	2	2
College or more	2	2

Data Collection Protocol

Methodological Triangulation was used in the data collection. Methodological triangulation refers to the use of more than one method to collect data in one study . The findings from the data that elicit from one method can be used to confirm or interpret the findings from the other method (Kimchi, Polivka, & Stevenson, 1991). Qualitative methods are the best in providing rich and detailed interpretive data (Duffy, 1987). This study used the qualitative method to verify and elaborate the findings of quantitative method. The purpose and sampling criteria for this study were introduced to the physicians and nurses in the clinics. The physicians and nurses of the clinics were invited to help identify and refer to the investigator subjects who met the sampling criteria. On the day of diabetic specialty clinics, the investigator arrived half hour before the clinics start. She screened the patient's medical record by diagnosis, laboratory data, medication prescribed, and age, and then, made a list of potential subjects for each office nurse to be used as a reference in making referrals to the investigator. After the potential subjects were seen by the physician, they were sent to the investigator's interview room. The purpose of the study was explained and confidentiality of the interview data was assured to the subject and informed verbal consent was obtained. If the subject were in a hurry to go home, another interview was

arranged for the subject at a more convenient time and place. Efforts were made to ensure minimal external distraction while the questionnaires were being completed.

In order to assess a subject's mental status to see if he/she could understand the information in the scales, the investigator met with each subject in an interview at which time demographic data were collected. After demographic data were collected, literate subjects were asked to choose either to self-administer or to helped-administer the measurement scales. If self-administer was selected, additional clarification was given only when the participant expressed difficulty in understanding the items. However, the high incidence of visual problems in diabetic patients and high illiterate rate in the Taiwanese elderly-- 36% of the elderly between 60 to 69 years old have education less than six years (Chang & Lin, 1993), made the interview the major way of collecting data. The interviewer read the statements to the subject and recorded subject's response.

The first interview lasted for 1.5 to 2 hours for each subject. If subjects chose to self-administer the psychometric scales, it took about 45 minutes. During the pilot study, it was found that some subjects tended to miss some lines and left some items unanswered. Therefore, the investigator did a quick check on the returned questionnaire. Missed or unclear answers were referred back to subject for completion, or clarity, or to determine that the subject chose not to respond. The second interview for the 12 subjects lasted 1 to 2 hours each. The interviewer asked the family member who accompanied the subject to leave the subject and interviewer alone during the period of interviewing. Before the second interview, permission was requested from subjects to tape-record the interview process. If the subjects declined to be tape recorded, then the interview content was recalled by the principal investigator and recorded in written text within 8 hours to avoid content lost from memory.

The first interview was conducted by the investigator and a research assistant. The second interview was conducted by the investigator using an in-depth interview. During the last two months of data collection, a college-prepared female research assistant was hired to help collect data for the first interview. The research assistant training included interview skill introduction, demonstration and practice in interviewing, and discussion. After the training period, the research assistant worked on Tuesday and Thursday only when the clinics had two unoccupied offices available for the research assistant and the investigator. Consequently, the data of the first two interviews which were conducted independently by the research assistant were discarded due to her obscured understanding on some items. The qualitative data gathered from first interview were used to examine the hypothesis that derived from the theoretical model. The qualitative data gathered from second interview were utilized to enhance the interpretation of the findings of the quantitative data analysis and to build the knowledge of meaning of well-being.

Pilot Study on Psychometric Properties of EFPS and RLSS (Dai, 1994)

Purpose of Pilot Study

Because the scales found in the literature were not adaptable directly to the sample of current study, scales were modified to fit the condition of the current study. In order to modify the scales and validate the reliability and validity of the Filial Expectation Scale (EFPS) and Recent Life Stress Scale (RLSS), a pilot study were conducted during June, 1993 and January, 1994. Two scales "the Survey of Recent Life Experience" (SRLE, Kohn & Mcdonald, 1992) and "Filial Piety Scale" (FPS, Yang, et al., 1988) were modified into EFPS and RLSS respectively and their psychometric properties were tested. The detailed process of modifying the scale will be presented in "measurements for quantitative data" section later.

Sample of Pilot Study

For the pilot study, a convenience sample was used. The data were collected in a large teaching hospital in Taipei. Potential subjects included patients, nurses and volunteers in the hospital who met two criteria: (a) 50 years or older, (b) had adult children who were 20 years or older. One hundred twenty subjects were recruited during August and September, 1993. Four questionnaires were excluded from analysis due to missing data. The total sample consisted of 116 subjects, 26 males and 90 females with mean age 60.4 years. Most subjects were married (87%) and had more than 9 years of education (86.2%).

Procedure of Pilot Study

The pilot study proposal was first reviewed and approved by the Human Subject Committee, Department of Physiological Nursing, School of Nursing, University of Washington. The purpose of the pilot study, procedure data collection , and time needed for participating the study were explained to the potential subjects first. Verbal consent was obtained. The subjects chose to either self-administer the questionnaires or verbally responded to the investigator's questions. It took subjects about 30 to 40 minutes to self-administer the questionnaire. However, it took approximately 1 to 1.5 hours when the questionnaire was administered by the investigator. Ten individuals among the 116 subjects were recruited to readministered both the EFPS and RLSS during 10 to 14 days after the first administration. The data were utilized to compute test-retest reliability.

Analysis and Results of Pilot Study

Statistical procedures of frequency, correlation, reliability (Cronbach alpha), and factor analysis were processed with SPSS. The results of this pilot study showed an acceptable internal consistency as well as test-re-test reliability for both EFPS and

RLSS. The factor analysis also showed evidence of construct validity on both scales as noted by a major factor emerging from the data for each scale. Both EFPS and RLSS were adopted to measure the expectation of filial piety and level of stress in the current study. The detailed analysis and findings on reliability and validity were discussed in the "measurements for quantitative data" section later.

Measurements for Quantitative Data

Demographic and Illness-related Variables

The data from the demographic and illness-related variables served two purposes in the current study: (a) they were used to provide background information for the studied sample, (b) they served as additional variables in the empirical model during the process of quantitative data analysis. These variables were not included in the original theoretical model. They were added to the original theoretical model to construct the empirical model. They were treated as control and predicting variables in the multiple regression analysis. The demographic variables consisted of age, gender, level of education, economic condition, living arrangement, marital status (Appendix B). The illness-related variables consisted of body mass index, diagnosis of hypertension, and duration of diabetes (Appendix B). The data of body weight, body height for calculating the body mass index were obtained from the subject's medical record.

Demographic Variables

Age. Measurements of age was obtained from the subject's medical record and verified by asking the subject " What is your age?" while interviewing the subject.

Gender. Data were obtained from the subject's medical record and observation.

Education. Education was measured by asking the subject "What is your highest education?" and "How many years did you attend school?".

Financial Status. Financial status was measured by asking patients "How much is the total income you and your spouse receive in a month?" and "How do you think about your financial situation, "well-to-do", "have some savings", "just make ends meet", or "poor"? Because the adequacy of finances is determined by both income and spending, high income did not necessarily mean financial adequacy. Therefore, subjective perception of financial situation was used in statistical analysis. Two subjects were reluctant to report their income but they were willing to give their subjective assessment of their financial situation.

Living Arrangement. The data on living arrangement were acquired by asking the subject to help the investigator to draw a family tree and circle all the family members who were living with the subject. The investigator categorized the information into: living alone, living with spouse, living with unmarried children, living with one married child, living with married children, living with married children in rotation, and living with others.

Marital Status. Once the living situation was known, data on marital status were usually obvious. If a spouse was not mentioned or did not live together, the investigator further probed with a question, like "How about your wife (or husband)?" The data were categorized into: married, widowed, divorced.

Illness-related Variables

Duration of Diabetes. The medical record on onset of diabetes was examined and verified by asking the subjects "when were you diagnosed as having diabetes?" Years of having diabetes were counted.

Body Mass Index (BMI). BMI is calculated as the weight in kilograms over height in meters, squared ($BMI = KgM^{-2}$). BMI is an estimation of total mass of body fat (Tai, et at. 1987_a). To date, it is a widely used index of obesity in diabetes studies. Some researchers defined obesity by BMI of ≥ 27 in males and ≥ 25 in females (Tai,et al. 1987_a). Patients' body weight was measured by the nurse using a calibrated digital scale during each clinic visit. Body height was measured by nurse using body height scale and recorded during patients' first visit. If these data were missing in the medical record, the investigator weighed or measured height using the devices in the clinic after the interview.

Hypertension. This was measured as a categorical variable with a yes or no. The data were obtained from the subject's medical record and subjects' report. Subjects were asked whether they had hypertension if they had no record of hypertension in their medical record because some patients were hypertensive and were receiving treatment in other hospital. Therefore, the definition of hypertension was based on patient's diagnosis made by physician not on a measure of blood pressure.

Independent and Dependent Variables

The independent variables consisted of the perceived family support, the expectation of filial piety, and the perceived stress. The perceived family support was measured by the Family Support Scale(FS). The expectation of filial piety was assessed by Expectation of Filial Piety (EFPS). The perceived stress was measured by the Recent Life Stress Scale(RLSS). The two dependent variables: glycemic control and psychological well-being were measures with Life Satisfaction Index A (LSIA) and level of glycosylated hemoglobin respectively. Either written or verbal permission was obtained from the authors of the instruments even though the instruments were all published and available (Appendix A). All the instruments developed in US.(English

version) were translated into Chinese and back-translated into English (Dai, 1994). The original version and the back-translated version were compared by the investigator and her dissertation advisor to insure clarity of items and to identify untranslatable items. The unclear items were modified, the untranslatable items were discarded or revised. The rewritten version was back translated and examined again.

Expectation of Filial Piety Scale (EFPS).

The 31-item EFPS was used to measure expectation of filial piety (Appendix B). Expectation of filial piety is the subject's expectation of filial responsibility of their adult-children. The EFPS was derived from a filial piety scale (FPS) (Yang, et al., 1988). The FPS was developed by K.Y.Yang, et al. (1988) on the basis of an extensive content analysis of the concept of traditional Chinese filial piety. The FPS was first designed to measure adult-children's attitude of filial piety toward their parents. The scale consisted of 52 items measured with a 4-point Likert-type response scale. Psychometric testing was conducted on samples of high school students, college students, and adult populations. Empirical data showed satisfactory psychometric properties. Factor analysis consistently extracted three factors: tender-heartiness to parents, obedience to parents, supporting parents or worship late parents and ancestors. The first factor accounted for 47% to 60% variance in various samples. The second factor explained 9 to 18% of variance (data on third factor was not reported). Construct validity was confirmed. There were 10 items which did not load well on any of these three factors. The content of these 10 items mainly referred to protecting parent's "face" and glorifying them. The authors grouped these 10 items into a conceptual factor called "protecting and glorify parents". The four subclass corresponded to the four factors examined for their internal reliability. The Cronbach alpha of the four subscales ranged from .47 to .96. Most of the alpha coefficients were

higher than .70. The one-month test-retest reliability ranged from .73-.88 (Yang, et al. 1988).

Parental expectation of filial piety refers to the attitudes parents have about the roles that adult children should play in their lives. Items in FPS operationalized the concept of Chinese filial piety. Therefore, it is appropriate to modify those items into questions of parents' expectation for the purpose of this study. Seven items of the subscale "supporting parents and worship late parents" which measure the parental or ancestral worship were discarded. Since these items are not related to living situation and they are death-relevant which may be offensive to the respondents who are ill. Consequently, 45 items comprise the original EFPS. Little modification has been made on each question. For example, if the original item is "Do you consider you should make time to accompany your parent?", the question was modified to "Do you think your children should make time to accompany you?"

Reliability of the EFPS in pilot study. In order to avoid extensive burden to the elderly respondents, statistical techniques were used to develop a shorter EFPS. The data on means of items, item-correlation, item-subscale correlation, item-total scale correlation and the change of alpha value if the item were deleted were analyzed to determine which item may not contribute well to the scale. Those items that did not contribute well were deleted from the scales. Finally, original EFPS was tailored into 31 items. All items retained in the 31-item scale were able to meet the following criteria: (a) item-subscale correlation was >.5, (b) item-total scale correlation was >.3. But, few items retained in the scale did not meet the other criteria of item-item correlation in subscale to be between .30 to .70 (Table C.4). The meaning of the items was also examined while trimming the items. For example, some items may be retained

if they contained important information for the measured concept even the statistical criteria were not perfectly met.

Reliability in quantitative research refers to the extent of the replicability of testing procedure (Carmine and Zeller, 1979). Without valid, reliable measurements, researchers will never be able to confirm their findings. For the 31-item EFPS, the reliability was tested on four subscales which classified the items into the same subscales as the original FPS.

The EFPS demonstrated adequate test-retest reliability with r=.82 (Table C.1). The estimates of Cronbach alpha on 31-item version of EFPS were .93 for total scale and .74 to .91 for each subscale. The estimates of the theta coefficient on 31-item scale was .94 (Table C.2). The internal consistency of short scale was lowered a little when the number of items reduced one third; however it still maintained good consistency (>.80). The test-retest reliability also showed good stability. Therefore, the findings of pilot study demonstrated acceptable reliability on EFPS.

Validity of EFPS in the pilot study. Validity refers to the extent to which the measurement measured what it intend to measure. To assess the evidence of construct validity of EFPS, the factor analysis was conducted on the original 45-item EFPS with four factors. It was found that four factors accounted for total of 56.6% of variance. After the EFPS was tailored into 31 items, the principal component factor analysis with oblique rotation found that the first four factors accounted for total of 55.7% of variance. The items loaded on each factor corresponded quite well with the factor clustering of K. S. Young, et al.'s (1988) analysis. The correspondence indicated that the conceptual integrity of the original filial piety scale was preserved. Eight of the 11 items in the first factor corresponded with the items of their first factor. Six of the seven items in the second factors corresponded to the items of their fourth factor. Six

of the seven items in third factor corresponded with the items of their second factor. Four of the six items in fourth factor corresponded with the items of their first factor (Table C.4). In summary, the large number of items in the first factor of the original FPS were loaded into two factors (factor I & IV) here. The four items in the factor of "supporting parent" were spread out into three factors (factor I, II, III). The items in the short version of EFPS were still clustering together similar to the original factor cluster. The 31 items of short EFPS were loaded well in four factors. The items of the four factors represent the concepts of respect the parents, obedience to the parents, supporting parents, and glorifying parents respectively. These four subconcepts were well-corresponded to the results of original content analysis of the filial piety. Table C.4 shows the factor loading of each items of 31-item EFPS. Evidence of construct validity of EFPS was presented in pilot study.

Reliability of EFPS in current study sample. Reliability and validity of the EFPS were reexamined using the data from current study sample. The data showed adequate internal consistency with Cronbach alpha = .92. The patients in outpatient clinic had their visit interval longer than two weeks. The data of retest were difficult to collect. The test-retest reliability was not reexamined in current study sample.

Validity of EFPS in current study sample. Validity of the EFPS was reexamined via factor analysis using the data from this study sample. Principal component factor analysis with oblique rotation confirmed a four-factor construct on EFPS and similar item clustering on the four factors as the previous pilot study did. These four factors accounted for 48.6% of variance. Construct validity of EFPS in current study was in evidence.

Family Support Scale (FSS).

Measure. A 29-item family support scale (Appendix B) was developed by adapting some relevant items from existing scales and adding some new items to measure the subject's family support. Twenty three items in the scale were adapted from the Personal Resources Questionnaire-85 Part II (PRQ-85, Weinert & Brandt, 1987) and additional six items were added, then the scale was referred to as Family Support Scale (FSS). PRQ-85 is a two-part measure of multidimensional characteristics of social support which was supposed to include five dimensions: intimacy, social integration, nurturance, worth, and assistance. Part I of PRQ provides descriptive information about the number of interpersonal resources a person can count on across eight life situations, the satisfaction with these resources, and whether or not there is a confidant (measure of social network). Part II is a seven-point, 25-item Likert scale which measures the respondent's level of perceived social support (Weinert & Brandt, 1987). Only Part II was utilized in the current study. These items are to measure the supportive attributes of emotional support, informational exchange, affirmation, and reciprocity in the family. Subjects were asked to refer their consideration within the network of their family only. The added six items were used to measure the tangible aids and recuperating atmosphere of the family (Caplan, 1982, Ofstadal, et al., 1993). A total of 29 items comprised the FSS used in the current study. The item response options were divided into five points which ranged from totally agree, somewhat agree, neutral, somewhat disagree to totally disagree.

Reliability of the FSS. Empirical data have shown PRQ-85 has strong psychometric properties. The test-retest reliability over four to six-week period was $r=0.81$ ($p<0.001$) for Part I, and $r=0.72$ ($p<0.001$) for Part II. Reliability coefficient for the total scales was alpha = 0.87, subscale reliability ranged from 0.62 to 0.74

indicating the scale has acceptable internal consistency (Weinert, 1987). The test-retest reliability of FSS for Taiwanese population was examined using same sample population of previous pilot study. During September 20 to October 7th, 1994, 10 hospital volunteer workers who were 50 and or older had adult children were invited to administered the FSS and Life Satisfaction Index-A twice with 14 days apart. It was found that test-retest reliability of the FSS was .87.

Even though the psychometric properties of the PRQ-85 are adequate, they can be taken as a referential value only. The psychometric properties of the derived family support scale can be very different because the item response option is different, and the concept of family support rather than social support is measured. In the current study, the reliability and validity were examined using the data from the current study sample. The internal consistency of FSS was high (Cronbach alpha = .92).

Validity of the FSS. Although validity of the PRQ had been shown in previous studies (Wiernert, 1987), evidence of validity of FSS needed to be established. Principal component analysis with oblique rotation was conducted to confirm the construct validity which was claimed in previous studies. Five factors were identified with 53.5% of total variance accounted for. There were seven, four, four, five, and three items loaded well on the five factors respectively. These five factors clearly indicated five attributes of assistance, nurturance, affirmation, intimacy and social integration which corresponded well with the subconcepts of original PRQ scale. The results showed evidence of construct validity of FSS.

Recent Life Stress Scale (RLSS)

The 30-item Recent Life Stress Scale (Appendix B) was used to measure the subject's perception of stress. RLSS was developed by adapting items from The Survey of Recent Life Experiences (SRLE). SRLE was developed by Kohn and

Macdonald (1992) to measure the perceived stress of adulthood. The most widely used Hassle Scale (Kanner, Coyne, Shaefer & Lazarus, 1981) is criticized as being biased by items which imply distressed physical and mental responses to stress as well as exposure to daily hassles. The authors claimed SRLE was a hassle scale that was less biased by the responses of illness while it was used to measure the subject's perceived stress. Hassles are defined as irritants that range from minor annoyances to fairly major pressures, problems, or difficulties (Kanner et al.1981). The original SRLE is a four-point 51-item scale that operationalized hassles related to responsibilities, work, romance, friends, family, other social relationships, finance, environment, time pressure, competitive standing and future security.

An empirical study tested the SRLE on a group of Canadian adults resulting in an acceptable psychometric properties. The internal consistency of SRLE was Cronbach alpha =.92 and its correlation to the Perceived Stress Scale (Cohen, et al., 1983) was r = .57 for concurrent validity. Factor analysis showed evidence of construct validity. Six factors: social and cultural difficulties, work, time pressure, finances, social acceptability, social victimization were identified. These factors accounted for a total of 43.3% of the variance.

Since SRLE has never been tested in a Chinese population the issues of transcultural measurement (Brislin, 1986; Jones & Kay, 1992) were thoroughly examined in pilot study. The SRLE was translated into Chinese. A bilingual graduate nursing student and a bilingual Ph.D. student in comparative literature were invited to examine and refine the terms and sentences of Chinese SRLE with the author. Then, the Chinese SRLE was back translated into English separately by two bilingual master-prepared nurses. The back-translated SRLE was compared to the original English SRLE by the author and her dissertation advisor. The discrepancies were discussed

and the meaning of the items was verified. Little change was made in the Chinese version. The concepts in the scale matched equivalent concepts in Chinese language. For example, the racial discrimination in the English version was translated into discrimination resulting from provincial origin in the Chinese version. Ten items that were suggested to be eliminated in the original scale were examined in the living context of Taiwanese elderly. These items were found to be not common or important experiences in Taiwanese elderly; therefore, were eliminated. Five additional items that were considered as common experiences in the elderly were added (Holahan, Holahan, & Belk, 1984). Finally, the scale was comprised of 46 items in total. The content of the scale was no longer identical to the SRLE. Therefore, this stress scale was named as Recent Life Stress Scale (RLSS) in following text.

Reliability of the RLSS in pilot study sample. The items of original 45-item RLSS was trimmed down to 30 items using the same strategies that were utilized to tailor the EFPS described in EFPS section previously (Table C.6). The mean of single items was low. Most of the item means were lower than 1.0 which indicated that most subjects rated their level of bother on daily hassles as mild. All items met the criteria of item-subscale correlation > .50 and item-total scale correlation >.30. However, some items were not able to meet the criteria with item-item correlation in subscale between .30 to .07. For the 30-item RLSS, reliability was first tested on five subscales which resulted from factor analysis with five factors.

The RLSS demonstrated adequate test-retest reliability with r = .87 (Table C.1). The value of internal consistency was Cronbach alpha = .88 for total scale and .70 to .78 for five subscales. The estimates of theta coefficient were .88 in 30-item RLSS(Table C.5). The findings demonstrated acceptable reliability of RLSS.

Validity of RLSS of pilot sample. Factor analysis was used to identify the evidence of construct validity of the RLSS. In the pilot study, principal component analysis with oblique rotation was conducted. Six factors accounted for a total of 47.4% of variance in the 46-item RLSS. For the 30-item RLSS, factor analysis found that the first five factors accounted for total of 50.1% of variance. The items loading on each factor were not stable and did not correspond well with the factor clustering of original analysis done by Kohn and Mcdonald (1992).

The subject number used in previous study and the pilot study did not meet the recommended number of 10 subjects per item (Nunnally, 1978) and this may account for the unstable factoring. Yet, the factor analysis of 30-item RLSS showed the first factor has eigen value of 6.94 which accounted for total of 23.1% of variance. The items in this factor were mainly related to time pressure and work. These findings evidenced that a major factor which represent the concept of stress did exist in RLSS. The results of pilot study has provided evidences of construct validity of RLSS.

Zero-order correlation coefficient showed that RLSS was significantly correlated with perceived adequacy of social support ($r(108)= -.21$, $p=0.01$), indicating the evidence of concurrent validity of RLSS .

Reliability of the RLSS in current study sample. Reliability of the RLSS were reexamined using the data from the current study sample. The RLSS showed an acceptable internal consistency with Cronbach alpha = .89.

Validity of the RLSS in current study sample. Principal component factor analysis with oblique rotation was used to examine a five-factor construct on RLSS and similar item clustering on the five factors was found as in that of pilot study. Factor analysis on RLSS confirmed five factors which accounted for 50.3% of variance. These five factors reflected the attributes which were purported by original authors of

the SRLE scale, include: too much work or responsibility, unsatisfied with living environment, financial difficulties, problems of interpersonal relationship, and social victimization. This five factors were evidence of construct validity of the 30-item RLSS.

Life Satisfaction Index-A (LSIA)

Measure. The Chinese version of Neugarten's multidimensional Life Satisfaction Index A (LSIA, Appendix B) was used to measure psychological well-being. No study with empirical data on reliability and validity on this Chinese version has been reported in literature, but an acceptable reliability and validity was claimed in one article (Rin, Lin, & Tsai, 1984).

LSIA was developed on the basis of five dimensions: zest(vs. apathy), resolution and fortitude, congruence between desired and achieved goals, positive self-concept, and mood tone(Neugarten, et al., 1961). Factor analysis yielded three factors of zest, congruence, and mood (Liang, 1984). LSIA included 20 attitude items for which only "agree', "disagree" or "?" response was required. The original scale scored a positive response as "1", negative response and "?" as "0". However, when subjects gave a "?" answer it did not mean they were totally in disagreement with the statement of the item stem. Most of the time they were somewhat but not totally in agreement. Sometimes they were unsure what their response should be when they were asked a life review question without time to think. One study (Wood, Wylie, & Shartter, 1969) scored "?" as "1" instead of "0", and found that the correlation between the LSIA and the Life Satisfaction Rating Scale (scale used as criterion, Neugarten, et al. 1961) was higher than when using the original scoring. Thus, the three-point scaling was adapted in this study, a score of 3 was given to a positive response which means "agree" in the twelve

positive items and "disagree" in the eight negative items. Contrary responses were scored as 1. All "?' responses were scored as 2.

In a cross-cultural study, LSIA was validated on an elderly Israeli population (Shmotkin, 1991). The three-factor solution was identified and a total of 31.1% of the variance was explained. Shmotkin (1991) maintained "despite the subjective and introspective nature of LSIA, the construct of subjective well-being appears to contain some generalized themes that let people meaningfully conceptualize their mental state and quality of life. Culture seems not to change the core meaning of the construct" (p.145). The test-retest reliability was not reported in literature. The test-retest reliability of LISA was examined using the same sample population of pilot study. During September 20 to October 7th, 1994, 10 hospital volunteer workers who were 50 or older and had adult children were invited to administered the LSIA twice with 14 days apart. It was found that test-retest reliability of the LSIA was .71.

Reliability of the LSIA in current study sample. The data of LSIA in current study sample showed an acceptable internal consistency with Cronbach alpha = .81.

Validity of the LSIA in current study sample. Construct validity of LSIA was estimated through factor analysis. Principal component analysis with oblique rotation yielded three factors which accounted for 39.8% of total variance. The items clustered on each factor were similar to that of previous study (Liang, 1984) as mentioned in previous page. The evidence of construct validity of LSIA was indicated.

In summary, all four scales: RLSS, EFPS, FSS, and LSIA demonstrated adequate internal consistency (> .80). Factor analysis showed the item clustering of EFPS, FSS, and LSIA had a similar composition of attributes as that were identified from the original content analysis of the concepts respectively. Only the RLSS has less

stable factor clustering that might be attributed to the fact that the original SRLE was not a well tested scale. Factor analysis also showed that items of the four scales explained sufficient amount of the total variance of each scale. This indicated that some major attributes that represented the studied concepts did exist in the scales.

Glycosylated Hemoglobin (HbA1c)

Glycemic control was referred to the physiological status of the diabetic control which was operationalized as the percentage of glycosylated hemoglobin (HbA1c) in blood. The measurement of HbA1c is a routine procedure in the diabetic specialty clinic. Therefore, these data were collected from subject's medical record. The HbA1c assay was performed in the Department of Laboratory Medicine of NTUH using high-performance liquid chromatography.

Instrumentation for Qualitative Data

The primary purpose of the second interview was to collect qualitative data to validate, interpret, and clarify the quantitative findings and to illustrate the subjective meaning of well-being. A semi-structured interview guide which probed subject's past experiences on glycemic control, subject's belief, impressive life experiences and present life situation was developed according to the interview purpose. For example, questions like "Please tell me in your experiences with diabetes, what conditions have ever made your disease out of control?" and " Does your diabetes control have anything to do with your family?" were used to probe the relationship between stress and glycemic control and family's role in diabetes control in subject's real life. Questions like "Can you tell me some major events which impressed you very much in your personal life, including good and bad experiences?" and "In terms of present life, what are the matters that can give you a sense of happiness or well-being?" were used to explore subject's subjective meaning of well-being.

The investigator interviewed a 76 years old foreign-born Chinese American in Seattle to test the applicability of the interview guide. The content of conversation was coded and analyzed to ensure the possibility of generating meaningful data. Finally, 14 open-ended questions comprised the interview guide (Appendix E--English version, Appendix G--Chinese version). Because the subjects were encouraged to talk about their life experience freely, they often brought up related questions to the investigator. The sequence of the questions and way of asking questions were flexible to make them suitable and more relevant for the subjects to answer. However, the investigator always made sure that the questions in the interview guide were asked.

Analysis Plan for Quantitative Data

The data analysis plan included: (a) analysis to examine the reliability and validity of measures, (b) analysis to detect the violation of assumption of multivariate regression analysis, (c) analysis of the magnitude of regression coefficient of linking path to test the theoretical model, (d) analysis of the qualitative data to enhance the understanding of the quantitative data. Computer program SPSS were used to analyze the quantitative data.

The psychometric properties (internal consistency, construct validity) of measurements which were used in the current study were tested with the gathered empirical data. The process and finding has been described earlier in this chapter. Prior to analyzing quantitative data, all variables were examined through various SPSS programs for accuracy of data entry, missing values, detection of the violation of normal distribution or the violation of the assumptions of multivariate regression analysis. The raw data were examined to see if linearity, normality, and homoscedasticity of the variables exist. The multicollinearity and singularity of the independent variables were tested with correlation matrix and tolerance to detect if

there was any highly correlated or confounded independent variables. Descriptive statistics were used to depict the sample. Scatterplot of independent and dependent variables were examined to check the assumption of linear relationship. A zero-order correlation between all the variables was estimated first. Multiple regression analysis were conducted to examine the magnitude of the effects of the independent variables on dependent variables.

The psychometric properties (internal consistency, factor loading of the items) of measurements which were used in current study were tested with the gathered empirical data. The indirect and total effects of variables hypothesized in the causal model were calculated according the formula of path analysis. The significance level of $p \leq .05$ was utilized for the bivariate correlation, standardized beta coefficient, and adjusted R^2s.

Analysis plan for Qualitative Data

The qualitative data analysis was used to enhance the interpretation of quantitative data and identify the themes of well-being in older persons. The content of the in-depth interviews was analyzed qualitatively following the procedure suggested by Miles and Huberman (1994).

After each in-depth interview, the investigator wrote a field note to summarize some interpretation or speculation about the subject's responses as references for later interviews or data analysis. The analysis of the qualitative data focused on "word" as basic medium. To identify the meaningful comments from the subjects responses to validate the findings of path analysis the investigator read through the data repeatedly to capture the meaning and identify the links between the concepts were embedded in the sentences or paragraphs. The identified verbal comments of the subjects were used to interpret the findings of path analysis.

For the purpose of finding the subjective meaning of well-being, the investigator did first level coding by assigning descriptive or interpretive labels to the meaningful words or sentences to summarize a segment of data. All codes were organized into a list to identify the recurrence or patterns in the first level codes. In other words, the first level codes with common attributes or meaning are threaded together to generate a pattern code (or theme). For example, the three descriptive codes: deep grief after losing family member, losing major support due to the death of spouse, and irresponsible husband caused serious family problems were integrated into a pattern code: family intact. Pattern codes are more exploratory and inferential than first level codes. They pull material together into more meaningful and parsimonious unit of analysis. Pattern coding which clusters information into parsimonious theme are analogous to the factor analysis of quantitative research (Miles & Huberman, 1994).

Protection of Human Subjects

The risk to subjects for their participation in this study was minimal. The nature of the questions examining family support, filial expectation and psychological well-being could have produced transient feelings of anxiety for those who had weak support or had feeling of unhappiness. The transient anxiety was reduced by the interviewer's skill of providing assurance and comfort or by allowing subjects to leave some items unanswered.

This research proposal was submitted for evaluation by the Human Subjects Review Committee of the University of Washington and the Research Proposal Review Committee of the National Taiwan University (Appendix A). After permission of the review committee was obtained, each potential subject was approached by the interviewer. The study was explained and an opportunity was provided to ask questions. Also, the potential subjects were informed that they were free to withdraw

at any time (Appendix A). If the person was interested in this study, verbal permission was obtained. It is not a required practice for a written consent form in Taiwan, and people are usually not used to sign on a written consent. A code number were assigned to each subject to assure confidentiality. The subject's name did not appear on the data collection forms. Only the investigator and her advisory committee had access to the data.

Summary

Chapter 3 presented the methodology. The study used correlational design with a causal modeling approach. Four instruments and a questionnaire consisted of demographic data and physiological data were utilized to collect quantitative data. A semi-structured interview guide was used to collect qualitative data. Expectation of Filial Piety Scale (EFPS), Family Support Scale (FSS), Recent Life Stress Scale (RLSS), Life Satisfaction Index-A (LSIA) were used to measure the variables: expectation of filial piety, family support, perceived stress, and psychological well-being respectively. Another dependent variable glycemic control was indicated by glycosylated hemoglobin. A pilot study on psychometric properties of EFPS and RLSS was reported. The reliability and validity of this four instruments were examined and discussed when each instrument was described. Both literature and empirical data of this study showed evidence of adequate reliability and validity for all instruments which were utilized in current study. Sample selection, data collection protocol, data analysis plan, and human subject protection in current study were also presented in this chapter.

CHAPTER 4

RESULTS OF PATH ANALYSIS OF QUANTITATIVE DATA

The purpose of this study was to test the impact of family support and expectation of filial piety on the perceived stress and well-being and to examine the subjective meaning of well-being of the older persons with NIDDM. A methodological triangulation was used. Both quantitative and qualitative data were collected. This chapter presents the results of the quantitative data analysis. Three sections are included. The first section reports the univariate and bivariate analysis of the observed variables. The second section describes the examination of the statistical assumption of causal model analysis. The third section reports the test of the theoretical model and revised theoretical model through path analysis.

Data Screening

A total of 152 subjects were recruited during the period of July 4th, 1994 to December 23, 1994. Prior to analysis, all data were examined using various SPSS procedures to ensure accuracy of data entry. Inspecting the printout of the data matrix and the output from the "frequency" program, errors were identified and corrected. Two subjects who lost contact with their children were excluded from the analysis. One man left most items of the Expectation of filial piety Scale (EFPS) unanswered because he did not know what to expect of his children. One woman gave all items in the EFPS identical answers because she said she did not have any expectation of her children.

To assess the assumption of linearity, univariate distribution of each variable was examined with a histogram and stem-leaf plot. The histogram of univariate distribution of age, years of education, EFPS scores, Life Satisfaction Index A (LSIA) scores, body mass index (BMI), and glycosylated hemoglobin (HbA1c) were examined

and shown to have normal distribution (A histogram of HbA1c is presented in Figure 4.1). Years of education and Recent Life Stress Scale (RLSS) scores were positively skewed, indicating more subjects had lower scores on RLSS or lower education. Scores on the Family Support Scale (FSS) were negatively skewed (Figure 4.2). Most subjects tended to give higher scores on FSS. The skewness and kurtosis were minimal so no data transformation was made. Some potential outliers were found but they were all valid, therefore, no outliers were excluded from analysis. In addition, the linear relationship between two variables was assessed with bivariate scatterplot. Linearity is fundamental to multivariate statistics because the solutions are based on general linear model. If scatterplots were not examined, a non-linear relationship that might exist among variables would be unnoticed while using general linear model.

Bivariate scatterplots of FSS vs. LSIA (Figure D.3), EFPS vs. LSIA, RLSS vs. LSIA, FSS vs. HbA1c, and RLSS vs. HbA1c were examined. No curvilinear patterns were found and no violation of the assumption of linearity was evidenced. Consequently, 150 subjects were included in following analysis.

Description of the Sample

Personal and Family Characteristics of the Sample

The sample of this study consisted of 150 older adults with Non-Insulin-Dependent Diabetes Mellitus (NIDDM). In terms of the site of data collection, all but one subject finished the first interview in the clinic office. Meeting time was arranged with this subject and the interview was conducted in her home. The investigator did the data collection on 121 subjects; a research assistant did the other 29 subjects. Fifty five subjects self-administered psychometric scales, 95 subjects finished scales with assistance. Twelve in-depth interviews were conducted by the investigator. Five of these interviews were held at the clinic office, and three were held at a classroom in the

hospital. The remaining five interviews were conducted in the living room of subjects' home. It was planned to tape record all in-depth interviews but only five patients agreed to tape-record the interview process due to subjects' sense of insecurity about the future use of the data despite the investigator have assured to them the confidentiality of the interview data before the interview started. The rest of seven subjects were interviewed without tape-recording.

Univariate analysis on demographic variables showed the average age of subjects was 63.67 (SD = 7.4) years, ranging from 50 to 90 years old (Table 4.1), and largely concentrated on 57 to 70 years (67.1%). Most subjects had long-term NIDDM which ranged from 4 months to 30 years, with 10.6 (SD = 6.7) years on average. Eighty eight subjects (59.3%) were under treatment with oral hypoglycemic agents to control plasma glucose, 45 subjects (30%) had insulin injections, 8 subjects (5.5%) had combined treatment of oral hypoglycemic agents and insulin, the remaining eight subjects took no medication and controlled their disease with diet and exercise. In addition to NIDDM, 58.7% of the subjects had hypertension. In general, subjects in this study were not obese. (Tai, et al., 1987_a) The average body mass index (BMI) was lower than 25 (mean = 24.85, SD = 3.51), ranging from 15.19-33.77. Even though they had NIDDM, 37.3% of the subjects self-rated their health as excellent or good, 31.3% rated it as fair, and 31.3% rated it as poor or very poor (Table 4.2).

The majority of subjects were married (75.3%); 22.7% were widowed, and 2.0% were divorced. There were more females than males (56.7% vs. 43.3%). Subjects achieved an education of 7.85 years on average; 51.3% received 6 years of education or less, 13.3% received at least college education.

Table 4.1 Demographic Data of the Study Sample (N = 150)

Variables	Range	Mean	Std Dev	Variables	Range	Mean
Age	50-90	63.67	7.40	Number of Children	1-8	4.07
	Number	%	-------		Number	% -------
Gender : Female	85	56.7		Source of income		
Male	65	43.3		Work	48	32
Education ≤ grade school	77	51.3		Saving or Investment	33	22
Junior high	24	16.0		Children	39	26
High school	26	17.3		work+saving+ investment	11	7.3
≥ college	23	15.5		Saving+invest. +children	11	7.3
Marital Status				Work+children	6	4.0
Married	113	75.3		Missing data	2	1.3
Widowed	34	22.7		Living arrangemt: Live with		
Divorced	3	2.0		Spouse	25	16.7
Financial adequacy				Unmarried ch.	20	13.3
Well-to-do	16	10.7		1 married ch.	92	61.3
Some Savings	90	60		each married ch. (rotation)	4	2.7
Make ends meet	36	24		≥ 2 married ch.	7	4.6
Poor	8	5.3		Alone	2	1.3

Note. ch. = child or children, each married ch. (rotation) = Live with each married child in a rotation ≥ 2 married ch. = Live with two or more than two married children together.

Table 4.2 Illness-related Data of the Study Sample (N = 150)

Variables	Range	Mean	Std Dev	Variables	Range	Mean	Std Dev
Duration of diabetes (years)	0.3-30	10.63	6.71	Body Mass Index	15.19-33.77	24.85	3.51
	Number	%	--------		Number	%	--------
Hypertension				Self-rated Health			
Yes	88	58.7	-----	Excellent	4	2.67	-----
No	62	41.3	-----	Good	52	34.67	-----
Treatment Mode				Fair	47	31.33	-----
Non-medication	8	5.3	-----	Poor	40	26.67	-----
OHA	89	59.3	-----	Very Poor	7	4.67	-----
OHA+ Insulin	8	5.3	-----				
Insulin	45	30	-----				

In terms of family characteristics, most subjects were living with their married child or children (77.3%), while 16.7% lived with their spouse, 13.3% lived with unmarried children, and only 2 subjects (1.3%) lived alone. The average number of children per subject was 4.07, which ranged from one to eight. Financially, 106 subjects (70.6%) claimed they were well-to-do or had some savings, 26% could only make ends meet, 3.3% reported they were poor. Ninety two subjects (61.3%) were financed independently by their own income from job, savings or investments, 26% were financed by children, 11.3% had mixed income from children and themselves.

Comparison of Sample to the General Older Population in Taiwan

In order to compare the similarity between the current study sample and the general older population in Taiwan, sociodemographic characteristics were examined. Because national data are only available for the 65 years or older population, this comparison is based only on study subjects 65 years or older.

Table 4.3 shows data of 65 years or older subjects in the study sample and the national population on level of education, marital status, and financial dependence on children. The current study sample has 79.4% with a junior high school or lower education, 58.7% married, and 57.1% receiving financial support from their children. In the national population over 65 years of age (Directorate-General of Budget, Accounting, and Statistics, R. O. C., 1993) 85.4% had a junior high school or lower education, 59.3% were married, and 52.3% were receiving financial support from their children. This comparison indicates that sociodemographic characteristics of subjects in the current study were roughly comparable to the national population.

In summary, most subjects of the current study were between the age of 57 and 70 years, married, living with their married children, received an education of 7.8 years, perceived themselves as financially adequate and independent. The sociodemographic characteristics of current study sample were similar to that of older population in Taiwan.

Univariate Analysis of the MajorVariables

The major variables included expectation of filial piety, family support, perceived stress, life satisfaction index, and HbA1c (Table 4.4). The possible range of total score of the expectation of filial piety was 31 to 124, the actual range of total scores was 41 to 116. The average sum scores of the expectation of filial piety was 79.45 (SD = 15.76). The item mean score for the expectation of filial piety was 2.56 (possible range = 1 to 4). This indicates subjects had a moderate level of expectations of their children. The possible range of total scores of family support was 29 to 145, the actual range of total scores was 71 to 141. Subjects reported high family support with an average total score of 119.96 (SD = 15.31), and an item mean score of 4.14 (possible range = 1 to 5). The possible range of total scores of stress scale was 0 to 120, the actual range of total scores was 0 to 84. The average sum score on stress was 15.15 (SD = 13.90), and item mean score was 0.51 (possible range = 0 to 4). This indicates that level of stress was not high on average, but quite variable across the subjects. The possible range of total scores of life satisfaction was 0 to 60, the actual range of total scores was 26 to 60. The mean score on the life satisfaction index was 47.71 (SD = 7.27), with an average item score of 2.39 (possible range = 1 to 3) which indicated that subjects tended to agree with the items which implied satisfaction with life. In terms of the physiological variable, the average of HbA1c was 7.56 (SD = 1.58),

Table 4.3 Comparison of Sociodemographic Data of Subjects > 65 years in the Current Study (N=63) and National Population

Variables	Study Sample	National Population (1993)
Education		
Junior high school or lower	79.4%	85.4%
High School	12.7%	7.8%
College or higher	8.0%	6.8%
Marital Status		
Married	58.7%	59.3%
Widowed	39.7%	33.6%
Divorced	1.6%	2.4%
Percentage of Financial dependency on children	57.1%	52.3%

Note. National data were from Report of Directorate-General of Budget, Accounting, and Statistics. R.O.C. 1994.

Table 4.4 Univariate Analysis of Major Variables in the Model (N = 150)

	Sum of Items				Mean of Items		
Variables	Possible Range	Actual Range	Mean	Std Dev	Possible Range	Actual Range	Mean
Expectation of Filial Piety	31-124	41-116	79.45	15.76	1-4	1.64-3.46	2.56
Family Support	29-145	71-141	119.96	15.31	1-5	2.68-4.57	4.14
Perceived Stress	0-120	0-84	15.15	13.90	0-4	0.12-1.45	0.51
Life Satisfaction	0-60	26-60	47.71	7.27	1-3	1.95-2.86	2.39
Glycosylated Hemoglobin (%)	------	3.8-11.5	7.56	1.58			

ranging from 3.8% to 11.5%. According to outcome criteria suggested by the Diabetes Association in Taiwan, the normal range of HbA1c was 4 to 6%, the average level of glycemic control of the subjects in the current study was in the well-controlled category (Lin, 1992).

Bivariate Correlation among Variables of the Model

Zero order correlations among six demographic variables in the theoretical model are examined first. Correlation coefficients at the statistically significant probability level of $p \leq .05$ are discussed. The magnitude of the relationships was arbitrarily considered weak if the coefficient was $r \leq .4$, moderate if the coefficient was between .4 and .65, and strong if the coefficient was $r \geq .65$ (Schepp, 1985).

Three variables that were multiple categorical variables in univariate analysis were transformed into two categories. Finance was recoded as inadequate or adequate. Those assessed their financial situation as "just make ends meet" and "poor" were arbitrarily recoded as inadequate. Those assessed their financial situation as "have some saving" and "well-to-do" were recoded as adquate. Marital status was divided into married and not married, and living arrangement was recoded as living with married children or other living arrangements.

No strong correlations were found in the correlation matrix (Table 4.5). Only one moderate correlation was found between subjects' gender and education ($r(150) = -.51$, $p < .0001$). This indicates male subjects generally had achieved higher levels of education. Seven correlations were weak but statistically significant at $p \leq .05$. In addition to education, gender correlated with marital status ($r(150) = -.38$, $p < .0001$), and living arrangement ($r(150) = .37$, $p < .0001$). More female subjects tend to be

Table 4.5 Bivariate Correlation Between All Variables in the Model (N = 150)

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1 Age	1.00													
2. Gender	.09	1.00												
3. EduY	-.25*	-.51*	1.00											
4. Finance	.11	-.12	.27*	1.00										
5. MariSt	-.37*	-.38*	.26*	.14	1.00									
6 LivArra	.10	.37*	-.27*	.03	-.18*	1.00								
7 .BMI	-.02	.15	-.05	.04	-.03	.08	1.00							
8. DuDM	.16	-.03	-.06	.09	-.09	.08	-.14	1.00						
9. HiBp	.05	.08	-.03	-.03	-.07	.03	.26*	.09	1.00					
10. EFP	.07	.26*	-.35*	-.06	-.06	.20*	-.01	.18*	.14	1.00				
11 .FS	-.08	-.15	.22*	.32*	.12	-.14	-.03	-.02	-.03	.07	1.00			
12. Stress	-.28*	-.16*	.32*	-.06	.17*	-.04	-.04	-.15	-.15	-.06	-.09	1.00		
13. LS	.09	-.06	.09	.36*	.04	-.08	-.01	-.01	.00	.01	.59*	-.39*	1.00	
14. HbA1c	-.05	-.12	-.05	-.14	-.01	.07	.15	.24*	.15	.02	-.04	-.15	.10	1.00

Note. EduY = Years of education, Finance = Subjective adequacy of financial situation, MariSt = Marital status, LivArra = Living arrangement, BMI = Body mass Index. DuDM = Duration of NIDDM, HiBP = Hypertension, EFP = Expectation of Filial Piety, FS = Family support, Stress = Perceived stress, LS = Life satisfaction. HbA1c = Glycosylated hemoglobin
* $p < .05$.

widowed and lived with their married children. Marital status also correlated with living arrangement ($r(150)=.18$, $p = 0.026$). Subjects who had lost their spouses were more likely to live with their married children compared to those married subjects.

Age correlated with education ($r(150)=-.25$, $p < .002$) and marital status ($r(150)=-.37$, $p < .0001$). Younger subjects achieved higher education. Older subjects were more likely to become widowed. Lastly, education correlated with finance ($r(150)=.27$, $p =.001$). Subjects who had a higher education were less likely to rate their financial situation as inadequate.

Inspection of correlations between the demographic variables and illness-related variables found only body mass index was significantly associated with diagnosis of hypertension ($r(150) = .26$, $p=.001$), indicating subjects with higher body weight were more likely to have hypertension. The correlation coefficients among major variables showed significant correlation between family support and life satisfaction ($r(150) = .59$, $p< .0001$), indicating the higher the family support, the higher the life satisfaction. In addition, a significant relationship also existed between perceived stress and life satisfaction ($r(150)=-.39$, $p< .0001$), suggesting the higher the level of stress, the lower the level of life satisfaction.

In the correlation matrix of all variables (Table 4.5) no evidence of multicollinearity or singularity between two variables was identified. All correlation coefficients were lower than .70. Multicollinearity refers to very high correlation between independent variables. It implies two variables or more may function as measures of one thing. Singularity refers to perfect correlation between variables. Two variables with bivariate correlation of .70 or higher should be

considered carefully before they are included in the same analysis (Tabachnik & Fidell,1989).

Test of Theoretical Model

The central purpose of this study was to test the theoretical model predicting the impact of the family support, expectation of filial piety, and perceived stress on well-being. The specific aims of this study were to test the following hypothesis:

1) Perceived family support affects perceived stress negatively in older adults with NIDDM.

2) Perceived family support affects psychological well-being positively in older adults with NIDDM.

3) Perceived family support affects glycemic control positively in older adults with NIDDM.

4) Expectation of filial piety affects psychological well-being negatively in older adults with NIDDM.

5) Perceived stress affects psychological well-being negatively in older adults with NIDDM.

6) Perceived stress affects glycemic control negatively in older adults with NIDDM.

Statistical Assumption of Causal Model Analysis

As discussed in the pevious section, prior to conducting the path analysis, the data were explored to examine the existence of outliers, multicollinearity, and violation of assumption of linearity, normality, and homoscedasticity. Because analysis of a causal model is based on multiple regression analysis, assumptions of both causal

modeling and multiple regression analysis need to be examined before data analysis. A violation of assumptions may not preclude use of multivariate regression analysis. However, such violations may affect both the type I error rate and the stability of estimated coefficients (Tabachnick & Fidell, 1989). If a violation of assumptions is found, a transformation of data may be needed or the results of analysis should be interpreted with caution. The following are further discussions of causal modeling assumptions.

1. Residuals should be normally distributed, linearly related, and homoscedastic. Residuals of the dependent variable should be normally distributed, should have a linear relationship with predicted dependent variables, and the standard deviations of errors of prediction should be equal for all predicted dependent variable scores. Residual scatterplots can be used to examine this assumption. If this assumption is met, the residuals would distribute rectangularly with a concentration of scores along the center in a scatterplot of residuals against predicted dependent variables score.

2. Independent variables should be reasonably independent of each other. Violation of this assumption is called multicollinearity. When bivariate correlation are higher than .70, there is a possibility of multicollinearity (Tabachnick & Fidell, 1989). Multicollinearity in an equation can be identified by examining the squared multiple correlation (R_i^2) or tolerance ($1-R_i^2$) among independent variables. Tolerance refers to the variance of an independent variable (i) which is not accounted for by other independent variables. A very low value of tolerance (less than .01) indicates multicollinearity among independent variables (Schroeder, 1990).

3. The model should be recursive. In a recursive model, residuals from an equation are neither correlated with residuals from other equations in the model nor with predicting variables. This assumption can be examined by (a). assessing the bivariate correlation between residuals of each equation and (b). assessing the correlations between residuals of dependent variables and their predicting variables (Asher, 1976; Blalock, 1985).

Empirical Examination of Statistical Assumptions

Scatterplots of residuals of dependent variables of each equation were used to examine the first set of assumptions--normality, linearity, and homoscedasticity of residuals. Scatterplots of all variables except perceived stress showed a rectangular shape on residuals distribution. A curvilinear pattern which indicates non-linear relationship was not in evidence (Figure D.4). Thus, this assumption was met on all major variables except perceived stress. The scatterplot of residuals of perceived stress represented a trapezoid shape which indicated heterosdasticity (Figure D.5). On the scatterplot, the error of prediction of perceived stress increased when the size of predicted score (predicted score of perceived stress) increased. In other words, the multivariate regression equation which predicted stress became less precise as the scores got larger. One potential outlier was identified in the scatterplot of residuals of perceived stress. However, this outlier was retained because it was considered valid.

Tolerance associated with the predicting variable was calculated and inspected to examine the assumption of multicollinearity. It showed that tolerance of all independent variables was higher than the multicollinearity criterion of equal or less than .01. Thus, no variable was excluded from the analysis.

To examine the assumptions of the recursive model, bivariate correlation between residuals of dependent variables as well as between residuals and their

predicting variables were calculated (Table E.1, Table E.2). All correlation coefficients except the relationship between residuals of family support and residuals of expectation of filial piety were statistically non-significant. The significant correlation between residuals of family support and residuals of expectation of filial piety was $r(150) = .17$, $p = .04$.

In summary, the assumptions of multivariate regression analysis and causal modeling were met in most situations. Heterosdasticity was found in the scatterplot of residuals of perceived stress against its predicted score. A weak correlation existed between residuals of family support and residuals of expectation of filial piety. This mild violation of modeling assumptions would not invalidate a path analysis of the model.

Path Analysis

Path analysis uses standardized multiple regression to examine a proposed theoretical model. The direct and indirect relationships that are presumed to exist between variables are examined to test the fit of the proposed model to the data. (Loether & McTavish, 1980). Multiple regression equations are used to compute regression coefficients in the theoretical model. The regression coefficient indicates the direction and magnitude of the direct effects of hypothesized causal variables on the hypothesized dependent or effect variable (Asher, 1976). The standardized regression coefficients (or "Betas") use a common scale of measurements for the variables and is more useful in assessing the relative importance of the predictors by comparing the magnitude of the coefficients. The unstandardized regression coefficients (symbolized as b) are preferred if researcher wants to compare effects of one single predictor on the dependent variable across subsets of data. The adjusted R-squares ($adjR^2$) are the variance of dependent variable accounted for by the predicting variables in the equation

(Asher, 1976). It is a more conservative estimate than R-square. The significance criterion level for all regression coefficients was set at $p \leq .05$.

A test of the theoretical model with the five major variables (Figure 4.1) was conducted first. The empirical model used for this test specified the causal relationships between measured variables as hypothesized in the theoretical model. These measured variables and their relationships were then used to construct the three multiple regression equations used to estimate path coefficients for the model (Figure 4.2). A revised theoretical model (Figure 4.3) which incorporated six selected demographic variables and three illness-related variables as exogenous variables was also tested. The revised theoretical model controls for the effects of demographic and illness-related variables on the major variables in the model, and also provides a chance to examine the effects of these "control" variables on the other variables in the theoretical model. Standard multiple regression procedures were used to test both the theoretical model and revised theoretical model.

Theoretical Model

Three standardized multiple regression equation were constructed for the theoretical model (Figure 4.1). The equations were:

$X_3 = B_{31}X_2 + e$ ----------(E_1)

$X_4 = B_{41}X_1 + B_{42}X_2 + B_{43}X_3 + e$ ----------(E_2)

$X_5 = B_{51}X_2 + B_{52}X_3 + e$ ----------(E_3)

Where

X_1 = expectation of filial piety, X_2 = family support, X_3 = Stress, X_4 = Psychological well-being, X_5 = Glycemic control, B_{ij} = the regression coefficient for the jth predictor variable in the model for the ith dependent variable, e = the error term.

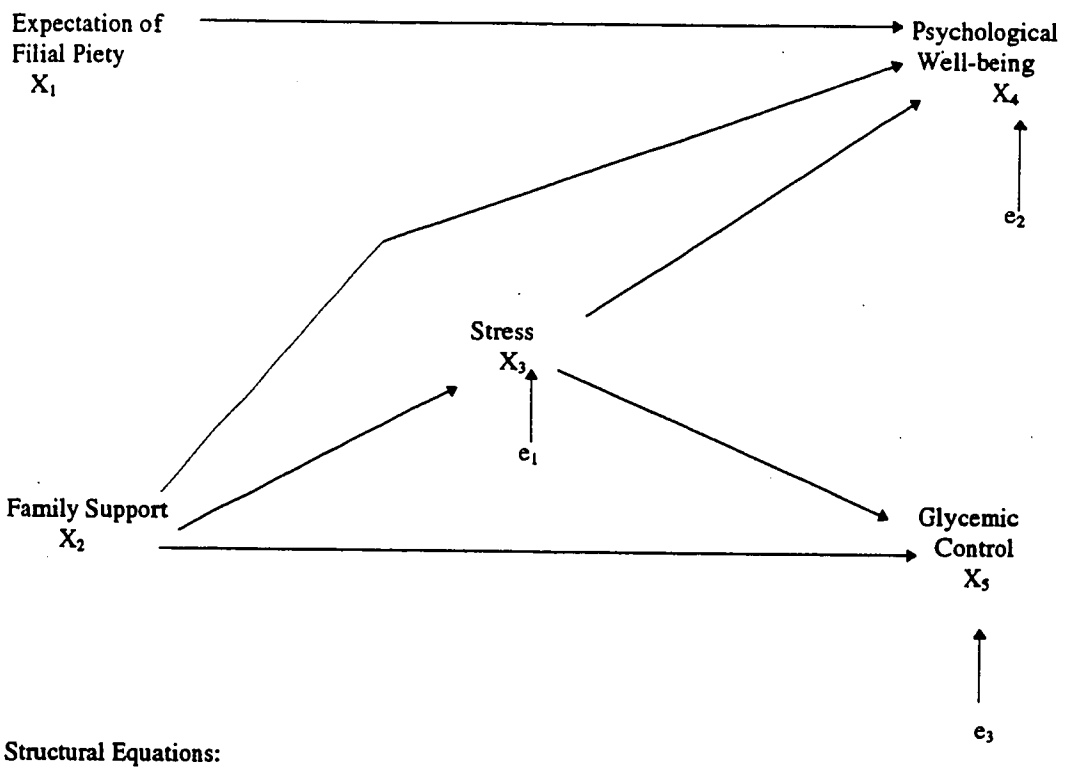
In the first equation (E_1) the Stage II variable perceived stress was regressed on the stage I variable family support. The equation was calculated using the empirical data of measured variables (Figure 4.2). Neither the regression coefficient nor the explained variance measure met the statistically significant criterion level indicating family support did not directly affect the perceived stress.

In the second equation, the Stage three variable psychological well-being was regressed on expectation of filial piety and family support in Stage I as well as the variable stress in Stage II. Both family support and stress showed moderate direct positive effects on psychological well-being ($B = .56$, $p<.001$; $B = -.33$, $p<.05$, respectively), together explaining 44.4% of the variation in psychological well-being ($B = .47$, adjR2 = .444). Expectation of filial piety had no significant impact on psychological well-being. Expectation of filial piety explained none of the variance for psychological well-being.

In the third equation, HbA1c in Stage III was regressed on family support in Stage I and perceived stress in Stage II. Neither the regression coefficients nor the explained variance measures met the statistically significant criterion level suggesting neither family support nor perceived stress directly affected the glycemic control.

In summary, the model was partially supported. Figure 4.2 presents the empirical model of the total sample with estimations of standardized regression coefficients, non-significant regression coefficient, and adjusted R-square. These modeling results provide evidence in support of Hypotheses 2 and 5 that are "the family support affects psychological well-being positively" and the stress affects the psychological well-being negatively." Hypotheses 1, 3, 4, and 6 were not supported.

Stage I Stage II Stage III



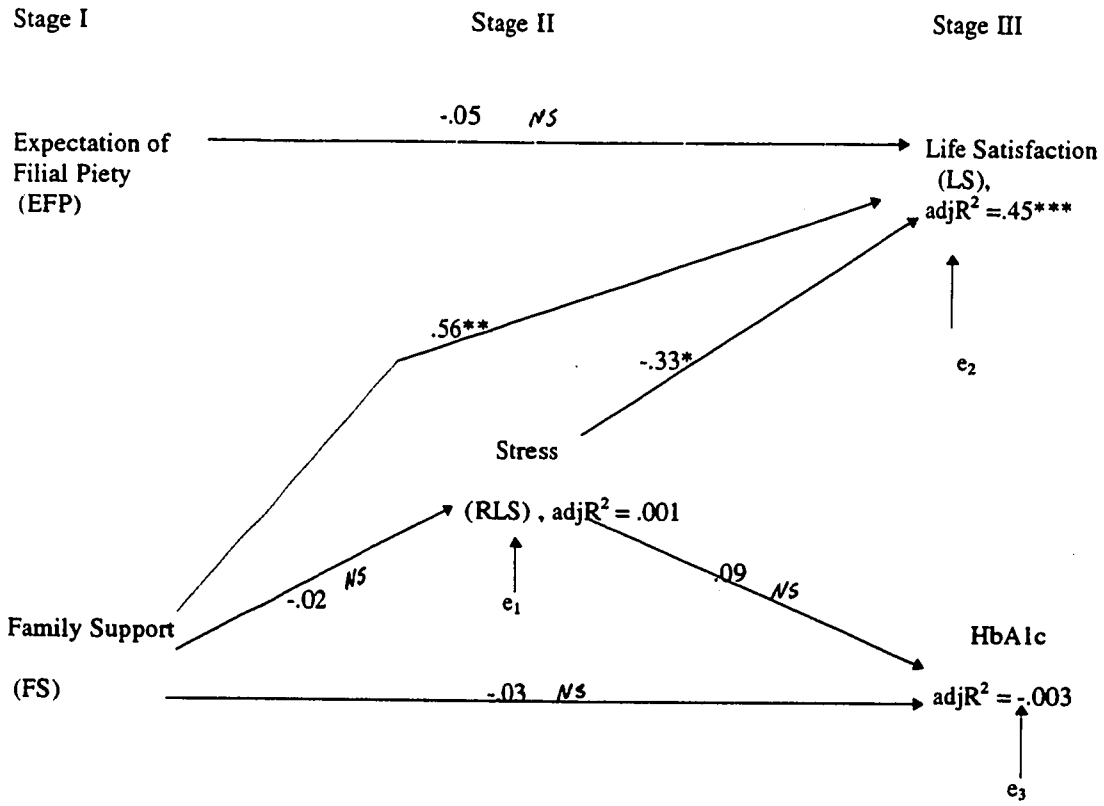
Structural Equations:

$X_3 = B_{31} X_2 + e_1$

$X_4 = B_{41} X_1 + B_{42} X_2 + B_{43} X_3 + e_2$

$X_5 = B_{51} X_2 + B_{52} X_3 + e_3$

Figure 4.1 Theoretical Model



Mathematical Equations:

RLS= (NS) FS + e_1

LS = (NS) EFP+ (.56) FS + (-.33) RLS + e_2

HbA1c = (NS) FS + (NS) RLS + e_3

NS =statistically Non-Significant coefficient

Statistically significant ciefficients are marked as follows:

* p = .01, **p = .001

Figure 4.2 Standardized Regression (Path) Coefficients for the Original Empirical Model

Test of Fitness of the Theoretical Model to the Data.

Loether and McTavish (1980) suggest three approaches for evaluating the fitness of the model to the data: (a) to examine the amount of variance in dependent variables accounted for by predicting variables, (b) to examine the size of regression coefficient to see if they are large enough to be included in the model, (c) to examine the ability of the model to predict correlation coefficients between dependent variables using the path coefficients of the possible alternate links.

With respect to the first approach above, only one of the three adjusted R-squares from the three equations was statistically significant. For psychological well-being, 44.4% of its variance was explained. With respect to the second approach, only two of the six paths showed statistically significant regression coefficients. Both approaches showed low goodness of fit. Finally, following the third approach the observed correlation and predicted correlations between psychological well-being and HbA1c (glycemic control) were calculated and compared. The observed correlation between this two variables was r = -.15, the predicted correlation which was calculated by summing up products of coefficients along all possible connecting paths between the two variables was -.049.

$(.56)(-.03) = -.017\ (p_{31}p_{14})$

$(-.33)(.09) = -.030\ (p_{32}p_{24})$

$(.56)(-.09)(.09) = -.0045\ (p_{21}p_{12}p_{24})$

$(-.33)(-.09)(.09) = .0026\ (p_{32}p_{21}p_{14})$

$r' = -.049$

The difference between observed and predicted correlation coefficients was relatively great. In conclusion, the analysis showed the theoretical model did not fit to the data satisfactorily. There may be some other links between the dependent variables

and the predicting variables that should be included but are excluded in the theoretical model. There may also be important variables that have been left out of these models. Therefore, a revised a theoretical model was developed.

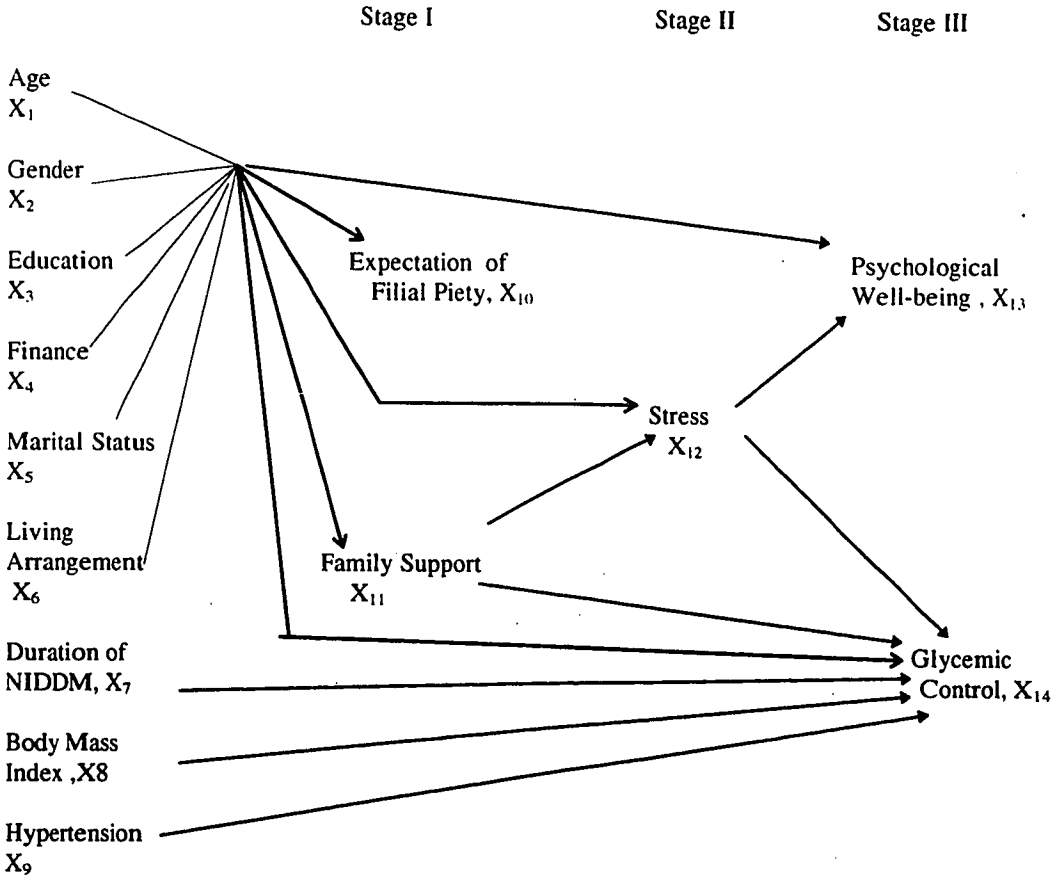
Revised Theoretical Model

Revised theoretical models were developed from the aforementioned theoretical model. Six demographic variables and three illness-related variables which were identified from the literature were incorporated into the model and treated as exogenous variables (Figure 4.3). The five major variables in the theoretical model remained in the same sequence relative to one another as in previous models and were treated as dependent variables in the five equations . The six demographic variables included age, gender, education, finance, marital status, and living arrangement (Chang et al., 1991, Kaplan & Hartwell, 1987, Erikson & Rosenqvist, 1993). The three illness-related variables consisted of duration of NIDDM, Body Mass Index (BMI), and diagnosis of hypertension (O'conner, Crabtree, & Abourizk, 1992, Tai, Chuang, Chen, & Lin, 1991). One following new hypothesis was also added to the original six hypotheses. Hypothesis 7: The demographic characteristics of age, gender, education, finance, marital status, living arrangement, body mass index, diagnosis of hypertension, and duration of NIDDM have significant association with family support, expectation of filial piety, perceived stress, psychological well-being, and glycemic control in older adults with NIDDM.

The revised theoretical model was tested using the following standardized multiple regression equations, each of which is derived from the revised model (Figure 4.3):

$$X_{10} = B_{101}X_1 + B_{102}X_2 + B_{103}X_3 + B_{104}X_4 + B_{105}X_5 + B_{106}X_6 + e_1 \text{ ---(E1r)}$$

$$X_{11} = B_{111}X_1 + B_{112}X_2 + B_{113}X_3 + B_{114}X_4 + B_{115}X_5 + B_{116}X_6 + e_2 \text{ ---(E2r)}$$



Structural Equations:

$$X_{10} = B_{101}X_1 + B_{102}X_2 + B_{103}X_3 + B_{104}X_4 + B_{105}X_5 + B_{106}X_6 + e_1 \text{ -------(E1r)}$$

$$X_{11} = B_{111}X_1 + B_{112}X_2 + B_{113}X_3 + B_{114}X_4 + B_{115}X_5 + B_{116}X_6 + e \text{ ---------(E2r)}$$

$$X_{12} = B_{121}X_1 + B_{122}X_2 + B_{123}X_3 + B_{124}X_4 + B_{125}X_5 + B_{126}X_6 + B_{1211}X_{11} + e_3 \text{----------(E3r)}$$

$$X_{13} = B_{131}X_1 + B_{132}X_2 + B_{133}X_3 + B_{134}X_4 + B_{135}X_5 + B_{136}X_6 + B_{1310}X_{10} + B_{1311}X_{11} + B_{1312}X_{12} + e_4 \text{----------(E4r)}$$

$$X_{14} = B_{141}X_1 + B_{142}X_2 + B_{143}X_3 + B_{144}X_4 + B_{145}X_5 + B_{146}X_6 + B_{147}X_7 + B_{148}X_8 + B_{149}X_9 + B_{1411}X_{11} + B_{1412}X_{12} + e_5 \text{.....--(E5r)}$$

Where

X_1: age, X_2: gender, X_3: year of education, X_4: financial situation, X_5: marital status, X_6: living arrangement, X_7: body mass index, X_8: duration of NIDDM, X_9: hypertension, X_{10}: expectation of filial piety, X_{11}: perceived family support, X_{12}: stress, X_{13}: psychological well-being, X_{14}: physiological well-being, B_{ij} = the regression coefficient for the jth predictor variablle in the model for the ith dependent variable standardized regression coefficient, e = the error term).

Figure 4.3 Revised Theoretical Model

$$X_{12} = B_{121}X_1 + B_{122}X_2 + B_{123}X_3 + B_{124}X_4 + B_{125}X_5 + B_{126}X_6 + B_{1211}X_{11} + e_3 \text{ ----------} \quad \text{(E3r)}$$

$$X_{13} = B_{131}X_1 + B_{132}X_2 + B_{133}X_3 + B_{134}X_4 + B_{135}X_5 + B_{136}X_6 + B_{1310}X_{10} + B_{1311}X_{11} + B_{1312}X_{12} + e_4 \text{ ----------} \quad \text{(E4r)}$$

$$X_{14} = B_{141}X_1 + B_{142}X_2 + B_{143}X_3 + B_{144}X_4 + B_{145}X_5 + B_{146}X_6 + B_{147}X_7 + B_{148}X_8 + B_{149}X_9 + B_{1411}X_{11} + B_{1412}X_{12} + e_5 \text{ ----------} \quad \text{(E5r)}$$

Where

X_1 = age, X_2 = gender, X_3 = year of education, X_4 = financial situation, X_5 = marital status, X_6 = living arrangement, X_7 = body mass index, X_8 = duration of NIDDM, X_9 = hypertension, X_{10} = expectation of filial piety, X_{11} = perceived family support, X_{12} = stress, X_{13} = life satisfaction, X_{14} = glycosylated hemoglobin, B_{ij} = the regression coefficient for the jth predictor variable in the model for the ith dependent variable standardized regression coefficient, e = the error term).

In the first equation (E1r), the variable expectation of filial piety was regressed on six demographic variables. Standardized regression coefficients and the adjusted R square of the equation were examined first on the total sample (N=150) using multiple regression analysis. Six variables explained the total of 10.6% of the variation in expectation of filial piety. In this model, only the variable education had a significant (negative) effect on the variable expectation of filial piety (B=-.32, Table 4.6).

In the second equation (E2r), family support was regressed on six demographic variables. These six variables explained total of 10.6% of the variation in family support. Only adequacy of the financial situation (finance) had a significant (positive) effect on family support (Table 4.6).

In the third equation (E3r), the variable perceived stress was regressed on six demographic variables and the family support variable. These seven variables explained 15.1% of the variation in perceived stress. Three variables (age, education, and family support) significantly affected subjects' perception of stress. Age was associated with a negative effects on stress (B=-.19, $p < .05$), education was associated with a positive effect on stress (B=.31, $p < .001$), and family support was associated inversely with stress (B=-.16, $p < .05$, Table 4.6).

In the fourth equation (E4r), level of psychological well-being (life satisfaction) was regressed on six demographic variables, as well as expectation of filial piety, family support, and stress. These nine variables explained 46.8% of the variation in psychological well-being. Three variables (finance, family support, and perceived stress) showed significant direct effects on psychological well-being. Finance was positively associated with psychological well-being (B =.18, $p < .01$). The better the financial situation, the higher psychological well-being. Family support also positively associated with psychological well-being. The higher the family support, the higher psychological well-being (B = .49, $p < .001$) Stress was associated inversely with psychological well-being (B =-.34, $p < .001$, Table 4.6).

In the fifth equation, HbA1c was regressed on six demographic variables, three illness-related variables, family support and stress. Lower the HbA1c indicated better glycemic control. The three illness-related and the six demographic variables, which were not in the original theoretical model, were used here as statistical control variables. The total of 11 variables explained approximately 10% of the variance for HbA1c (adjR^2 = .097). Financial situation, body mass index, and duration of NIDDM were found linked to HbA1c with significant regression coefficient (B =.19, .17, .30 respectively, Table 4.6).

Table 4.6 Standardized Coefficients (Betas) for the Regression of 5 Dependent Variables (EFP, FS, RLS, LS, and HbA1c) on Selected Subsets of 11 Independent Variables (Total Sample, N = 150)

	Dependent Variables				
Independent Variables	EFP	FS	RLS	LS	HbA1c
Age	-.002	-.091	-.187*	.032	-.019
Gender	.105	-.041	.037	.022	.131
Education	-.293**	.062	.311***	.004	.038
Finance	.020	.315***	-.073	.181**	-.185*
Marital Status	.065	-.012	.047	.021	.069
Living Arrangement	.091	-.108	-.094	-.080	.043
Body Mass Index	----	----	----	----	.171*
Duration of NIDDM	----	----	----	----	.298**
Hypertention	----	----	----	----	.083
EFP	----	----	----	-.020	----
FS	----	----	-.163*	.492***	.056
RLS	----	----	----	-.339***	.12
AdjR^2	.106	.106	.151	.463	.097
F(df)	F(6,143) =3.94***	F(6,143) =3.95***	F(7,142) =4.78***	F(9,140) =15.26***	F(11,138) =2.47**

Mathematical Equations for Multiple Regression:

EFP = (NS)AG + (NS)GE + (-.29)ED + (NS)FI + (NS)MS + (NS)LA + e

FS = (NS)AG + (NS)GE + (NS)ED + (.32)FI + (NS)MS + (NS)LA + e

RLS = (NS)AG + (NS)GE + (.31)ED + (NS)FI + (NS)MS + (NS)LA + (-.16)FS + e

LS = (NS)AG + (NS)GE + (NS)ED + (.18)FI + (NS)MS + (NS)LA + (NS)EFP + (.49)FS + (-.34)RLS + e

HbA1c = (NS)AG + (NS)GE + (NS)ED + (-.19)FI + (NS)MS + (NS)LA + (.17)BMI + (.30)DN + (NS)FS + (NS)RLS + e

Note. EFP = Expectation of Filial Piety , FS = Family Support, RLS = Recent Life Stress, LS = Life Satisfaction, HbA1c = Glycosylated Hemoglobin, AdjR2 = Adjusted R-square.
For mathematical equation, NS = Non Significant, AG = Age, GE = Gender, ED = Education, FI = Finance, MS = Marital Status, LA = Living Arrangement, BMI = Body Mass Index, DN = Duration NIDDM, HT = Hypertension.
*p< .05 **p<.01 ***p<.001

The regression coefficient corresponding to several paths in this model were statistically non-significant (Table 4.6). All predicting variables that had non-significant coefficients were deleted from the model in the subsequent analysis. Both marital status and living arrangement were not statistically significant in any of the five equations and therefore did not appear in any further analyses. These two variables were totally excluded from equations in further analysis. Standard multiple regression analysis was reconducted on equations including variables that had significant regression coefficients with their respective dependent variables. Figure 4.4 presents results for the reduced empirical model based on the total sample, with estimates of standardized regression coefficients and adjusted R-square (adjR^2). Because the fifth equation included 11 predicting variables in the original model, the degrees of freedom were greatly reduced. The possibility of type I error was correspondingly increased. Therefore, in the succeeding subsample analyses, the predicting variables with standardized regression coefficient greater than .1 in absolute value were retained in the model. As a result, in the models for subsamples of male and lower educated subjects, the predicting variables used in the reduced models were not same as the predicting variables used in the original revised model.

Previous analysis of bivariate correlations among exogenous variables showed moderate correlations between gender and education (r = -.51). In order to examine interactional effects of these variables, the theoretical model was reanalyzed with subsamples of subjects of different gender and education levels. Female and male subsamples was examined first using the same analyzing procedure used to analyze the total sample (Table F.1, Table F.2). Figures 4.5 and 4.6 show results of the analyses for the reduced models for female and male subsamples respectively. Then, the model was reanalyzed with the same procedure for subjects who achieved more than 6 years of

education and subjects who had fewer than 6 years of education separately (Table F.3, Table F.4). Figures 4.7 and 4.8 present the results of analyses for the reduced models for subjects with higher and lower education respectively. Comparing the difference of the standard regression coefficients and adjusted R-squares in the original revised models and the reduced models, small differences existed in the total sample analysis and larger differences was found in subsamaple analyses. This phenomenon may be attributed to the small N in subsample models, which resulted in a less stable parameter estimates.

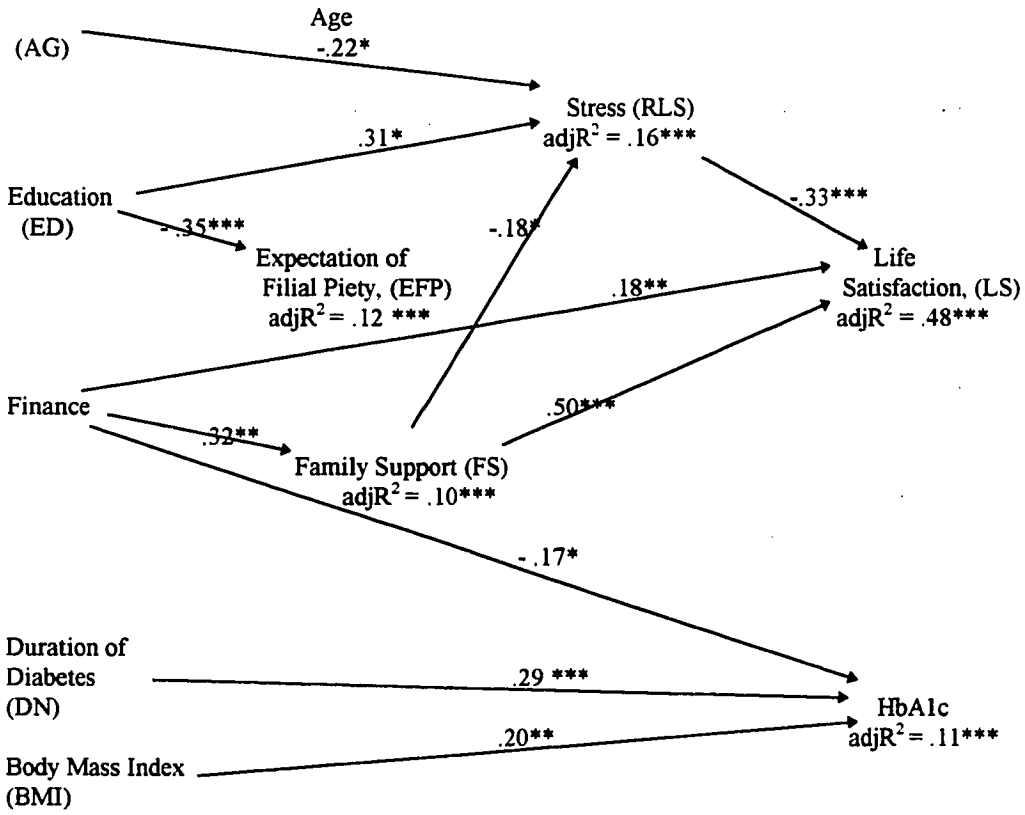
The following describes the results of the analyses for each hypothesis for the revised theoretical model.

Hypothesis 1 The Effects of Family Support on Stress

Of the total sample, Figure 4.4 showed that perceived family support had weak and negative effects on perceived stress ($B=-.18$, $p < .05$) in the reduced empirical model. However this effect was not shown in original empirical model (Figure 4.2) while the demographic variables were excluded from the model. In subjects with fewer than 6 years of education (Figure 4.7) the effect of family support on perceived stress was highly significant ($B=-.42$, $p \leq .001$). In other subsamples, the effect of family support was non-significant but in the negative direction consistently. This suggests that subjects with better family support reported a lower level of stress, especially in lower educated subjects.

Hypothesis 2 The Effect of Family Support on Psychological Well-being

The analysis of both the total sample and the subsamples consistently supported the hypothesis that family support positively affects subjects' psychological well-being ($B=.48$ to $.60$ in Figure 4.4 to Figure 4.8). The strength of this effect was consistent with the results found in analyses based on the original theoretical model. The male



Mathematical Equations:

EFP = (-.35)ED + e

FS = (.32)FI + e

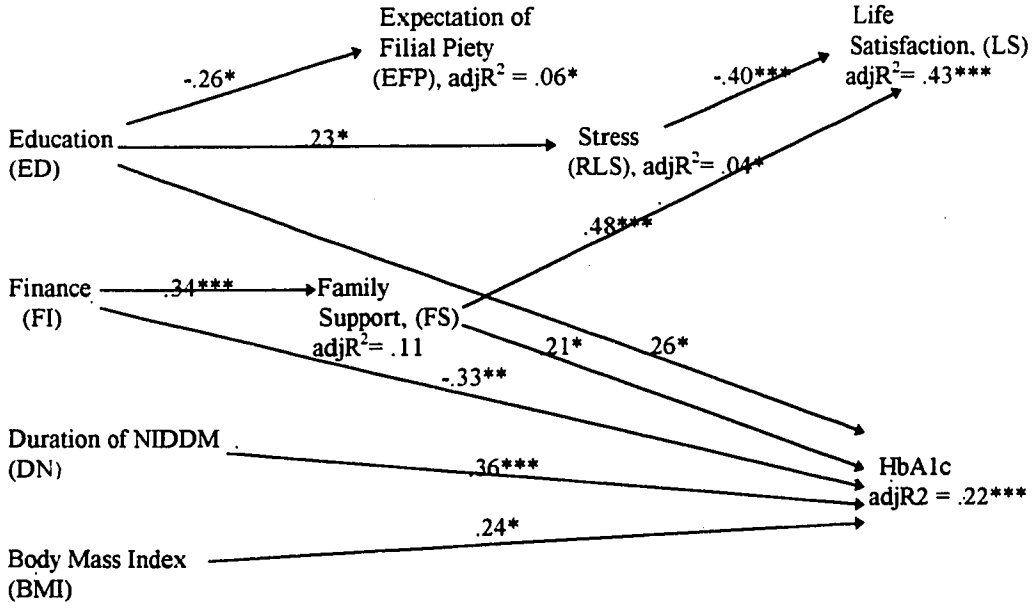
RLS = (-.22)AG + (.31)ED + (-.18)FS + e

LS = (.18)FI + (-.33)RLS + (.50)FS + e

HbA1c = (-.17)FI + (.29)DN + (.20)BMI + e

* $p < .05$, ** $p < .01$, *** $p < .001$

Figure 4.4 Reduced Empirical Model for Predicting Well-being of Older Persons with NIDDM Total Sample (N = 150).



Mathematical Equatios:

EFP= (-.26)ED + e

FS = (.34)FI + e

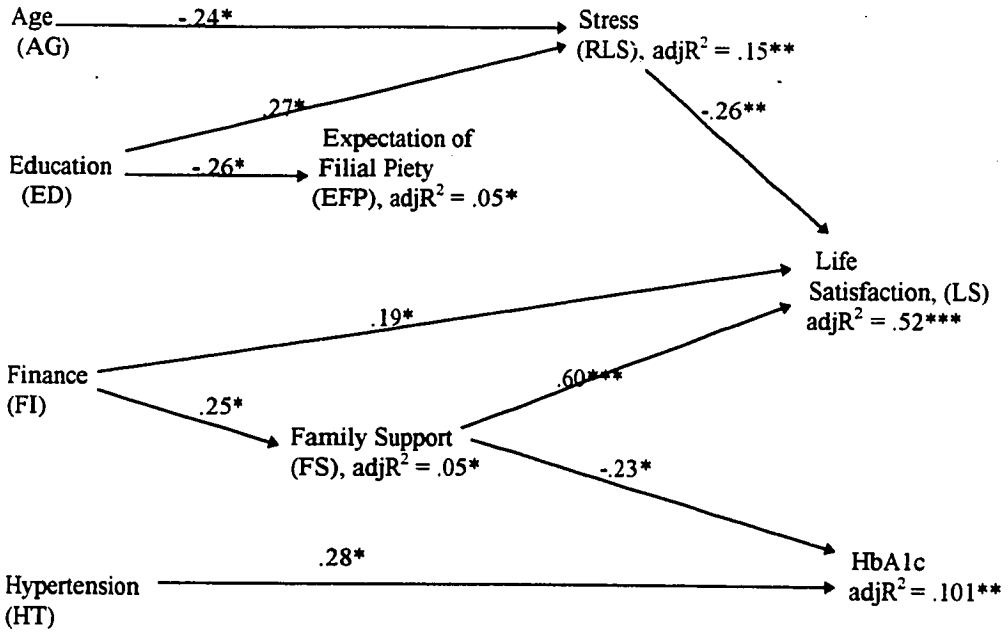
RLS = (.23)ED + e

LS = (-.40)RLS + (.48) FS + e

HbA1c = (.26)ED + (-.33)FI + (.36)DN + (.24)BMI + (.21)FS + e

*p < .05. **p < .01. ***p< .001.

Figure 4.5 Reduced Empirical Model for Predicting Well-being of Older Persons with NIDDM Subsample of Female (N = 85)



Mathematical Equations:

EFP = (-.26)ED + e

FS = (.25)FI + e

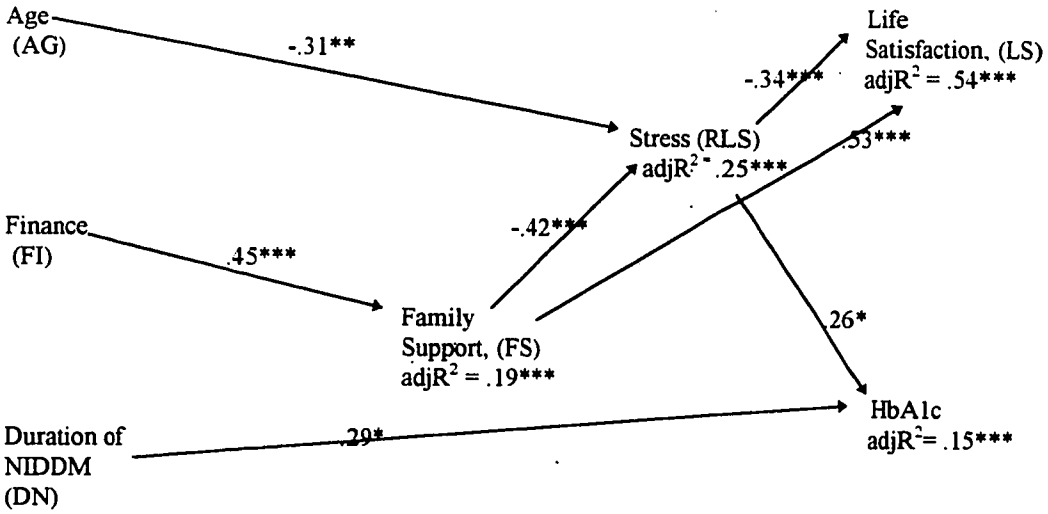
RLS = (-.24)AG + (.27)ED + e

LS = (.19)FI + (.60)FS + (-.26)RLS + e

HbA1c = (.28)HT + (-.23)FS + e

* p< .05. **p< .01. ***p< .001***

Figure 4.6 Reduced Empirical Model for Predicting Well-being of Older Persons with NIDDM Subsample of Male (N = 65)



Mathematical Equation:

FS = (.45)FI + e

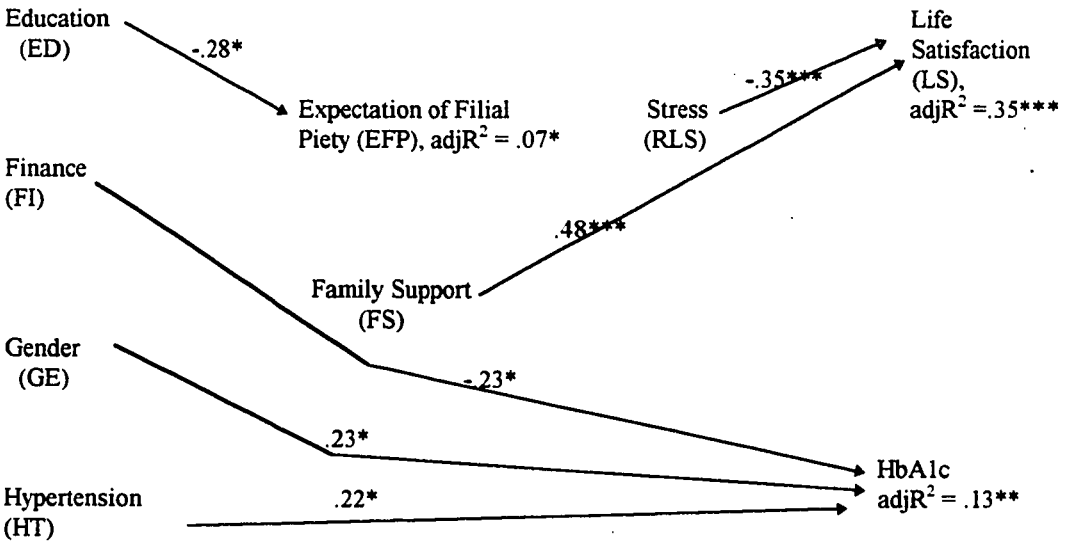
RLS = (-.31)AG + (-.42)FS + e

LS = (.53)FS + (-.34)RLS + e

HbA1c = (.29)DN + (.26)RLS + e

*p < .05. **p < .01. ***p <.001

Figure 4.7 Reduced Empirical Model for Predicting Well-being of Older Persons with NIDDM Subsample of Education ≤ 6 Years (N = 77)



Mathematical Equations:

EFP = (-.28)ED + e

LS = (.48)FS + (-.35) RLS + e

HbA1c = (-.23)FI + (.23)GE + (.22)HT + e.

*p < .05. **p<.01. ***p< .001.

Figure 4.8 Reduced Empirical Model for Predicting Well-being of Older Persons with NIDDM----Subsample of > 6 Years Education (N=73)

subsample showed the strongest regression coefficient on this path. These results indicate that subjects perceiving higher family support tend to experience more satisfaction in their lives. The intensity of the effects were all statistically significant but different across subjects with different gender and education. Comparing the unstandardized regression coefficient (b) between subgroups reveals that the positive effects of family support on psychological well-being is more prominent in males (b= .31) than in females (b= .24), and is more prominent in higher educated (b=.26) than in lower educated subjects (b=.24).

Hypothesis 3 The Effects of Family Support on Glycemic Control

The effects of family support on glycemic control were statistically significant in subsamples of female subjects and male subjects, but in opposite directions (Figure 4.5 and Figure 4.6). Female subjects who reported higher family support tended to have higher levels of HbA1c, suggesting that higher family support in females may contribute to a worse glycemic control ($B=.21$, $p<.05$). Male subjects who reported higher family support tended to have lower levels of HbA1c ($B=-.23$, $p< .05$), suggesting higher family support has a positive association with glycemic control in males. The opposing directions of association between these variables for males and females resulted in a non-significant coefficient for this path in the model based on the total sample. Gender was associated with an interactional effect on relationship between family support and glycemic control. In males, family support was associated with a positive effect on glycemic control. In females, family support was associated with a negative effect on glycemic control.

Hypothesis 4 The Effects of Expectation of Filial Piety on Psychological Well-being

All analyses showed that expectation of filial piety had no significant effects on psychological well-being for any group of subjects. Tables 4-6, F.1, and F.2 showed non-significant negative regression coefficients on the path between expectation of filial piety and psychological well-being for total sample and subsamples of female, , and less educated (B = -.020, -.111, -.030 respectively). However, Tables F.2 and F.4 showed positive but barely identifiable coefficients in male subjects and higher educated subjects (B =.09, B = .02 respectively). The results do not support the hypothesized negative relationship of expectation of filial piety on psychological well-being.

Hypothesis 5 The Effects of Stress on Psychological Well-being

All analyses showed that perceived stress was persistently associated with (negative) effects on psychological well-being (B ranges from -.26 to -.40). Higher levels of stress are associated with a lower levels of psychological well-being. Comparing the unstandardized regression coefficients (b) between the subsamples, the negative effects of stress on psychological well-being was somewhat more prominent in females (b = -.17) than in male subjects(b = -.13), and more prominent in lower educated (b = -.25) than in higher educated subjects (b = -.16).

Hypothesis 6 The Effects of Stress on Glycemic Control

The magnitude of regression coefficients between perceived stress and HbA1c ranged from .08 to .26 in the original revised model across different subsample groups (Tables 4.6, Table F.1 to F.4). Only for subjects with 6 years of education or less, had this coefficient statistically significant (B = .26). This indicates a weak but deleterious effect of perceived stress on glycemic control among less educated subjects.

Hypothesis 7 The Effects of Demographic Variables and Illness-related Variables on Major Variables Expectation of Filial Piety, Family Support, Stress, Psychological Well-being, and Glycemic Control

The analyses show that different demographic variables not only affect major variables differently, but also behave differently in different subsamples. Figures 4-4, 4.5, 4-6, and 4-8 all show education had a negative effect on expectation of filial piety, suggesting that the subjects with higher education had a lower expectation of filial piety. Education also affected level of stress positively, indicating that subjects with higher education reported higher levels of stress in recent life experiences.

Age affected level of stress negatively, indicating that older subjects have lower reported levels of perceived stress. In female and higher educated subsamples (Table F.1 and Table F.4), regression coefficients between age and stress show a negative trend in this relationship but it is not statistically significant.

Finance affected subjects' family support positively and significantly in all groups except in subjects with higher education. Of the total sample, finance also positively affected psychological well-being ($B = .18$, $p < .01$). Therefore, finance had indirect effects (.32 x .50 = .16) on psychological well-being via the effect of family support. There also existed another route of indirect effect through family support and stress (.32 x -.18 x-.33 = .02). The total effect of finance on psychological well-being, including both the direct and indirect effects, was .36 (.18 + .16 + .02 = .36). The effect of finance on family support was stronger for female and stronger for less-educated subjects than the higher educated. Subjects who had an adequate financial situation reported higher levels of family support. Finance also associated with a weak negative effect on level of HbA1c in the total sample. In subsamples of female and

higher educated subjects, the effects were statistically significant (B=-.33, B = -.23 respectively). In the female subsample, an indirect effect of finance on HbA1c via family support was identified as .07 (.34 x .21 = .07). Combining direct and indirect effects, the total effect of finance on HbA1c was -.27 (-.33 + .07 = -.27). This suggests that adequacy of finances leads to a better glycemic control, and in turn, better glycemic control. In the subsample of lower educated subjects, finance showed a negative but non-significant effect on HbA1c. In the subsample of male subjects, the regression coefficient was positive but barely identifiable.

In addition to the impact of the demographic variables on endogenous variables, the results of these analyses showed illness-related variables accounted for a significant amount of variation in the variable HbA1c. Body mass index and duration of NIDDM positively affected the level of HbA1c in the total sample (B=.20 and B=.29 respectively). Subjects with higher body weight or longer duration of NIDDM tended to have higher levels of HbA1c. Diagnosis of hypertension was a significant predictor of higher level of HbA1c for male subjects and higher educated subjects.

Summary

Hypotheses related to the theoretical model were partially supported. Without including the demographic and illness-related variables in the model, only two hypotheses were supported. Four hypotheses were not supported. Family support appears to affect psychological well-being positively. Perceived stress appears to affect the psychological well-being negatively. The revised theoretical model fit the data better (in terms of the number of hypotheses supported and the higher magnitude of path coefficients). As predicted, family support affected perceived level of stress and psychological well-being

significantly. Perceived level of stress affected psychological well-being negatively. The predicting variables accounted for 48% of the variation in psychological well-being. Glycemic control was less predictable. Only approximately 10% to 20% of its variation was predicted by the variables in the revised empirical model. The significant predicting variables varied across subsamples. Perceived level of stress acted as predicting factor for glycemic control only in lower educated subjects. Gender had an interactional effect on the relationship between family support and glycemic control. Higher family support predicted higher levels of HbA1c in women with NIDDM. However, higher level of family support predicted lower levels of HbA1c in men. Contrary to prediction, expectation of filial piety did not affect psychological well-being. All the statistically significant path coefficients were weak, except that between family support to psychological well-being ($B \leq .40$). Education affected expectation of filial piety and perceived level of stress. Finance benefited family support and glycemic control (lower HbA1c). Duration of NIDDM, body mass index and hypertension have deleterious effects on glycemic control.

CHAPTER 5

RESULTS OF QUALITATIVE DATA ANALYSIS

The purpose of the qualitative data analysis in the current study was to use methodological triangulation to further explain and verify the relationships found in the model using quantitative data analysis and to analyze the perceived concept of well-being in older Taiwanese. The data of qualitative data analysis (content analysis) come from a series of open-ended questions in semi-structured interview questionnaire (Appendix B).

Personal and Family Characteristics of the Subjects

Six female and six male subjects were recruited and interviewed as described in the data collection protocol. Seven interviews were conducted in either a clinic office or the classroom of the hospital: five were conducted in the subject's home.

The demographic data of these twelve subjects showed an average age of 66 years, ranging from 57 to 78 years. Eight subjects were married, three were widowed, one was divorced. Nine of the subjects were retired and three were still holding a job. In terms of living arrangement, five lived with their married children, four lived with their unmarried children, two lived with a spouse, and one lived alone. Only one subject rated her financial situation as well-to-do, ten reported having some surplus, one reported to be just making ends meet (Table 5.1).

Table 5.1 Demographic Data of Subjects who Participated In-depth Interview (N = 12)

Gender & case number	Age	Marital Status	Edu (year)	Living Arran	Dur of NIDDM	LSI-A (score)	HbA1c (%)
F1	60	Married	0	UMC	1	54	5.5
F2*	61	Married	0	MC	17	39	9.5
F3*	69	Widowed	12	MC	11	56	8.1
F4	57	Married	9	UMC	6	54	7.5
F5	73	Widowed	16	MC	23	44	7.7
F6	76	Widowed	16	MC	10	46	8.2
M1*	71	Married	6	MC	5	54	6.2
M2	66	Married	6	Spouse	9	52	8.3
M3	58	Married	9	UMC	13	52	8.3
M4	78	Married	11	UMC	10	53	6.7
M5	63	Divorced	15	alone	8	34	6.3
M6*	60	Married	15	Spouse	11	33	10.3
Mean	66		9.58		10.3	47.7	7.7

Note. Fi = the ith female subject, Mi = The ith male subject, Edu(Year) = years of Education, Living Arran = Living Arrangement, Dur of NIDDM = Duration of Non-Insulin Dependent Diabetes Mellitus, LSI-A(score) = Score on Life Saticfaction Index-A , HbA1c(%) = % of glycosylated Hemoglobin, alone = Living alone, MC = Living with Married Children, UMC = Living with unmarried Children, Spouse = Living with spouse.
* indicates subjects reported in case study.

Reliability of the Content Analysis

In the first part of content analysis, the investigator examined the entire set of qualitative data for its relevance to the findings of the quantitative data analysis of the proposed theoretical model. Four case studies were selected to make exemplary interpretations of the theoretical model. Secondly, the themes of subjective meaning of well-being were identified from the qualitative data utilizing content analysis. The content analysis was done by the investigator under the supervision of one member of her dissertation advisory committee. The definition of codes and themes were developed during the data coding. Those definitions were discussed with the supervising faculty to ensure the first level codes to be mutually exclusive. To check the reliability of the data coding, three interview transcripts were randomly selected and translated into English. The supervising faculty did an intercoder reliability check by coding these transcripts against the definitions made by the investigator. No disagreement was found in the coded items but four more important meaningful statements in the transcripts were identified. The data set was determined to be reliably coded.

Results of Content Analysis

Initially the two male and two female subjects who were interviewed were identified who had the highest and the lowest scores on the variable of psychological well-being, Life Satisfaction Index A (LSIA). Their verbatim responses from the interviews were summarized to illuminate the hypotheses in the theoretical model. Using these data, some issues of psychometric

measurements will be discussed too. To ensure the confidentiality of subjects' identity, neither their first name nor their surname will be used. Fictitious names are used throughout. Mr. Chin and Mrs. Ho who reported lowest score on LSIA ,33 and 39 respectively (Table 5.1), will be described followed by the summary of Mr. Chiu and Mrs. Kim who reported highest score on LSIA with 54 and 56 respectively. The possible range of LSIA score is 20 to 60. In the following text, Mi indicates the ith male subjects, and Fi indicates the ith female subjects in Table 5.1.

Case Study 1 --Low Life Satisfaction

Mr. Chin (M6), 61 years old junior college graduate, and retired accountant, is married, and has three sons. He lives with his wife who helped their eldest son take care of three and one-half year old twin granddaughters during the day. Mr. Chin was diagnosed as having Non-Insulin Dependent Diabetes (NIDDM) 11 years ago and is now treated with insulin. Since Mr. Chin mastered Japanese, he helps coordinate foreign business for his eldest son's trading company since his retirement.

Mr. Chin was heavily distressed by his sexual dysfunction and lack of family support. He said

> I did not realize that this disease (NIDDM) can affect my emotion and change my way of viewing my surroundings. I did not realize that this disease might hurt eyesight either. I worry that someday I may become blind. I suspect it may destroy my teeth too. Everyday I

worry that some complications may show up, I am afraid to eat what I like. It has been very deeply distressing.

When asked about what was his most impressive experiences in his life, he disclosed his central concerns with great difficulty.

> I don't know if others also have this problem. This symptom probably is. . . .[pause]; it affects sex life a great deal. It is a big obstacle in the life process. A man will feel bad and different from other normal men, especially sorry for his wife. He would feel ashamed and guilty because he did not fulfill the responsibility of being a husband. To have diabetes already troublesome; the pressure is enormous when adding this kind of difficulty. If counting all the pressure as 100 points, the pressure from this problem would be 50%. This is not a resolvable problem, and there is no breakthrough.

He was also concerned about other fellow patients and felt obligated to keep the link between NIDDM and sexual dysfunction in secrecy.

> I try hard to avoid letting people know. They may think something is wrong with me. If people know that diabetes may cause this problem (sexual dysfunction), they will not allow girls to marry people with diabetes. Most of the people do not realize this situation, since people with diabetes appears as normal as everyone else. That is why girls still marry to the men with diabetes.

Talking about the problems in dealing with family members, he stated

> My wife minds her own business, and I do mine. I can tell that she treated me differently since I am having this kind of difficulty. My wife has a hot temper; she is not a tender, agreeable and accommodating person.. . . . As to the kids, there is a generation gap between us.

When asked if family offered help with insulin shots, he replied

> My wife said that she would faint as soon as she sees any blood. I don't want to talk too much and force her to do the things she does not want to do. Those shots are really bothersome. I will run out of sites for those shots soon. Its very inconvenient without help.

Mr. Chin's verbatim responses clearly indicated that diabetes-related sexual dysfunction was a primary stressor which caused marital dissatisfaction and inadequate family support. Unavailability of family support aggravate his worry about future care of diabetes (another stressor). In response to how can he make his life happier, he said "My life is not great. We do not have a harmonious atmosphere at home. *It's just like a square missing a corner*". This implies that discordant family relationships made him lose his sense of integrity and satisfaction with his life.

Under such a depressive, helpless mood, Mr. Chin did not get actively involved in blood glucose monitoring or diet control and did not have good glycemic control either. His level of HbA1c was 10.3%. Talking about his diabetes control, he said

> I can't help grabbing food on table when my family is not watching. It's too much emotional pressure if I have to perform the

> blood test daily. Furthermore, I am still working, it's only possible for someone who has nothing to do during the day.

In terms of his expectation of children, he put it this way:

> My son, my daughter-in-law and I each hold different opinions. I try not to interfere with the decision on trading business lest it affects their relationship. Kids are different from before. In the old days, when kids earned ten cents, they would give eight cents to parents. Nowadays, you consider a kid is good if he gives you two cents. I don't expect much from them. It's good enough if they do not ask for money from you. Times are different.

He also reported that his son was not close to him and did not listen to him. Facing the reality, he lowered his expectation of filial piety to avoid further disappointment or create disharmony in the family.

Case Study 2---Low Life Satisfaction

Ms. Ho (F2)is a 61 years old housewife, who received no formal school education. She is a mother of one son and four daughters. She scored low on the variable LSIA. Twelve years ago her husband had an extramarital affair and moved out of her house. Two years ago, her only son died in an auto accident while he was traveling in Australia for a business trip. She is living with her second daughter who is not married and her fourth daughter who was divorced and has custody of her daughter. Ms. Ho helped take care of the 6 year old granddaughter and did family house keeping. She had been diagnosed as having NIDDM for 17 years and treated with oral hypoglycemic agents.

Ms. Ho reported that good mood, no worry, diet control and exercising regularly are major factors which would contribute to a better blood glucose control. She complained that she had been in a bad mood, feeling sad, crying a lot, and not sleeping well since her son died. During the first year of her son's death, she recalled "I could not sleep for a couple of months when my son passed away. During that period of time, I had no appetite and ate very little, but my blood sugar was very high".

In order to help her overcome the deep grief, her daughters encouraged her to convert to Buddhism, accompanied her to the Buddhist temple to attend religious gathering, and listened to the lectures of the priest. They also encouraged her to attend a supplementary education program during the evening because she has regretted that she could not attend school when she was young. In those activities, she met other people and learned to view her marriage and her son's death from different perspectives. During the interview, she liked to quote the words of her teacher and her Buddhist priest, such as "my teacher said everyone should face reality, when it's time to die, one should go and don't mourn and lament".

> What I complained the most about is my son's death. I am not willing to let go. My Buddhist priest always advise me "should it be yours, it will be yours. You can not keep it even with force", then she concluded "my son was a good son. He loved me, respected me, and cared about me so much, but the fate by which we are brought together is over. I should not be too negative which might make him uneasy in the other world.

Social integration helped her walk through grief and minimized her emotional distress. When asked about who had the most influence in her life , she replied

> The people who influenced me the most are my son and my husband. My son was a positive influence. . . . The person who influenced me negatively was my husband. I still am full of hatred whenever I see his name. The Buddhist priest said one should try to resolve rather than to perpetuate hatred.

She is actively involved in recovery process and found that she is "more at peace and the blood glucose control has improved". Apparently, family and religious support played a significant role to help her regaining balance in her life. Talking about the family's influence on her diabetic control, she said "There are advantages to having a family. My daughters remind me to stay on my diet when they see me eating food containing high sugar. They would accompany me to the clinic if I need help". She also pointed out friction in the family can worsen glycemic control, "Last month my blood sugar went up to over 200 (HbA1c 9.5%), because I was angry and argued with my daughter when she disciplined my granddaughter harshly". However, she tried to solve this problem by using extrafamilial support, she said "My neighbors advised me that my granddaughter is my daughter's kid; it's better not to interfere. Now, I have learned that when she disciplines my granddaughter, I go outside and chat with neighbors".

Ms. Ho's experience showed that major life events that had happened in the family had almost torn her life apart, but also that the support from the

family brought her back together. Although the subject identified that her family acted only as a monitor and accompanied her to clinic visits, the effort to help her regain emotional balance was the major force that lowered her level of blood glucose.

During the interview, the investigator was both impressed by her sorrow when she kept talking about her son and her active attitude when she shifted to another topic. She was still influenced by the emotional distress which resulted from the death of her son. However, she reported a score of Recent Life Stress Scale (RLSS) lower than the average (mean = 15). It seems that chronic emotional distress caused by a major life event was not captured well by RLSS which only includes items measuring hassles.

Case Study 3--High Life Satisfaction

Mr. Chiu (M1), 71 years old, is a retired businessman, and father of six married sons and one married daughter. He is the head of a 16-member extended family which included his wife and families of three married sons. He had NIDDM for 5 years and was well-controlled (HbA1c = 6.1%) with oral hypoglycemic agents.

Talking about the glycemic control, he reported that diet restriction was not difficult for him. The event of catching a cold and being in a bad mood would raise his level of blood glucose. Having a physician specialized in diabetes was also important to help him keep his blood glucose under control. When questioned how he could make life more meaningful, he replied "Each

Sunday, my entire family arranges activities and spends time together. Usually we got 20 to 30 people. We are very *happy* together".

> You have to be in a good mood when you grow old. Medications can not cure your worry. I started to prepare for my retirement when I was 60; at that time, all my children were married. I closed my business to lighten the responsibility and avoid stress in order to care for my own health. Health is most important. You need to take medications when you are sick. As to diet, frequent servings with small portions are good for you. I eat eight times a day. I only eat one half bowl of rice with lots of vegetables for a meal; therefore my blood sugar has been in good control. Exercise is important too. From 5 to 7 o'clock every morning I go exercising in a park. Other times I go to chat with my relatives and friends, go to movies or listen to music. Once a month I participate in a senior gathering.

A shorter history of NIDDM might make the diabetes less severe so that it is easier for this case to control. In this verbatim response he pointed out many documented factors which are contributors to a better glycemic control such as: a good prescription from a knowledgeable physician, happy mood, lower level of stress, regular daily activities, diet control, exercise, social support, etc. He perceived himself as the most important person to control his disease and he incorporated the self-care activities well into his daily routine. He expressed his satisfaction with life as "Now I have completed all the responsibilities in my life. . . .I don't have any complaints or unhappiness. *My sons don't make me unhappy*".

Satisfied with life he held a higher expectation of his children than Mr. Chin did. He is financially adequate and physically independent, however, he required his sons to share all the household expenditures, listen to him, and be successful in their careers.

> I expect sons to study hard to keep their father's social standing. If they can not study, they should work hard. I raised them in accordance with their ability, do not give them too much pressure, support their development; then they will not engage in evil. They will listen to what I have to say. I feel they have tried their best. I hope they will be happier, more prosperous, and live an even better life in the future.

It is evident that filial children and the context of supportive family not only eliminated the family-induced stress , but also acted as a source of happiness for him. His family also provided him a diet pattern with frequent and small meals, and a great freedom to arrange his own life into a healthy life pattern. The relationships between family support, stress, and well-being in this subject supported the hypotheses that family support had direct effect and indirect effect through stress on subject's health consequences. His high level of life satisfaction and high expectation of filial piety also provide a plausible explanation for the unsupported hypotheses: expectation of filial piety negatively associated with psychological well-being.

Case Study 4---High Life Satisfaction

Mrs. Kim (F3), 69 years old, a retired public health nurse, was widowed three months ago. She is the mother of four sons and one daughter. All children have been married and she is living with the family of her second son. The stem family consisted of Mrs. Kim, her son, daughter-in-law and two granddaughters aged seven and five years.

Mrs. Kim reported an average score of 15 on RLSS. The recent death of her husband did not cause her much emotional distress since she claimed the relationship with her husband was harmonious but not very close. The troubles which resulted from the hassles to deal with inheritance tax were the major stressors which had disturbed her sleep sometimes but she did not feel it was unmanageable. Actually, her hesitation and reluctance to accept the fact that she needed insulin injection has been the major cause of failing her glycemic control (HbA1c = 8.1%). She stated

> Since the oral hypoglycemic drugs has reached maximal doses and the level of blood glucose still not close to normal, physician advised me to have insulin injection. I am so hesitant. I feel my life has been so much bothered by the diabetes. The injection would make even more trouble to me. If I start doing insulin injection, I will have to depend on insulin all my life later.

She is satisfied with and proud of her sons and sons' families. She reported

My sons are in their forties. They all have a successful career, stable and harmonious family. My daughters-in-law all welcome me to live with them together. I have finished all my obligations. I just help them to take care of their health, remind them to take a regular physical check. I help my daughter-in-law do the chores and take care of my granddaughter when she is not home. I feel my life is full of blessing and happiness.

In terms of her expectation of filial piety, her response was

I have higher expectation of sons than daughter. I required them to behave properly and study hard when they were young. Now, they all have nice career and nice family. My grandchildren are doing well in the school. I think parent have to respect their adult children. When you say something to them, never be bossy or force them to do it. Times are different. Always be considerate to their situation. Don't interfere in their business. Give a hand when they need. Before my husband die, we had built a family grave yard. I just hope I have a quick death, then I won't burden my children a bit.

In this case, we did not find that a high level of family support and low level of stress were associated with good glycemic control as predicted. In addition to the variables included in the model, there may be some important determinants of outcome of glycemic control that have been left out. Compared to the good adaptation to the restricted diet of Mr. Chiu, Mrs. Kim felt she was bothered by restriction on sweet consumption, indicating that personal characteristics are important factor in glycemic control. Unable to accept the

suggestion to change medication is also an important factor for the high HbA1c. Furthermore, Mrs. Kim felt that she is welcomed by all her sons' families, what might this mean to her life? Mrs. Kim addressed the importance of helping her children, does that make her too busy to pay attention to her own self-care activities for health maintenance?

Based on these life experiences of the four subjects, the effects of family support on psychological well-being is clearly demonstrated. The effects are especially evident in Mr. Chiu and Mrs. Kim's responses. Both of them reported how happy they are about their family support and how that made them feel life is meaningful and satisfactory during their in-depth interviews.. To examine the related scores they reported in the psychometric scale (Table 5.2), both Mr. Chiu and Mrs. Kim correspondingly scored higher on Family Support Scale (FSS, X=136 and 140 respectively) than the mean score (mean = 119.97) of the total sample. They also scored correspondingly on the Life Satisfaction Index A (LSIA) with 54, and 56 respectively (mean = 47.71). This also implied that the psychometric measurements had well indexed subjects' perception of family support and sense of well-being. According to the reports of the two subjects with low life satisfaction, the perception of stress was minimized by adequate family support in Ms. Ho's situation but was aggravated by lacking of family support in Mr. Chin's life. The relationship proposed in the theoretical model that family support mediates individuals' perception of stress and in turn affect their well-being was well-explained by the empirical data of case study adequately. Referring to the quantitative measurements, Ms. Ho scored FSS (X = 137) higher than the mean score, but scored Recent Life Stress Scale (RLSS, X = 11) lower than the mean score (mean =15.15) of the

Table 5.2 Comparison of the Data of the Five key Variables of the Model in Four Case Study Subjects

	Subjects	LSIA	HbA1c	FSS	RLSS	EFP
Low Life	Mr. Chin	33	10.3	109	36	74
Satisfaction	Ms. Ho	39	9.5	137	11	74
High Life	Mr. Chiu	54	6.2	136	6	97
Satisfaction	Ms. Kim	56	8.1	140	15	72
Sample Mean Score		47.71	7.56	119.96	15.15	79.45
Actual Range of Score		26-60	3.8-11.5	71-141	0-84	41-116

Note: LSIA: Life Satisfaction Index A, HbA1c (%): Percent of Glycosylated Hemoglobin, FSS: Family Support Scale, RLSS: Recent Life Stress Scale, EFP: Expectation of Filial Piety

sample. Mr. Chin reported a score of FSS (X=109) lower than the average (mean = 119.96), and a score of RLSS (X = 33) higher than the average. With the grief over her son's death and a good family support, Ms. Ho reported a score of LSIA lower than the average (X=39, mean = 47.71), but not as low as Mr. Chin's score of LSIA (X=33). These scores were corresponded to their statements in their in-depth interview. The confirmation added further evidences to the validity of the three measurements: LSIA, RLSS, and FSS that were used in the current study.

Most subjects adopted the social and family reality as reference when they set their expectation of filial piety. They modified their expectation since "times are different". They adjusted their expectation based on what they experienced with filial care. They tried to lower expectation of filial piety to minimize their disappointment with their children. This indicates that the expectation of filial piety is subject to change over time. In terms of quantitative measurements, Mr. Chiu expressed high expectation in in-depth interview, he also scored the highest Expectation of Filial Piety Scale (EFPS) among these four studied subjects (X = 97, Table 5.2). The other three subjects reported similar scores on EFPS (X = 72 to 74) that were lower than the average of the total sample (mean = 79.45). Even though Mr. Chin emphasized his efforts on lowering his expectation of filial piety, his score (X= 74) was not particularly low. It might be speculated that he used to have higher expectation that might have affected his perception of family support. In other words, he might have scored his family support lower than the others with similar support would have scored. However, this speculated relationship

between expectation of filial piety and family support can not be confirmed in this study.

Glycemic control has been documented as a phenomenon involving multiple dimensions: the provision of professional care, personal factors related to compliance and self-care, and environmental factor such as family support (Blake, 1992, Glasgow & Toobert, 1988). The findings described above are in accord with results of previous studies which supported multifactorial model. This also explains why the variables in the model accounted for a small amount of variation in HbA1c. It is assumed that the treatment factor can be neglected in the current study since all subjects were receiving adequate treatment from the same diabetic care team. Mrs. Kim's responses demonstrated that patient's reluctance to accept the change of therapy is a confounding variable to the prediction of the level of HbA1c. To acquire a better prediction of outcome of glycemic control further exploration of the effects of some other variables is needed.

The Meaning of Well-being

In addition to describing the experiences of diabetic control, subjects were invited to talk about beliefs or experiences that are important to them, or the persons who influenced them the most, and things that can make their life happier and more meaningful. In the following section, the method of content analysis was used to identify the attributes of well-being from the in-depth interview data in order to build a model which could explain the concept of well-being of older Taiwanese theoretically and parsimoniously.

The in-depth interview data were analyzed first to identify the meaningful verbatim responses. For example, a subject reported that her sons and daughter-in-law welcome her to live with them and take care of her very well, and this made her feel happy and satisfied. This statement implied that having children with filial piety was very important and desirable to the subject. Thus, the first level code " filial children" was identified. Through the process of comparison and contrast with other two codes, family intact and family harmony, the common characteristics embedded in these first level codes were then revealed as "support from family is valued and closely related to the happiness and satisfaction of life".. A term (pattern code) that represent these common characteristics was then designated as "family support" from the analysis. Using this analytic process, other attributes were emerged subsequently and the model of the meaning of well-being was constructed. The meaning of the well-being as reported by the 12 subjects is analyzed as follows.

Family Support

Family intact. Family support was the most prominent theme identified. Having intact and harmonious family with filial children was valued by the subjects in every encounter of the interviews. An intact family is the structural foundation for the provision of support. The loss of a family member is a serious impact that mar result in a loss of hope or important support in their life. Ms. Ho (F2) reported her deep grief and feeling of hopelessness over her loved son's accidental death. "I wanted to die with my son. He was the only son. He was the hope of my family."

Another 73 year old widow (F5) reported

> After my husband died, all the relatives on his side turned their backs on me. I did not get any help from them. I had to work hard to raise my four children. My life was miserable at that time. I told my children I hated their father because he left me such a mess."

Since death is considered an uncontrollable event, particularly death in an accident, older Taiwanese adults used the strategy of "cultivate a field of blessing" to protect their family from bad luck and bring themselves a quick and peaceful death to avoid burdening their family with long-term caregiving. Taiwanese people believe that performing good deeds to help others or making a donation to a religious organization will cultivate a field of blessing for oneself.

> Helping others is like cultivating your own field of blessing. . . . To assist the poor is like planting a field of blessing there will be a reaping. It will bring peace, luck and health to your family. You live well in present life because you had cultivated the field of blessing in your previous life. There is retribution in this life for the sins of previous existence. We have to constantly cultivate our field of blessing, otherwise, the blessing could be exhausted (F4).

According to Buddhism's principle, suffering is part of life. How much a person would suffer depends on his own conduct of present life or previous life. His own conduct is the cause. The suffering the consequence. If a person wants to escape from suffering, he has to do good deeds (Bentley-Taylor &

Offner, 1985). This is called the law of causality (*yin-kuo*). Based on this law of causality, this subject put effort to help others and was hoping she would have a nice family in return. .

Family harmony. The most important support these subjects receive is provided in the context of family. In addition to an intact structure, making family relations harmonious is indispensable for creating a supportive family atmosphere. The need to create a harmonious relationship was often reported in the interview. Evidently, having a harmonious relationship in the family is not a matter of natural occurrence for the subjects. The following comments from two different subjects suggest that they lowered their expectation of filial piety and respect adult children's autonomy to avoid intergenerational conflict or marital conflict between their son and daughter-in-law.

> Don't demand too much. It's better to lower the expectation of your children or wife, then you won't feel unhappy or have grievance. I lower my expectation of others, it makes my expectation easy to be achieved. I feel *satisfied*. Once I was satisfied, I feel *happy*. It's always easier to change myself than to demand others to change for me (M3).

> I don't intervene in my son's business. I don't want to put my son in a dilemma or cause a conflict between my son and daughter-in-law. My daughter-in-law and I have different disposition, but I don't want to make her unhappy. I try to be tolerant, patient and forbearing (F6).

A harmonious environment was an important contributing factor to the individual's sense of wholeness. Mr. Chiu's (M6) statement provided a good example, "My life is not great. We do not have a harmonious atmosphere at home. It's just like a square missing a corner".

Filial children. Nine out of 12 subjects spontaneously reported that raising proper, moral, and honorable children is the ultimate goal of their life. The statements in the case studies of Ms. Ho, Mr. Chiu and Mrs. Kim provide good examples to indicate the importance older adults place on having children with filial piety. Although some subjects mentioned the importance of being self-reliant and having a devoted spouse, the filial children are among the most often mentioned. They made efforts on "cultivating morality" and "fulfilling family duty" to set themselves as a role model for their children to motivate them to become filial children and responsible family members in the whole family system. They anticipate that their children would practice filial piety subsequently. Self-discipline, self-restraint, doing your best, and personal responsibility are the characteristics they strive for.

For the subjects themselves, family obligations consisted of practicing filial responsibility to their own parents, nurturing, supporting, and educating their children, and preparing a proper grave site for themselves. The quotes in the case studies of Mr. Chiu and Mrs. Kim showed subjects' strong sense of obligation to their children. In addition, it is believed that a quick death would avoid putting an excessive burden on the family and a proper grave site is important for the fate of the family in the future.

> I want to complete my last obligation. Since I am getting old and I will be gone someday, therefore I have started looking for a grave site. It is necessary to be careful in selecting the locality of the site, because the Feng-Shue (in the geomantic sense) of grave site are said to have an influence on the later generations (M1).

Completion of All Family Obligations

Before they die, older adults would like to fulfill their obligations to family as mentioned above. Once they fulfill all their obligations, they feel they are at ease and they would not be in debt to ancestors or descendants in their family lineage. Subjects reported "I feel good. I have treated my late parents nicely. I have done my best for them when they were living" (M3).

> To raise my children has always been my ultimate goal. I expect them to become proper and useful people. They all grew up nicely and that fulfilled my expectations. *I have no worry if I were to die now* (M1).

> I divorced my wife. I left my children to my mother. I only provided them with material necessity. I did not educate them well. I was indulged myself too much in fooling around while I was young. Now, my children are estranged from me. *I am just waiting to die* but I dare not commit suicide myself. *My life is meaningless* (M5).

One subject reported that his life did not come to a wholeness because he was separated from his family by the war. He could not practice filial piety to his parent.

> The only thing I feel regrettable in my life is the war forced me to leave my family. It is sad and very unfortunate. I could not take care of my parents when they were alive. I was not there when they died. I feel sorry. The war separated me from my siblings for 50 years. When I visited my hometown, people no longer identified me with them. *My life is not a wholeness* (*yuan man*, M4).

Those who had fulfilled their family responsibility, who are not in debt to anybody in the family, could enjoy life at ease and felt they could die any time without regret or worry. For those who were negligent in family duty, life is filled with remorse. Life has become an intolerable existence. For those who was separated from their family by the war, a state of wholeness of life has become an unachievable dream. This corresponds to Erikson's human development theory which proposed that while older people evaluate their past life, they either achieve an ego-integrity or become despairing in old age (Freiberg, 1987)

Sense of Dignity

Maintaining a sense of dignity is an important factor to acquire a sense of well-being in the life of older adults. This sense of dignity consists of self-respect and respect from others. Self-respect means that the individual's possession of a positive value toward self. When subjects achieved or contributed something important to the society or their family, a sense of dignity was generated. Sense of achievement, autonomy were reported as important for self-respect.

> I hire workers and help their families. My donation to Buddhist temple makes the program of Purifying the Society possible. It makes our society a better place to live. I made a significant contribution to the society. To me, this is meaningful. I like my work. Some of my friends suggested that I to quit. I think I have to have my own opinion. I listen to what people have to say, but I don't just follow their suggestion. It is important to keep learning and make yourself knowledgeable, then you can have your own opinion (F4).

> I never expect to make so much money. Now I have given each of my sons a condominium and was able to fulfill my duty to my mother. *I am very satisfied* (F5).

Respect from others occurs when the individual feel he/she is valued by other people. Maintaining parent's dignity in front of children and having respect from people outside the family were important. However, the ways to acquire respect from others seem variable across individuals.

> Parents and children are different generation. I cannot talk to them about my issues. I cannot go and complain to them. . . . I would lose my dignity (F4).

> I don't want to make myself suffer or look sloppy because of being overly frugal. It is important to spend some money on myself such as: buying some beautiful clothes, taking a taxi ride lest my daughter-in-law or others look down on me(F5).

Self-reliance

Self-reliance is the perception of not needing to depend on their children or others for financial support or physical care. Subjects reported that working hard and putting aside some savings earlier in their lives is the way to achieve financial self-reliance in old age. They also reported that health is the most important matter. In their opinion one should commit to health-maintaining practice to keep oneself physically independent. Their major concern was to avoid imposing extensive burden on their children. "Times are different. Everybody is busy, we should do as much as we can". Activities like caring for yourself as much as you can, making life simple to avoid too much vicissitude and stress, enjoying self and having a positive attitude about life encounters were the reported strategies to maintain good physical health. One subject reported that he would like to be institutionalized if he becomes severely disabled one day, because "Although living with children is pretty good, you never know if younger people would be willing to live with you then".

Extra familial Support

People engage in a variety social activities with friends, neighbors or other community members as a source of extrafamilial support. Subjects reported that they go to friends or neighbors when they have family friction or some family issues which are not suitable to talk about with their family members. Social integration (i.e. engage in extrafamilial social activities) creates a chance to help ventilate grievance or mediate discord happening in the family. It also provides a chance to acquire company for leisure activities to maintain a good mood. For most subjects, the family plays a major role in the

provision of social support. Extrafamilial support serves a supplementary function to family support. People turned to individuals outside the family to acquire the support which is usually unavailable in their family. However, for some subjects friendship could play a major role in their support system. For example, a 76 years old widow described her friend as the person who influenced her the most in her whole life.

> We give advice to each other. I always consult her when I have to make important decisions. I listen to her. We take care of each other if any one of us were sick. Daughter-in-law is not helpful in this way since they have to go to work. It's good to have old friend to take care each other.

The five themes are the major attributes which contribute to the well-being of the older Taiwanese with NIDDM. The most prominent concern of subjects was their family. Life satisfaction is related to the intact, harmonious, and supportive family and the individuals' satisfaction that they have done their family duty by raising good children and fulfilling filial responsibility to their own parents.

Summary

Subjects construed their sense of well-being from their past and present experiences. They perceived that well-being in older age is primarily a consequence of their own conduct in earlier life. There is a tendency for subjects to feel they could be responsible for their own well-being. This philosophy is mainly derived from the Buddhist ethos which maintains that things that happen in life have been caused by the individual's previous conduct of this life or previous lives. This logic indicates that you yourself must make

the effort in order to escape from the suffering of life and to further achieve a state of well-being.

Five themes (or attributes) emerged from the qualitative data; family support, completion of all family obligations, sense of dignity, self-reliance, and extrafamilial support. Two hierarchical levels of well-being, basic well-being and comprehensive well-being (Figure, 5.1), were derived from further analysis of the five attributes. Basic well-being consists of psychological integrity and a sense of happiness. Psychological integrity was achieved through the fulfillment of family obligations and sense of dignity. Corresponding to the sense of ego-integrity which was described by Erickson (Freiberg, 1987). When looking back over his/her life, the individual accepts all that has happened in his/her life and appreciates what he/she has done. He/She is not afraid of death. Death is perceived as a part of natural process of life. With a sense of psychological integrity, subjects felt they could die in peace. In addition to psychological integrity, self-reliance and social integration are important for obtaining a sense of happiness.

Comprehensive well-being could be achieved through obtaining both basic well-being and family well-being. Family well-being would be seen as the result of having family integrity, family harmony and filial children and requires effort from every member in the family as well as a good blessing from supernatural power. Through the family well-being and basic well-being, a sense of wholeness can be derived. This sense of wholeness is a perception of being full of blessing, and is an ideal state of life. With the sense of wholeness the individual achieves not only psychological integrity, also feels his family has

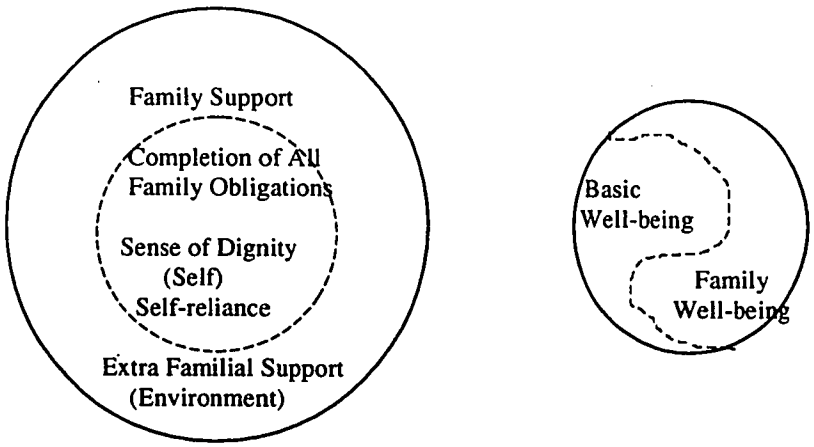


Figure 5.1 The Model of Concept of Well-being in Older Taiwanese. The figure of circle represents the sense of wholeness and happiness in the concept of well-being. The three attributes of left inner circle are self-oriented, the two attributes in left outer circle are environment-oriented. The broken line of inner circle implies that self and environment always interact with each other. The curved and broken line in the right circle indicates that in order to achieve comprehensive well-being, the basic well-being and family well-being have to be complementary to each other.

developed into an intact, harmonious, prosperous, and supportive system. A sense of wholeness would generate a long-lasting happiness. Findings from qualitative interviews are incorporated into the discussion of the research in the next chapter.

CHAPTER 6

DISCUSSION

This chapter includes the interpretation of findings, theoretical issues, methodological issues, and implications for nursing education, practice, and research. Lastly, the strengths and limitations of the current study are presented.

Interpretation of the Results

Discussion related to the results of the study is focused on the research questions. The findings of the study will be interpreted following the order of the five research questions.

The Effects of Family Support on Stress

Research question 1: Does family support affect stress in older Taiwanese adults with Non-Insulin Dependent Diabetes Mellitus (NIDDM)? The theoretical basis for this question is that the level of perceived stress is based on cognitive appraisal of the individual assessing whether a life encounter would risk his/her well-being. Family is the primary living context of the older adults who participated in this study. Family support gives them a resource to counteract the feeling of threat of an stressful encounter. Family support should be able to minimize the perception of stress.

Quantitative data analysis showed that family support had a weak association with the perceived stress. That is, subjects with higher family support tended to perceive lower level of stress. It further verified the theory of social support (Payne & Jones, 1987). The effects of family support were more salient for subjects with 6 years education or less.

The reason family support minimizes the perception of stress has not been investigated in previous research. On the basis of the qualitative data , I conclude that this relationship could be a function of two mechanisms. First, family support provides a sense of security and dependability of the family which eliminates some environmental threat to the individual. For example, when the subjects were asked about their planned living arrangement if they become disabled in the future, ten of the twelve subjects responded that their children will definitely take the responsibility to take care of them. There is no need for them to worry about that. For those older people, to be self-reliant financially and physically is a matter of pride since they are not burdening their children, but, the privilege to be taken care of in their later life is still unquestionable. Family is the shelter they can always resort to for help and care. A sense of security and dependability may provide a balancing effect to the threat caused by environmental stimulus and chronic disease. The other route for family support to protect the individual from perceiving stress might be that the family with strong support is less likely to create a stress to the individual. Family is a primary social institution that can provide nurturance and protection, also a place that can produce conflict, trouble, or worry to the individual. It has been clearly demonstrated in case studies 1 and 2 that family conflict induced by the discipline of a child and marital discord was a common source of daily hassles in the life of older adults. These hassles can be a source of chronic stress. Individuals with less harmonious or less functional families are more likely to have stressors in their daily life that are created by family friction.

Why does family support play a more prominent role in perceived stress for subjects with lower education? From the perspective of resources, individuals with lower education are less advantaged in the aspect of personal and social resources. Family support could make a greater difference to them than it does to those who have achieved higher education and have access to other resources.

The Effects of Stress on Health Consequences

Research question 2: Does stress affect psychological well-being and glycemic control in the older adults with NIDDM? As predicted, perceived stress affected psychological well-being negatively. The finding was consistent with that of numerous previous studies (Holahan & Moos, 1991, Krause & Liang, 1993, Lai, 1995). The findings of the current study further validate the theory that exposure to stress relates to the deterioration of psychological well-being. The differential effects of stress on well-being were identified with different gender and with education levels. The negative effects of stress on psychological well-being were more prominent in females than in males, and also more prominent in lower educated subjects than in higher educated subjects. Little research has been done to investigate how gender and educational level affect the individual psychological well-being. The stress and coping process, the outcome of stressful encounters can be determined by the character of stressors, the resources of the individual, and coping strategies (Lazarus & Folkman, 1984). Female and lower educated (who are more likely to be female, among the 80 female subjects, 61 were categorized into less educated group) subjects may have fewer resources to cope with stress, which results in a more profound effect on well-being. The female subjects and less

educated group were highly overlapped. More research to investigate variables and why they influence the stress outcome is needed to understand these differential effects of stress on psychological well-being.

In terms of the effects of stress on glycemic control, only subjects with 6 years education or less showed statistically significant effects. This indicates that in lower educated subjects, the higher level of stress is associated with higher level of blood glucose. Why were both psychological well-being and glycemic control of lower educated subjects more sensitive to the detrimental effects of stress? It may be speculated that lower educated subjects have less ability to seek information and solve problems and owned fewer resources (Lazarus & Folkman, 1984). As a result, stress was not resolved as effectively as in higher educated individuals. This unresolved stress taxed the well-being of lower educated subjects. Further research on the differential effects of educational level on stress-coping process, and how individuals with different educational levels manage the same kind of stress might shed light on this question.

The Effects of Family Support on Health Consequences

Research question 3: Does the family support affect the glycemic control and psychological well-being in older adults with NIDDM? Literature has shown that social support and family support contributed significantly to positive well-being in individuals experiencing a variety of chronic illnesses such as Parkinson's disease, rheumatoid arthritis, renal failure with hemodialysis, and diabetes mellitus (Dimond, 1979, Lambert, Lambert, Klipple, & Mewshaw, 1989, White, Richter, & Fry, 1992). The positive finding in the current study is further evidence to establish the validity of social support theory.

The finding of the current study showed that the effect of family support on psychological well-being was positive and consistent across both gender and different educational subsamples. Subjects who perceived higher family support experienced more satisfaction in their lives. However, family support has more prominent effects in males than in females, and in higher educated than in lower educated subjects. In other words, the male, and the higher educated benefited more significantly from family support for their psychological well-being. The existing literature does not provide adequate information to interpret these differential effects, indicating that further study is needed.

Males with higher family support had better glycemic control. To the contrary, however, females reporting higher family support had worse glycemic control. What might explain why males benefited more from social support than females did ? One possible cause is the fact that women are usually the caregivers of the family. Women, more than men, act as a health provider, health educator in the family, and mediator between the family and the formal health care system (Graham, 1985). In her study, Kagawa-Singer (1993) found women with cancer tended to continue performing household duties even when they were very ill because of their sense that they were responsible for taking care of the family. It is difficult for women to reverse their role to become a care receiver. If they receive more family support they tend to feel obliged to repay their family in daily life by helping with chores and taking care of children. For the retired older adults, a retired female, but not male, would face continuing responsibility for family caregiving. For most retired men, after they release their bread-winner's role, family is the place where they receive care. To compare the two subjects with high life satisfaction in the qualitative case study,

the female subject kept emphasizing the importance of being considerate and helpful to her children. The male subject was acting as a head and financial manager with a control on his life. He enjoyed the happiness of family and friend gathering but was not busy with family hassles. It is a great contrast. Furthermore, female subjects who perceive higher family support may not get specific support for their diabetic care. Murphy, Willianson and Nease (1994) reported that among married patients with NIDDM, 84% of diabetic men identified their wife as their family health monitor (FHM), only 27% of diabetic women identified their husband as their FHM. When those respondents were asked to identify the person in their family who helps them the most with care of their diabetes, 48% of diabetic women and 64% of diabetic men identified an individual who performed one or more specific helping tasks for them. Other studies (Penning & Strain, 1994, Weinert, 1988) also reported that women who were disabled or had chronic illness receive less care from their family and have more unmet needs than their male counterparts do. This indicates that female subjects were less likely to get the health-related help from spouse or family. The help they get from their husbands is less likely to be as intensive as that which men would get from their wives. Moreover, if females are busy helping and caring for other family members, they are more likely to be tied down by these family tasks and neglect practicing the health-promoting activities such as: exercise, diet control, or taking medication regularly (Kaplan & Hartwell, 1987). An example from qualitative data may provide a better understanding on how the assumed role of caregiver could be a problem to an older female. Mrs. Lin (F1), 60 years old, stated her life as:

> Monday is my best day of the week. They were all gone. I feel so relieved. Usually I start worrying about my weekend on Friday. My son and daughter-in-law bring their baby son to me for baby-sitting every weekend, then they went out to see movie or play golf. My grandson is so noisy. He exhausts me. In addition I have to prepare meal for the whole family. They would come back to dine. I am old now, I do not have so much energy. I am so mad at my daughter-in-law, but I can not say a word. I am worried that they might not come home to visit us if I say anything to them.

This women is trapped in a labor-intensive caregiving job from which it is difficult for her to announce a formal retirement such as her husband has done from his work. The caregiving role leads to a coercive privacy which keeps women from attending activities outside the family, forces them to sacrifice their own inclinations, and probably to risk their well-being (Graham, 1985).

These differences in family role and life experience between males and females provide some basis to interpret why the perceived family support tended to have beneficial effects on males but detrimental effects on females with regard to their glycemic control.

The Effects of Expectation of Filial Piety on Psychological Well-being

Research question 4: Does expectation of filial piety affect the psychological well-being in older Taiwanese adults with NIDDM? The data analysis showed that the expectation of filial piety was not associated with any effects on psychological well-being of older adults with NIDDM. When the theory of relative deprivation was applied to this theoretical model, it was

assumed that expectation of filial piety is a trait which was held constant by parents. Parents were thought to evaluate the performance of their adult children against this constant criterion which they expected their children to achieve. However, the analysis of qualitative data showed that expectations of filial piety are subject to change based on the reality parents are experiencing. For most parents the gap between expectation and performance might be minimized through constant reality testing and adjustment. Especially for those parents who are self-reliant, the fulfillment of filial responsibility by children is not the only resort for their future life, the adjustment of expectation may be less difficult and serve a protective function for their psychological well-being. Parents who are reluctant or unable to make adjustments, may experience grievance or dissatisfaction toward their children, which in turn harms their psychological well-being. This is a plausible explanation for my findings that the regression coefficient showed non-significant value but negative direction on the path between expectation of filial piety and psychological well-being.

The Effects of Age, Finance, Marital Status and Living Arrangement on Expectation of Filial Piety, Family Support, Stress, Well-being and Glycemic Control

Age

A previous study has shown that older subjects experience fewer life events than do younger subjects (Chiribago, 1989). Most subjects older than 65 were retired while younger subjects were still working. Work stress comprised a major stress in the Recent Life Stress Scale (RLSS). The difference in working status would therefore result in younger subjects being more likely to report higher level of stress. Some researchers have suggested

these could be the cohort effects on life events (Seigler & George, 1983). To answer the question whether the effects of age on level of perceived stress was confounded with cohort effects in older adults needs further research.

Finance

Financial situation did not show an impact on subjects' perception of stress. Previous studies in Western countries found that inadequate financial status is a major source of stress for older adults (Wilson, 1985). This unexpected finding may be attributed to cultural difference. The Chinese culture is designed to ensure filial care. Children are required to be responsible for parents' financial need. The strain of financial hardship may not affect older persons directly but shift to their children. The significant path coefficient of financial situation on family support indicates that the shifted stress on family has a negative impact on family , in turn minimizing family capability to provide support. This finding further verifies Krause and Liang's claim about the Chinese elderly (1993) that the financial strain of supporting the elderly can erode the emotional support from the family.

The financial situation not only affects on psychological well-being directly, but also has an indirect effect through two routes: through family support, or via family support and then stress. The total effect of finance on psychological well-being in the total sample was B = .36. Next to effects of family support, financial situation is the second most prominent variable in the model to explain the psychological well-being .

Financial situations are also associated with a weak path coefficient to glycemic control. The better one's financial situation, the better one's glycemic control. Did the better financial situation allow patients better choice of their

food, or allow more time and ability to perform other self care activities, or was it simply the case that poor subjects did not take medication regularly due to their inadequate financial situation? The financial situation was not selected as a variable to recruit subjects for qualitative interview. None of the subjects interviewed were in poor financial situation. Thus, there are no qualitative data to illuminate these questions. The effect of financial situation on the subject's glycemic control is a question worth further investigation.

Living Arrangement

The findings showed that different living situations did not have a different effect on expectations of filial piety, family support, perceived stress or well-being. In terms of physical distance, older people who live with married children may be in a more convenient setting to get intergenerational physical assistance than those who did not live with children, especially when intensive physical care is needed. However, subjects in the current study were primarily independent in their activities of daily living.

Antonucci (1985) maintains that the social network can not generate social support automatically unless the members in the network have good relationships. A study of a sample of Native Americans also found that patients with extended family did not necessarily receive more family support (Williams, Boyce, & Wright, 1993). Living with married children means the subject had a bigger family network. The bigger network did not mean more family support however. The provision of family support may be explained better by the nature of the family relationship rather than by the network or the structure of the family. The qualitative data showed that five of the 12 subjects spontaneously reported complaints about their daughters-in-law who usually

provided assistance with instrumental activities of daily living such as cooking, shopping, housekeeping. Subjects reported that they usually don't make comments on the meals they were served. Inadequate communication could create more conflict and stress rather than bring more support. This would cancel out the benefits of the physical closeness. A previous study showed living with married children was associated with better glycemic control (Chang, Chiou, Shin, Tsai, 1991). However, the findings of the current study showed that living arrangement correlated with education level and marital status. Therefore, it is hard to tell whether the finding of Chang et al's study (1991) would be different if the covariance analysis was done in their study.

In the literature review it was discovered that older Taiwanese who live with each married son in a rotation reported low satisfaction in their life (Directorate-General of Budget, Accounting, and Statistics, 1992). In the current study, only four subjects were in this kind of living situation. The small number is inadequate to make a statistical analysis of this subgroup.

Marital Status

Marital status was once used as an indicator of social support in earlier literature. It was supposed that married subjects would have more family support and better well-being. In the current study, the analysis of quantitative data showed marital status did not affect perceived stress, family support, and well-being. This finding is in accord with recent studies on social support which showed marital status did not relate to perceived level of social support (Revenson, Schiaffino, Mojerovitz, & Gibofsky, 1991, Sugisawa, Liang, & Liu, 1994). The qualitative data showed that marital discord can be a major stressor for an individual. The marital relationship could be a better indicator than

marital status for indicating social support. In addition, in the current study, zero-order correlation analysis showed that marital status had a significant correlation with age, gender and educational level. The multivariate analysis revealed that age, gender, and educational level were more powerful predictors of family support, perceive stress, or well-being than that of marital status.

The Meaning of Well-being

Research question 5: What is the subjective meaning of well-being for the older Taiwanese adults with NIDDM? The data analysis demonstrated that the traditional Chinese concept of well-being in later life, consisting of five blessings, longevity, wealth, health, virtue, and a peaceful death, is still embedded in today's concept of well-being. The theme of self-reliance which emphasized hard working and saving; and health maintaining practice indicated the importance of wealth, health and longevity. In order to obtain the other two attributes, family support and sense of dignity, subjects have emphasized the virtue of helping others in order to obtain blessing for themselves and their family. They also strove to cultivate their morality to set a good example for their children. To fulfill family obligations, subjects reported a strong wish to have a quick peaceful death and prepare a grave yard in advance in order to avoid becoming a burden for their family. These evidences indicates that virtue and a peaceful death found in previous concept of well-being, are still highly valued by contemporary older Taiwanese as part of well-being. The only theme found among contemporary older Taiwanese which was not included in traditional five blessing is the extra familial support. Affluent life today allows people to have time and money to engage in leisure activities. Convenient transportation, advanced information systems, increased mobility in the

population, and the increased life expectancy make the maintenance of friendship in later life more possible and important. This may be the reason that the extrafamilial support emerged as an important theme for the modern Taiwanese elderly.

Traditional Chinese philosophy is heavily rooted in human-environmental interaction. D.Y.L.Chen (1991) found that the core process of health promotion and illness prevention in older Chinese Americans is conformity with the nature. She concluded that the elders did not center their world view around the self but around family. In the current study, in addition to the personal basic well-being that derived from psychological integrity and a sense of happiness, the subjects held an ideal goal of achieving family well-being. They considered family well-being the ultimate goal of one's life and the best blessing for an individual. Only after achieving both personal basic well-being and family well-being, would they perceive life has come to a state of "wholeness" without any defect or regret. This finding provided the evidence that traditional culture, with its emphasis on human-nature harmony, still dominated the world view of contemporary older Taiwanese.

Compared to the findings of a previous qualitative study on well-being (Thomas & Chambers, 1989), the concept of well-being in older Taiwanese of both genders seems closer to that of older Indian men in New Delhi than to that of older English men in London. Taiwanese and Indian men are both highly concerned about family, helping others, satisfaction with present life, and experience less dread about incapacitation or loss of control. To be self-reliant is an important goal to avoid imposing an extensive burden on their children, and potentially doing harm to the well-being of the family. However, self-

reliance is not an indispensable necessity for the Taiwanese elderly, because they believe that family can be relied on if they become incapacitated. They are privileged to be taken care of. On the other hand, the dominant theme of English men was dread of incapacitation which threatened their view of good and useful life. In addition, this fear may be attributed to the idea that living with or relying on children is not considered as the right thing to do for older persons in Western society (Connidis, 1983). They are afraid of burdening their children in their later life.

The identified themes indicate that the subjects of this study perceive well-being in an integrative way. They were concerned with physical, psychological, and social perspectives at the same time. For a patient with chronic illness like NIDDM, there is usually no symptom or sign in the physical aspect. This may create a barrier for them to take a patient's role to perform the care program decisively. If the level of blood sugar is not high enough or the care program is not seriously violated, it is difficult for the patient to perceive a causal link between glycemic control and daily experiences. As Mr. Chin (M6) expressed, he can not tell the difference between high and low blood sugar. The treatment is quite abstract to the patients even though the health professional works hard to make the physiological indicators reach a normal range. For example, trying to lower the level of HbA1c from 7.5% to 6% could be an abstract goal for the patient, but it may require more sacrifice of their quality of life by imposing tighter control of their diet or requiring them to do more exercise.

The findings of this study indicate that it is essential to reevaluate the goal of nursing care for chronic patients like persons with NIDDM. What level

of glycemic control is the optimal for the patients ? Should the level of blood glucose be controlled as low as people without diabetes ? Studies reported that hyperglycemia could cause toxic effects on the pancreas itself which could advance the diabetes and also damage other tissues which may finally result in complications such as: retinopathy, neuropathy, and nephropathy (DeFronzo, Bonadonna, & Ferrannini, 1992). The American Diabetes Association (1994) has suggested that the blood glucose level of diabetic patients should be controlled to normal or near normal. The Diabetic Control and Complication Trial (DCCT) observed insulin-dependent diabetes mellitus patients with an average HbA1c of 7.2% in intensively treated groups have reduced 50-75% of retinopathy, nephropathy and neuropathy compared with patients averaging HbA1c 9.0% in conventionally treated groups (The Diabetes Control and Complication Trial, 1993). Similar research on patients with NIDDM was not available. What would be the difference on long-term incidence of complications between those whose HbA1c were controlled under 6%, 7%, and 8% ? If the patients with HbA1c could enjoy improved psychosocial well-being and only increase their complication rate a small extent, ought we to be more permissive in setting the goal of glycemic control? These are still largely unexplored but important questions.

Theoretical Issues

It was found that the expectation of filial piety was not associated with significant effects on psychological well-being. What does this mean for the proposed theoretical model? The residual analysis found a significant correlation between the residuals of family support and residuals of expectation of filial piety (Table 4.6). The analysis of qualitative data revealed that subjects

did not hold their expectation of filial piety constant. In fact, hey modify their expectation of filial piety based on their observation of social reality and their experience of the quality and quantity of family support they received. Subjects expressed their adjustment as "Times are different". They had lowered their expectations when they perceived it might be hard for their children to attain traditional norms of filial piety. This may protect them from being disappointed. Some required their children to provide a monetary offering and consulted them on major family matters. They tried to ensure children's respect toward them and a sense of responsibility to parent care. Both qualitative and quantitative data indicated that the expectation of filial piety might have a reciprocal relationship with family support. The expectation of filial piety did not have a direct effect on psychological well-being. However, it may have an indirect effect on psychological well-being through the mediation of family support.

The theory of self-fulfilling prophecy proposed that in human interactions, the occurrence of interpersonal expectation can result in a behavioral confirmation effect (Darley & Oleson, 1993). The behavioral confirmation effect refers to the possibility that expectations lead the target (the person who is expected) to behave in a manner consistent with the perceiver's (the person who expects) expectancy. The perceiver can initiate some verbal or non-verbal behaviors to convey his expectation to hint the target act accordingly. Because the interaction is a circular process, the target can block the occurrence of expectancy confirmation in certain conditions. The resourcefulness of the target, as well as the power difference and the prior relationship between target and perceiver may determine if the cues will be

confirmed behaviorally. If the behavioral confirmation does not occur accordingly, the perceiver may modify his expectation after a period of observation (Darley & Oleson, 1993). On the other hand the perceiver may develop a grievance or dissatisfaction with the target. If the perceiver refers to parents, and the target refers to adult children, it is promising to develop the theoretical model based on the self-fulfilling prophecy theory to further test the effects of expectation of filial piety on parent care. In fact subjects of this study who did not experience the gap between their expectation and the practice of their children had not modify their expectation. This would seem indicate that a self-fulfilling prophecy is operating when expectation are changed.

Due to the current trend of promoting family care in the health care system, research on filial piety and filial responsibility has been increasing (Sung, 1995). In Taiwan and Korea, the preservation of the practice of filial piety has been a social policy to strengthen family care for older family members. However, little research has been done on the relationship between the expectation of filial piety and motivation of practicing filial responsibility.

Measurement Issues

It was very difficult to administer expectation of filial piety scale (EFPS) for those who had lost contact with children . It is suggested that EFPS should only be used with the individuals who have maintained contact with their children.

The Recent Life Stress Scale did not include the major life stressors, yet the subjects suffered major life changes and had experienced a high level of stress. The uncounted major events could minimize the magnitude of parameter estimates between the stress and health outcome. Also, the qualitative data

showed that a major life event such as loss of a spouse did not necessarily cause a serious stress. The assumption made by Holmes and Rahe (1967) on their Social Readjustment Rating Scale that proposing major life events cause certain amount of stress to individual was not supported..

Based on comparison with the qualitative data, the score on the Life Satisfaction Index A (LSIA) showed a reliable score for indicating the levels of basic well-being which were rated on the subjects' expression of satisfaction on their present life. For some who expressed lack of wholeness in their life, the score on LSIA could still be very high, indicating that the attribute of comprehensive well-being was not measurable using this LSIA.

Implications

for Nursing Curriculum

The primary living context for patients with chronic illness, is family and community. Family support is a major factor influencing the outcome of care. The results of this study support the contention that an ecological approach to curriculum development about chronic care should be implemented. Family should be featured as a setting to produce well-being rather than a system only to consume health care.

The finding of the content analysis confirmed the major attributes of well-being which consisted of physical, psychological and social perspective. The integrative approach in the chronic care curriculum should be emphasized to help student define a proper concept of health for the population with chronic illness.

Implications for Nursing Practice

Family support not only affects psychological well-being, it also affects the glycemic control of the patients with NIDDM. Family should be included in the care plan when a patient with NIDDM is treated. The family context must be considered. The modification of life style should include family members. For example, if the whole family has high sugar, high fat and low fiber as their diet pattern, or the house always has affluent foods scattered around, it certainly increase the barrier for diet control. If the family could limit the supply of soft drinks, juice, or other sweet food, keep these food out of sight, arrange family gatherings around activities other than eating, the diabetic control regimen could be more easily integrated into ordinary daily life. Patients would not be required by their environment to put extra effort into the fight against the desire for food. The sense of deviance from other family members could be reduced, in turn reducing the emotional distress caused by food craving or the frustration resulting from family supervision.

Stern (1991) maintained that world-wide epidemiological evidence has shown that NIDDM has reached epidemic proportion in non-white population. This supports for need for further studies of high risk population. It has been shown that NIDDM has a strong hereditary tendency. If one identical twin has NIDDM, the other one has 100% chance of developing the condition. It has been estimated that diabetes might be ultimately developed in up to 43% of first-degree relatives of patients with NIDDM (O'Rahily, et al., 1986). Prospective intervention trials should be conducted to reduce the behavioral risk factors for high risk individuals. Increase physical activities, reduce fat consumption and control body weight are the major strategies suggested . In

the long run, the life style change in the entire family would benefit not only the member with diabetic tendency, by reducing and delaying his/her risk of becoming NIDDM, but would also minimize the risk of cardiovascular disease for the entire family.

In summary, the difficulty for the patient to adhere to the care regimen and the hereditary tendency of NIDDM makes the family approach to care even more important than with other chronic disease. If the whole family could engage in a life style which enhances diabetic control and prevention, it will minimize the patient's sense of being deprived in the family, benefit the glycemic control, and also reduce the risk factors of NIDDM for the whole family.

For the health professional, the level of family support and the way family provide their support should be assessed before and during the process of treatment. The findings of the current study showed that family support was associated with a negative effects on glycemic control in Taiwanese females. In the case of female patients, special attention should be paid to response, and possibly reciprocation for family support,and efforts should be made to help them better balance their family responsibility and self-care activities.

Implications for Further Research

1. The findings of this study show that finance is an important variable on family support and well-being in the case of older Taiwanese with NIDDM. It is important to know why and how finance has its effects on well-being for future intervention on family with different financial status. A qualitative study of the life experience, self-care activities, family interaction on subjects with different financial status would be illustrative.

2. Further examination of the relationship between family support and expectation of filial piety is needed. Family support and expectation of filial piety are the important issues in the care of the elderly for most of the Asian society (Sung, 1995). Whether the theory of self-fulfilling prophecy could be applied to further study of expectation of filial piety and family support should be confirmed with empirical testing.

3. Further study using the family as a unit of analysis would provide valuable insight. It is necessary to understand how family members with diabetes mellitus could affect the family dynamic and how the family's interaction affects the patient's adaptation. For example, how are the patient's need for dietary control and weight reduction affecting family's cooking and daily meal arrangement? How does the family's daily routine affect patient's exercise program? The knowledge from this type of research will help investigators build a better theory of family support, and find how to mobilize family resources for promoting the well-being of their older family members.

4. An intervention study on promoting family support in the care of the patient with NIDDM would be well worth the attempt. A theory of family support intervention must developed before such an intervention study is implemented. Extensive review of social support intervention studies by the investigator and other authors (Lanza & Revenson, 1993) revealed that most of these studies were flawed by lack of a theoretical basis and did not show significant effects from the intervention. The specification of the source of support, the type of support, the target of support, and the outcome indicators of the social/family support intervention should be grounded in solid theory.

Innovative strategies for improving family involvement and integrating the care program into daily life should be emphasized in the intervention design.

Strengths and Limitations of the Current Study

Strengths of the Current Study

1. The great advantage of the current study was the use of methods of triangulation, using in-depth interviews to take account of the living context of the subjects to shed light on the findings of the quantitative analysis. The data were interpreted within subject's living context as a member of their family and community. The analysis of qualitative data also added evidence to verify the time sequence between variables which were hypothesize in the model by using cross-sectional causal modeling approach.

2. Home care has been considered as the first alternative for reducing skyrocketing health care costs, especially for the older population with chronic illness (Jamieson, Campbell, & Clarke, 1989). Many studies have been focused on the family caregiving for patients with a frail condition (Baldwin, 1990). However, the factors which affects the adaptation to chronic illness of those less disabled elderly and their ability to live a better life in is an important but a less studied issue. Caregiving induced family problems, or the institutionalization of the elderly, could be delayed or reduced if these older persons and their families could manage well during the earlier phase of chronic illness. Culture is an important factor which influences the relationship and interaction between older persons and their families. The focus of the current study on cultural and family support issues provides valuable knowledge to the field of gerontology.

3. The measure of the expectation of filial piety used in the current studies was culturally specific and has adequate psychometric characteristics. The other measures developed in western countries were revised and tested through pilot studies.

Limitations of the Current Study

1. The sample of the current study was selected by convenience sampling. The non-random sampling may cause bias in sample selection and limit external validity. Generalization of the findings needs to be cautious, and the cultural differences must be taken into account. Moreover, older patients with NIDDM who were more disabled in mobility or other functions were usually escorted to the clinic by their family. Those family members were usually in a hurry to go back to their daily activities and were not willing to be referred to the investigator. Therefore, most cases recruited in current study were those who were physically independent. The implications of this should be taken into consideration if the results of the study were applied in a practice setting.

2. The causal relationship between the variables was not certain, due to the cross-sectional design in the current study. The problem of causal sequence might have been minimized to some extent by using a designated time frame such as measuring life stress of previous month and present health consequences. In addition, the qualitative data also provided some evidence of the sequential relationship between variables. However, no time frame was imposed variables like expectation of filial piety and family support. The findings of the current study should be considered as tentative until further evidence generated from longitudinal study is available.

3. For qualitative data, the decision on sample size of 12 was based on the findings of previous life satisfaction study which reported that theoretical saturation was achieved after interviewing 10 subjects (Thomas & Chambers, 1989). The data analysis in the current study was done after the data collection rather than using the circular process until saturation was achieved. It is uncertain that saturation was achieved about the meaning of well-being. The study can be replicated to verify the model identified in the current study.

4. The data were collected from the older adults' perspective only. It is a one-sided view of the family system. The triangulation from family point of view was not included. The findings from a study triangulating the family's point of view could be even more fruitful and convincing.

5. Measures such as Recent Life Stress Scale and Family Support Scale used in the current study may not be completely culturally sensitive for this group of subjects. Further research of these measures, to explore sensitivity in cross-cultural populations, is needed.

Conclusion

The primary purpose of this study is to test a theoretical model that proposed that the health consequences (well-being and glycemic control) of older persons with Non-Insulin Dependent Diabetes Mellitus (NIDDM) could be predicted by family support, expectation of filial piety, and stress. The secondary purpose of this study was to explore the subjective meaning of well-being in order to develop a concept of well-being that is culturally specific.

This study used a cross-sectional, correlational design with a convenience sample (N=150) of older Taiwanese with NIDDM. Methodological triangulation was used to collect both quantitative and qualitative data. The quantitative data were

triangulated with qualitative data using in-depth interview on 12 subjects who were recruited from the 150 subjects, and stratified on gender and educational level. Five research questions were inquired in this study. For the first question: Does family support affect stress in older Taiwanese adults with NIDDM ? My findings indicate subjects with higher family support tend to perceive a lower level of stress. The effect of family support on stress was more salient for subjects with 6 years education or less. For the second question: Does stress affect psychological well-being and glycemic control in older Taiwanese adults with NIDDM ? My findings show stress was associated with psychological well-being inversely. The higher the stress, the lower the well-being. In terms of the relationship between stress and glycemic control, only in subjects with 6 years of education or less showed statistically significant association. For the question 3: Does family support affect psychological well-being in older adults with NIDDM? Family support was associated with psychological well-being positively. The effect of family support on psychological well-being was more prominent in males than in females. Regarding glycemic control, family support was associated with glycemic control positively in males, but associated with glycemic control inversely in females. For the research question 4: Does expectation of filial piety affect psychological well-being in older Taiwanese adults with NIDDM ? No significant association was found between expectation of filial piety and psychological well-being.

The qualitative data provided rich information to help interpret the findings of path analysis. Content analysis of the qualitative data revealed that parents adjusted their expectation of filial piety to protect themselves from disappointment with filial care. Adjusted expectation of filial piety contributed to non-significant association between the expectation of filial piety and well-being. For the fifth research question

what is the subjective well-being for the older Taiwanese with NIDDM? Content analysis showed well-being consisted of five attributes: family support, completion of all family obligation, sense of dignity, self-reliance, and extrafamilial support. Two hierarchical levels of well-being were further derived from the five attributes: basic well-being and comprehensive well-being . To attain a state of comprehensive well-being, the individual perceived both personal basic well-being and family well-being.

Family support showed its significant association with well-being and glycemic control of the older adults with NIDDM in this study. This added further evidence of the importance of family support to the health of older adults. Intervention that facilitates family support and adjustment of expectation of filial piety may improve health consequences of older Taiwanese adults with NIDDM. Further investigation is required to confirm the effects of gender and education on the relationship between social support and health consequences.

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Appendix A

Permission Letter from Author
Human Subjects Approval Letter
Hospital Approval Letter
and Information Sheet
(English Version and Chinese Version)

Department of Psychology

UNIVERSITÉ YORK UNIVERSITY

4700 KEELE STREET • NORTH YORK • ONTARIO • CANADA • M3J 1P3

May 24, 1994

Ms. Yu-Tzu Dai
3801 Brooklyn Ave. N.E.
C137-1.
Seattle, WA. 98105
USA

Dear Ms. Dai,

You are entirely welcome to use the SRLE in your dissertation research. However, I do not think the proposed scoring-format change will be at all helpful.

The SRLE and its sibling measures, the ICSRLE (for college students) and the IHSSRLE (for high-school students), were developed to measure stress-exposure freed from contamination by subjective distress or impairments in physical and mental health. Items were selected on the basis of significant correlation with an independent measure of perceived stress to nonetheless retain the stress-appraisal aspect. Your proposed format would recontaminate the measure with subjective distress. I also don't believe it would add anything to the predictive power of the SRLE. The enclosed reprint by Maria Gurevich and myself should amplify on all the foregoing points. (Admittedly, we used the ICSRLE rather than the SRLE; however, I see absolutely no reason why the results would be different had we used the SRLE with an adult sample.)

The bottom line is that,offhand,I think your plan could use some modification, but you are welcome to use the SRLE in the way you outlined or in any other manner. In any event, I would be interested in hearing from you about the findings.

Yours sincerely,

Paul Kohn

Paul M. Kohn, Ph.D.
Professor of Psychology

PMK/sl
Enclosures

Form UW 13-11
(Rev. 9/87)

UNIVERSITY OF WASHINGTON
Human Subjects Review Committee Application

HUMAN SUBJECTS
APR 27 1994

* PLEASE TYPE *

This box for Human Subjects Review Committee use only

MAY 02 1994 24-677-E
Action Date Application No.

CONFIDENTIAL

Date April 25, 1994

PLEASE TYPE. Submit 9 copies (including the signature copy) and all relevant materials (consent form/s, questionnaire/s, debriefing statement, advertisement/s) to Grant and Contract Services, Human Subjects Division, JM-22. Submit one copy of each grant or contract proposal, and one copy of investigator's notebook for clinical drug trials. Students should submit one copy of thesis or dissertation proposals. For information and assistance, call 543-0098. Handwritten forms will be returned.

I. Investigators and associates (applications are filed under name of first person listed).

Name	Position	Department/Division	Mail Stop	Telephone
Yu-Tzu DAI	PhD Candidate	Nursing	SC-72	633-3653

II. Title of activity: The Effects of Family support and Filial expectation on Well-being in the Taiwanese Elderly with Diabetes Mellitus

III. Beginning date for use of human subjects ~~July, 1st, 1994~~

IV. If submitted for expedited review, check here X. (See manual for definition of expedited review.)

V. List all relevant grants or contracts. Use separate sheet if more than one. If none, check here V.

A. Type: ___research grant, ___contract, ___fellowship, ___training grant, ___other (specify_____).

B. Name of Principal Investigator:

C. Name of funding agency:

D. Agency's number (if assigned):

E. Title of proposal:

F. Inclusive dates: from_____ through _____.

G. Status: ___new ___competing continuation ___noncompeting continuation

H. Submitted through University of Washington Grant and Contract Services? ___yes ___no

Please indicate name of first investigator listed and application number on all correspondence.

VI. SIGNATURES

A. Submitted by Investigator: Yu-Tzu Dai Yu-Tzu Dai April, 25, 1994
Typed name plus signature DATE

✓ B. Faculty sponsor (for student): Margaret Dimond, RN, PhD Margaret Dimond April 25, 1994
Typed name plus signature DATE OF APPROVAL

C. Department Chairman: _____
Typed name plus signature DATE OF APPROVAL

DO NOT WRITE IN THIS BOX

HUMAN SUBJECTS REVIEW COMMITTEE Helen McConnell MAY 02 1994 X _____
Committee Chairman's signature Date Approve Disapprove

Subject to the following conditions: Submit documentation of project approval & consent to records without written consent from National Taiwan University Hospital

Period of approval is one year, from MAY 02 1994 through MAY 01 1995

VALID ONLY AS LONG AS APPROVED PROCEDURES ARE FOLLOWED

國立臺灣大學醫學院附設醫院
NATIONAL TAIWAN UNIVERSITY HOSPITAL
7, CHUNG-SHAN SOUTH ROAD, TAIPEI, TAIWAN 100
REPUBLIC OF CHINA

To: Ms. Yu-Tzu Dai
School of Nursing
University of Washington
Seattle, WA. 98195
U.S.A.

May 11, 1994

Dear Ms. Dai

Your application for review and approval of the proposal of the study-- The Effects of Family Support and Filial Expectations on Well-being in The Taiwanese Elderly with Diabetes Mellitus-- was reviewed and approved by our research commitee on May 10, 1994. The data collection of the study can be started in National Taiwan University Hospital as you proposed.

Yueh-chih Chen

Yueh-Chih Chen, RN, PHD.
Professor and Director
Department of Nursing
National Taiwan University
Hospital

Information Sheet

For the First Interview

My name is Yu-Tzu Dai. I am studying in School of Nursing, University of Washington. I am interested in the subject matters related to what factors make the elderly have better life experience. I am conducting a study to explore the daily life experience among Taiwanese elderly. I would like to explain the study first, and then I would like to invite you to participate in my study.

The purpose of this study is to understand your perspectives about some hassles encountered in your daily life and the expectations of how your children should treat or care of you, and how you feel about your family and your life. Therefore, I will ask you some questions on these aspects. These questions do not have right or wrong answer, please just answer these questions base on your personal beliefs and experiences. In addition, I will ask some of your personal date like: age, education marriage, income. The data of body weight, height, blood pressure, and blood glucose will be obtained from your medical records. It will take about 1 hour if you self-administer the questionnaire. It may take one and a half to two hours if you would rather I ask question, you answer it.

Your name will not appear in research report. The information you provide will be kept in strictest confidence. Your participation in this study is voluntary. Your health care will by no means be affected by your decision to participate or not. Once you agree to participate , you can withdraw any time or if there is any question you don't feel comfortable to answer, please feel free to let me know, and you don't need to give a reason. If you feel tired, you can take a break anytime or we may arrange another time to finish .

I would like to invite you to participate in this study. Please feel free to say no if you are not interested in participating.

After the patient agree to participate, the investigator will ask the subject if he/she like to self-administer the questionnaire or to be interviewed.

Information Sheet

For the Second Interview (Semi-structured interview, 12 respondent will be recruited)

Thank you for your participation in the first interview. I appreciate that you have provide me very valuable information. I am interested in discussing with you in some more details on some of your important life experiences. It will take about one hour and I like to tape record the interview if you do not object it. I would like to invite you to participate the second interview session. We may need to arrange another time and place to conduct this interview if you agree to participate. Please feel free say no if you are not interested in, and you can withdraw anytime if you don't like to continue.

第一次問卷或面談前的說明

我的名字叫戴玉菡，我目前是美國華盛頓大學的護理研究生。因爲對影響中老年人幸福的因素甚感興趣，所以正在進行一項探討中老年人生活的研究。首先讓我說明一下我的研究，希望在說明之後能邀請您參與我的研究回答問卷。

我這次問卷的目的是要瞭解日常生活中會困擾您的一些事物、您對子女的期望、您認爲子女應該如何對待您、以及您對家庭和生活的感受，所以我會問有關這三方面的問題。這些問題的答案並沒有對或錯，請按照您個人的想法和經驗作答就是最好的答案。此外，我會問一些您的個人資料如：年齡、教育程度、婚姻、收入等。另外，從您的病歷我需要抄錄您的體重，身高、血壓、血糖檢查結果。您如果想要自填問卷，可能需要花一小時；如果您要我念您答就可能要花 1.5 至 2 小時。

這項調查是匿名的，您的名字將不會出現在研究報告上。您提供的資料我會絕對保密。參加與否是完全自由，您的醫護照顧絕對不會因爲您的決定而受影響。若您同意參加，對任何一個問題您有權決定回答或不回答，或中途退出。如果您覺得累，我們可以中途休息一下再繼續或另外安排時間完成問卷。

我誠懇地邀請您參加這項研究，如果您實在沒時間或沒興趣則不敢勉強您。（病人決定參與後再詢問是要自填或採一問一答方式）

第二次面談說明

非常謝謝您的參加，幫忙回答這份問卷，提供我寶貴的資料。我還希望能有機會和您做第二次的面談，談談您的重要生活經驗中的詳細情形。下次面談可能需要一小時，而且我希望把我們談話的過程能用錄音機錄下來。不知您能否答應下一次的面談？如果您沒時間或沒興趣您有權拒絕。（如果病人答應）我們可不可以約定下次面談的時間和地點？即使您現在答應了，您還是可以隨時退出。

Appendix B

English Version of Questionnaires, Measures

Questionnaire for Well-being Study

Demographic Data

Following are some of your personal informations which may help me to understand your experiences and answers on the questionnaire. Please tell me the conditions which are fit with your situation.

1. Gender__ Male
   __ Female
2. Age_____
3. Would you please tell me what is your marital status?
   __ Married.
   __ Separated.
   __ Divorced.
   __ Widowed.
4. Would you please tell me what is your highest educational level ?
   __ Illiterate, no schooling.
   -- Less than 6 year education.
   -- Elementary school
   -- Junior high school
   -- High school
   -- Junior college
   -- College
   -- Graduate
5. Would you please tell me your employment status?
   __ I am employed.
   __ I am retired.

6. Draw a Family tree. (Who you have in your family? parents? spouse? children? grandchildren? ask the age of the eldest child).

7. Would you please tell me who you are living with?
(circle the family members who live together with the respondent on the family tree,).

8. How do you feel about your health condition?
__ excellent, __ good, __ fair, __ poor, __ very poor

Physiological Data

Body Weight _____(Kg), Body Height _____ (cm)

Blood Pressure _____, Glycosylated Hemoglobin _____

Treatment ____ Diet therapy, ____ Oral hypoglycemic agent,
____ Insulin therapy

Family Support Scale

Below are some statements about you and your family with which some people agree and others disagree. Nowadays, it is quite common that people feel their family is not nice enough to them. Please read each statement and circle the response most appropriate for you. There is no right or wrong answer. Your real feeling is the most valuable answer.

5 Totally agree
4 Somewhat agree
3 Neutral
2 Somewhat disagree
1 Totally disagree

1. There is someone in my family I feel close to who makes me feel secure.	5 4 3 2 1
2. I belong to my family in which I feel important.	5 4 3 2 1
3. My family lets me know that I do well at my work.	5 4 3 2 1
4. I can't count on my family to help me with problem.	5 4 3 2 1
5. I have enough contact with certain family members who make me feel special.	5 4 3 2 1
6. I spend time with some members in my family who have the same interests that I do.	5 4 3 2 1
7. There is little opportunity in my life to be giving and caring to my family.	5 4 3 2 1
8. My family let me know that they enjoy getting together with me.	5 4 3 2 1
*9. There are family members who are available if I was ill and needed care over an extended period of time.	5 4 3 2 1
10. There is no one in my family to talk to about how I am feeling.	5 4 3 2 1
11. Among my family members we do favor for each other.	5 4 3 2 1
12. I have the opportunity to encourage my family to develop their interests and skills.	5 4 3 2 1

13. My family lets me know that I am important for keeping the family running. 5 4 3 2 1
14. My family will help me out even I can't pay them back. 5 4 3 2 1
15. When I am upset there is someone in my family I can be with who lets me be myself. 5 4 3 2 1
16. I feel no one in my family has the same problems as I. 5 4 3 2 1
17. I enjoy doing little "extra" things that make my family's life more pleasant. 5 4 3 2 1
*18. There is someone in my family always happy to help me to do house chores, shopping, run errands. 5 4 3 2 1
*19. The atmosphere in my family is not quite harmonious. 5 4 3 2 1
20. There is someone in my family who loves and cares about me. 5 4 3 2 1
21. I have family members to share social events and fun activities with. 5 4 3 2 1
22. I am responsible for helping provide for family's needs. 5 4 3 2 1
23. If I need advice there is someone in my family would assist me to work out a plan for dealing with the situation 5 4 3 2 1
24. I have a sense of being needed by my family. 5 4 3 2 1
25. My family think that I am not as good as a family member as I should be. 5 4 3 2 1
26. If I got sick, someone in my family would give me advice about caring for myself. 5 4 3 2 1
*27. My family would always be responsible to give me financial support if I need it in the long run. 5 4 3 2 1
*28. When I am at home, family always makes me feel at ease and relaxed. 5 4 3 2 1
*29. When I feel upset, tired, or ill, my family always picks up the signs right away. 5 4 3 2 1

* Overall.how much do you think your family support of you ?

__ very much, __ moderate, __ some, __ very little, __ almost none.

* Can you tell me, at present, how much is the total money income you and your spouse receive in a month ?

__ less than NT 3,000.
__ 3,000 - 4,999
__ 5,000 - 9,999
__ 10,000 - 14,999
__ 15,000 - 19,999
__ 20,000 - 49,999
__ more than 50,000

Expectation of Filial Piety Scale

We all have our expectation on how our adult-children should treat us. Listed below are a number of items parent may expect their children to do. Please read each item and indicate whether or not you need your children to do of that item in some degree. Please circle "1", if totally has no need on that item. If you have certain expectation on that item, please measure how much you need your children to perform that item. Circle "2", if you feel somewhat need it. Circle "3", if you pretty much in need of that performance. Circle "4", if you are very much in need of that performance. The situations of each family are quite different, the expectations of children's performances are differ. There is no right or wrong expectation. These questions only try to explore your personal experiences. The most important and appropriate answer is how you feel on that item.

1 no need at all
2 somewhat in need
3 pretty much in need
4 very much in need

1. Do what I ask them to do right away.	1 2 3 4
2. Avoid quarrelling (or fighting) with siblings in front of me.	1 2 3 4
3. Pay attention to my activities of daily living	1 2 3 4
4. Help me do something voluntarily when I am busy.	1 2 3 4
5. Talk with me and try to understand my experiences, beliefs, feelings.	1 2 3 4
6. Take care of my health condition.	1 2 3 4
7. Let me know when they are leaving or coming back home lest I should be worrying about them.	1 2 3 4
8. Accepting my advice or admonition.	1 2 3 4
9. Try to promote my sense of importance.	1 2 3 4
10. Treat me nicely despite how I have been treating them.	1 2 3 4
11. Pay their concern, care, and empathy to me.	1 2 3 4
12. Talk to me gently and courteously.	1 2 3 4
13. Take care of me in person when I am ill.	1 2 3 4
14. Share same religious belief with me.	1 2 3 4
15. Break their promise to their friends to avoid being against my order.	1 2 3 4

16. Consider their availability of caregiving to me while they are choosing their job. 1 2 3 4
17. Follow my suggestions while they are choosing their jobs. 1 2 3 4
18. Avoid having friendships with somebody whom I don't like. 1 2 3 4
19. Live with me until they get married. 1 2 3 4
10. Have at least one son to continue my family lineage. 1 2 3 4
21. Follow my advice while he is dating and courting. 1 2 3 4
22. Seek as best health care as they can for me to cure my disease. 1 2 3 4
23. Offer the best quality of life as they can to me. 1 2 3 4
24. Save a portion of food for me when they have something good to eat. 1 2 3 4
25. Be well-behaved and don't get into trouble lest they should upset me. 1 2 3 4
26. Avoid doing something immoral lest should lose my face. 1 2 3 4
27. Do something which may make me proud of. 1 2 3 4
28. Avoid quarrelling with his/her spouse in front of me. 1 2 3 4
29. Make excuses for me to prevent me from losing my face. 1 2 3 4
30. Always try their best to make me happy. 1 2 3 4
31. Avoid doing something which may embarrass me. 1 2 3 4

Recent Life Stress Scale (Version for Older Taiwanese)

Following is a list of experiences which many people have sometime or other. Please indicate for each experience how much it has been bothering you in the past one month. Read each item. Then, look at the numbers to the right of the items, circle a 0, if it does not happen to you. Circle a 1, 2, 3, 0r 4 to indicate how much the hassle bothered you in the past month if it does happen to you. There is no right or wrong answer. The most important is how you perceive about these hassles.

0 did not occur
1 did not bother me at all
2 somewhat bothersome
3 moderate bothersome
4 very bothersome

1. Illness of family members.	0 1 2 3 4
2. Disliking my work.	0 1 2 3 4
3. Being let down or disappointed by friends.	0 1 2 3 4
4. Conflict with supervisor(s) at work.	0 1 2 3 4
5. Too many things to do at once.	0 1 2 3 4
6. Being taken for granted.	0 1 2 3 4
7. Financial conflicts with family members.	0 1 2 3 4
8. Having my contributions being overlooked.	0 1 2 3 4
9. Struggling to meet my own standards of performance and accomplishment.	0 1 2 3 4
10. Not enough leisure time.	0 1 2 3 4
11. A lot of responsibilities.	0 1 2 3 4
12. Dissatisfaction with work.	0 1 2 3 4
13. Not enough time to meet my obligations.	0 1 2 3 4
14. Dissatisfaction with my physical fitness.	0 1 2 3 4
15. Financial burden.	0 1 2 3 4
16. Lower evaluation of my work than I think I deserve.	0 1 2 3 4
17. Experiencing high levels of noise.	0 1 2 3 4
*18. Adjustment to the change of living or housing situations.	0 1 2 3 4
*19. Misplaced or lost things.	0 1 2 3 4
20. Conflicts with family members.	0 1 2 3 4
*21. Financial investment is at risk.	0 1 2 3 4

22. Getting "ripped off" or cheated in the purchase of goods.	0 1 2 3 4
23. Unwanted interruptions of my work.	0 1 2 3 4
24. Social isolation.	0 1 2 3 4
25. Unsatisfactory housing condition.	0 1 2 3 4
26. Failing to get money I expected.	0 1 2 3 4
*27. Too much to do in following doctor's order,taking medications, restricting diet for treating my illness	0 1 2 3 4
28. Gossip about myself.	0 1 2 3 4
29. Difficulties dealing with modern technology.	0 1 2 3 4
30. Hard work to look after and maintain home.	0 1 2 3 4

Note. Asterisks identify items added in the scale of Chinese-version.

Life Satisfaction Index (LSIA)

Here are some statements about life in general that people feel differently about. Would you read each statement in the list and, if you agree with it, put a checkmark in the space "agree". If you do not agree, put a checkmark in the space under "disagree". If you are not sure one way or the other, put a checkmark in the space "?".

1. As I grow older, things seems better than I thought they would be. Agree ? Disagree
2. I have gotten more of the breaks in life than most of the people I know. Agree ? Disagree
3. This is the dearest time of my life. Agree ? Disagree
4. I am just as happy as when I was young. Agree ? Disagree
5. My life could be happier than it is now. Agree ? Disagree
6. These are the best years of my life. Agree ? Disagree
7. Most of the things I do are boring or monotonous. Agree ? Disagree
8. I expect some interesting and pleasant things to happen to me in the future. Agree ? Disagree
9. The things I do are as interesting to me as they ever were. Agree ? Disagree
10. I feel old and tired. Agree ? Disagree
11. I feel my age, but it doesn't bother me. Agree ? Disagree
12. As I look back on my life, I am fairly well satisfied. Agree ? Disagree
13. I would not change my past life, even I could. Agree ? Disagree
14. Compared to other people my age, I've made a lot of foolish decisions in my life. Agree ? Disagree
15. Compared to other people my age, I make a good appearance. Agree ? Disagree
16. I have made plans for things I will be doing a month or a year from know. Agree ? Disagree
17. When I think back over my life, I didn't get most of the important things I wanted. Agree ? Disagree
18. Compared to other people, I get down in the dumps too often. Agree ? Disagree
19. I've gotten pretty much what I expected out of life. Agree ? Disagree

20. In spite of what people say, the lot of the average man is getting worse, not better. Agree ? Disagree

Semi-structured Interview Questions for Life Satisfaction:

In this interview, I would like to talk with you about your personal experiences in the past, and present, and your plan for the future. I would like you to tell me some experiences you think that are important, meaningful or influential. If you don't feel comfortable in answering any question, please let me know, and you don't need to give the reason for it.

1. First of all, many people have some important beliefs to guide them through the life. Would you please tell me if you have any belief or goal which guide you through your past life ?
2. Can you tell me some major events which impressed you very much in your personal life, including good and bad experiences ?
3. Some people have told me that they are heavily influenced by certain persons in their life. Can you tell me some of the most influential persons in your life ? How they influenced you ?
4. Would you please tell me what you think of the pain and illness in old age ?
5. Please tell me in your experiences with diabetes, what conditions have ever caused your disease to get out of control ?
6. Please tell me, under what kind of situations your diabetes would generally tend to be controlled well ? Is there anything to do with your family life (or family members) ? What does the diabetes mean to you ?
7. In terms of the present life, what are the matters that can give you a sense of happiness or well-being ? Why do these matters make you feel happy or satisfied ?
8. What are the matters that upset you most in this age ?
9. Do you have any problem getting along with your family members ? Would you please give me some examples ?
10. Would you please tell me what have you ever been dreaming about your children ? Have the dream come true ? In the old age, what is the most important thing which you like your children to do for you or your family ?
11. Can you tell me something which usually make you feel unhappy, upset or angry at home in this age ?

12. What are your major concerns or worries in your present life ?
13. What are the perspectives for your future life ? Do you feel it is secure enough financially ?
14. Can you tell me what is your plan for the future on your finance and your living arrangement ?

Appendix C

Tables of Pilot Study

Table C.1 Test-Retest Reliability of EFPS and RLSS

	N	# of item	scale mean	SD	item mean	retest
EFPS	107	45	41.71	22.51	.927	.815
EFPS(short)	107	31	31.84		1.027	
				16.99		
RLSS	110	46	25.05		.545	.873
				16.40		
RLSS	110	30	19.03		.634	
(short)				12.54		

Note. EFPS = Expectation of Filial Piety Scale, RLSS = Recent Life Stress Scale. N=10 for test-retest r, time interval between two test was 10 to 14 days.

Table C.2 Reliability of EFPS(Internal Consistency, Cronbach Alpha, Theta)

	Original version			**Short version**		
	Alpha	Theta	# of items	Alpha	Theta	# of items
Total scale	.942	.95	**45**	.931	.94	**31**
Subscale I	.922		20	.909		13
Subscale II	.832		12	.755		8
Subscale III	.742		3	.735		3
Subscale IV	.884		10	.886		7

Note. EFPS = Expectation Filial Piety Scale.

Table C.3 Item Analysis of EFPS (31-item version)

item #	mean	SD	# meeting criteria for subscale item-item (R=.30-.70)	item-subscale (R>.50)	item-scale (R>.30)
Subscale I					
1	1.22	.95	12/13	.69	.56
2	1.04	1.00	12/13	.58	.55
5	1.39	.63	7/13	.43	.45
6	1.11	.86	11/13	.66	.57
8	1.09	.80	11/13	.72	.69
9	1.07	.91	12/13	.73	.69
12	1.66	1.02	11/13	.73	.69
13	1.36	.94	12/13	.71	.71
14	1.09	.95	11/13	.72	.68
16	1.03	.96	12/13	.73	.60
17	1.36	.94	12/13	.70	.76
18	1.39	.94	11/13	.81	.69
19	1.16	.97	11/13	.75	.67
Subscale II					
21	.70	1.01	5/8	.63	.47
22	.49	.76	4/8	.61	.34
23	.24	.55	4/8	.57	.15
26	.81	.84	2/8	.49	.26
27	.68	.80	2/8	.63	.38
28	.50	.81	5/8	.60	.30
29	.81	1.03	3/8	.73	.49
30	.95	.88	6/8	.73	.49
Subscale III					
33	1.08	1.05	2/3	.88	.76
34	.59	.91	2/3	.84	.61
35	.55	.79	2/3	.71	.47
Subscale IV					
36	1.37	1.11	6/7	.80	.66
38	1.58	1.22	6/7	.85	.70
39	1.38	1.10	6/7	.74	.72
41	1.32	1.06	6/7	.78	.67
42	1.67	1.11	6/7	.58	.54
44	1.45	1.22	6/7	.82	.68
45	1.67	1.15	6/7	.82	.74

Note. EFPS = Expectation of Filial Piety Scale.

Table C.4 Factor Loading of the Items of 31-item Version EFPS

item #	factor of origin	factor 1	factor 2	factor 3	factor 4
8	I	.57	.32		
9	I	.68			
12	I	.59	.44		
14	I	.72			
16	I	.75			
17	I	.81	.33		
18	I	.55	.48		
19	I	.60			
33	III	.60	.33		
35	III	.55		.31	
39	IV	.64		.49	
13	I	.45	.52		
36	IV		.80		
38	IV		.83		
41	IV		.68		
42	IV		.49	.44	
44	IV	.30	.72		
45	IV	.53	.61		
21	II			.56	
23	II			.66	
27	II			.65	
28	II			.64	
29	II			.50	
30	II			.65	
34	III	.51		.52	
1	I	.44			.67
2	I				.51
5	I				.44
6	I	.47			.60
22	II			.47	.57
26	II			.32	.48

Note. EFPS = Expectation of Filial Piety Scale.
Factor of origin: factor I: respect the parents, factor II: obedience to the parents, factor III: supporting parents, factor IV: glorifying parents in original Filial Piety Scale (FPS).

Table C.5 Reliability of RLSS (Internal Consistency, Cronbach Alpha, Theta)

	Original version			Short version		
	Alpha	Theta	# of items	Alpha	Theta	# of items
Total scale	.901	.91	**46**	.879	.88	**30**
Subscale I	.538		9	.777		7
Subscale II	.782		7	.703		6
Subscale III	.763		7	.773		6
Subscale IV	.525		6	.703		7
Subscale V	.432		5	.698		4
Subscale VI	.447		4			

Note. RLSS = Recent Life Stress Scale.

Table C.6 Item Analysis of RLSS (30-item Version)

item #	mean	S.D.	# meeting criteria of subscale - tem-item (.3-.7)	item-subscale (>0.5)	Item-total scale (>0.3)
Factor I					
3	.36	.62	6/7	.72	.53
6	.58	.79	4/7	.58	.45
9	1.10	1.12	3/7	.68	.43
10	.64	.91	6/7	.68	.58
14	.95	.90	4/7	.61	.60
35	.65	.79	2/7	.57	.45
45	.68	.81	5/7	.71	.45
Factor II					
2	1.02	1.26	0/6	.61	.39
7	.30	.70	3/6	.67	.48
13	.64	.87	2/6	.55	.50
29	.66	.89	1/6	.59	.41
30	.36	.72	4/6	.74	.44
43	.55	.78	2/6	.61	.37
Factor III					
11	.23	.57	1/6	.47	.37
16	.61	.90	4/6	.81	.54
19	.74	.96	3/6	.70	.48
20	.39	.73	3/6	.74	.63
22	.70	.91	3/6	.77	.55
28	.25	.65	2/6	.58	.30
Factor IV					
23	1.08	1.20	3/7	.75	.56
24	.46	.84	3/7	.63	.45
25	.47	.84	2/7	.53	.57
31	.53	.97	1/7	.48	.30
40	.47	.98	1/7	.51	.31
42	1.04	1.14	1/7	.68	.54
44	.90	.95	2/7	.58	.50
Factor IV					
27	.94	1.23	3/4	.81	.37
33	.63	.89	3/4	.69	.42
34	.46	.89	3/4	.68	.60
38	.54	.86	3/4	.71	.47

Note. RLSS = Recent Life Stress Scale.

Appendix D

Figures Related to Data Screening and the Examination of Statistical Assumptions

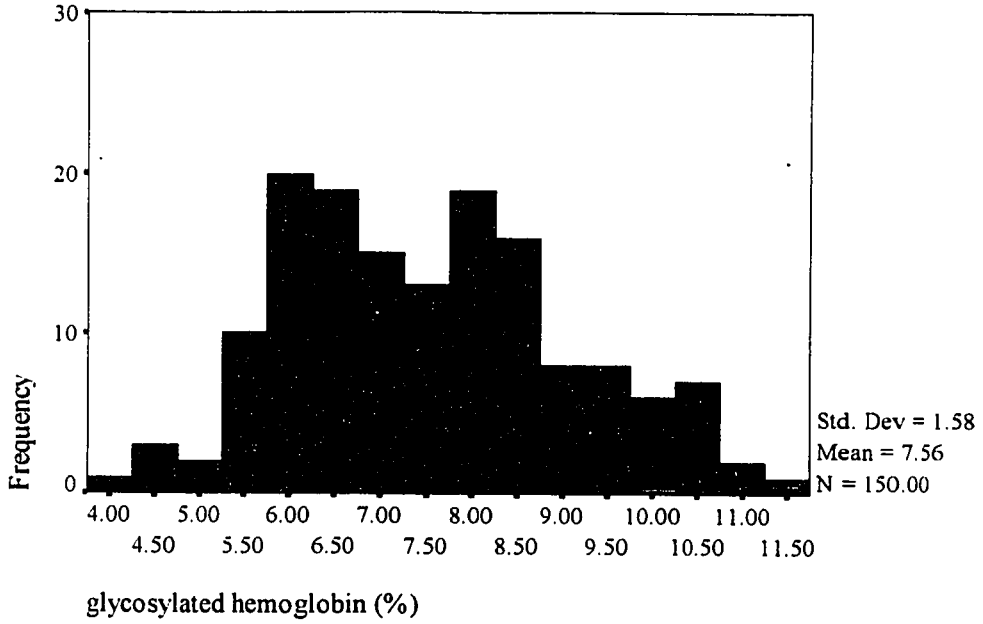

Figure D.1 Histogram of Glycosylated Hemoglobin Showing Roughly Symmetrical, Normal Distribution.

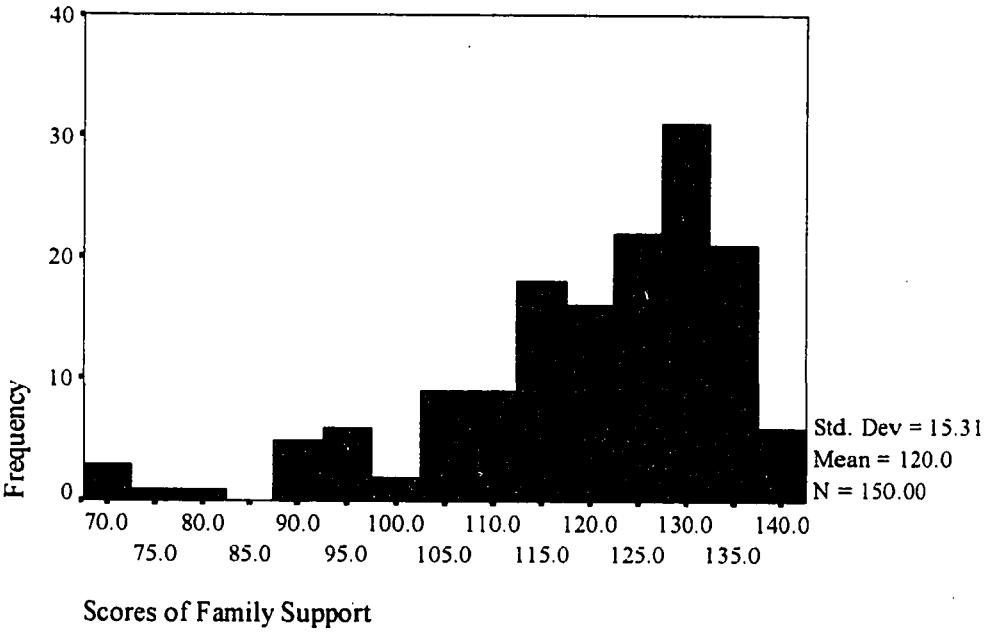

Figure D.2 Histogram of Scores of Family Support, Showing the Frequency Distribution Negatively Skewed .

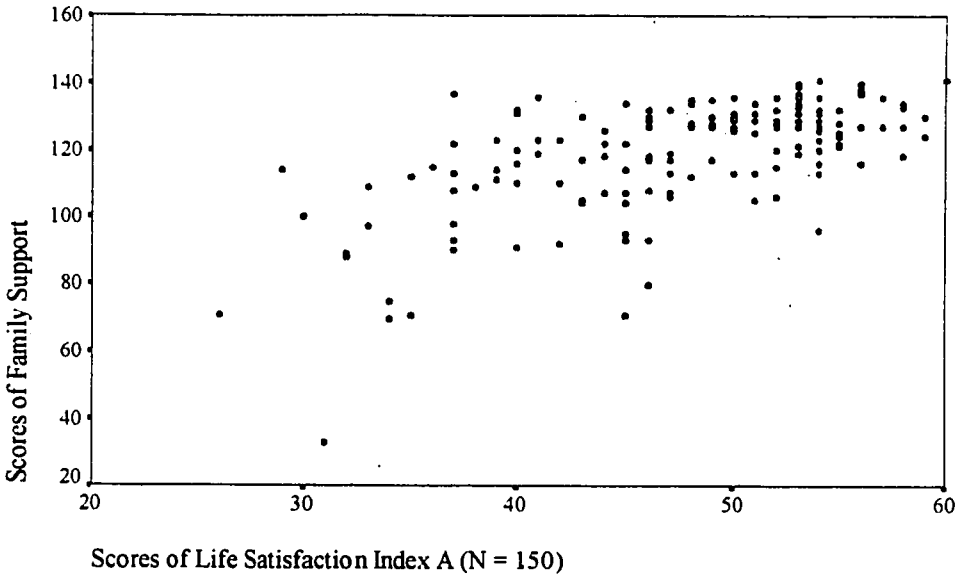

Figure D.3 Scatterplot of Family Support with Life Satisfaction Index A, Showing an Oval-shaped Distribution which Indicates Linear Relationship between This Two Variables

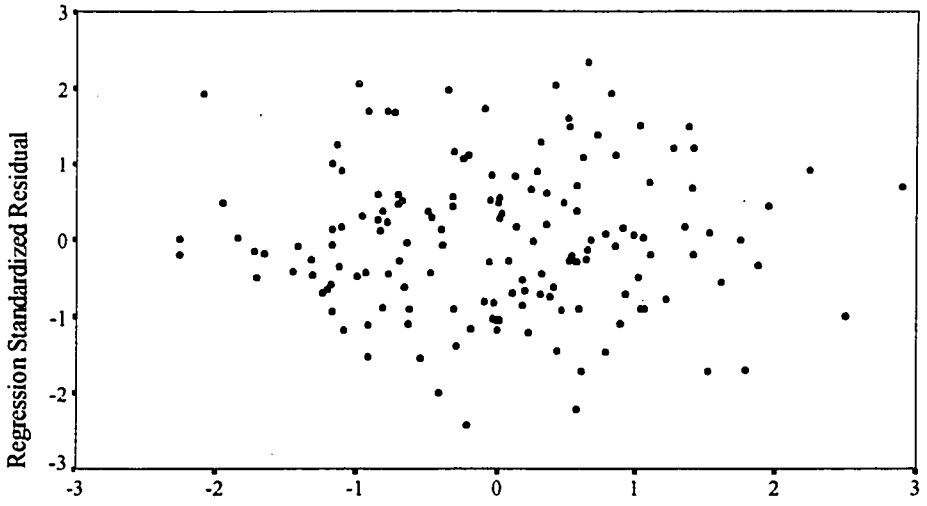

Figure D. 4 Scatterplot of Predicted Values of Glycosylated Hemoglobin against Residuals from the Reduced Empirical Model for predicting Well-being of Older Adults with NIDDM (Figure 4.4), Showing Residuals Distributed in a Rectangular Band which Indicates the Assumptions of Normality, Linearity, and Homoscedasticity are Met.

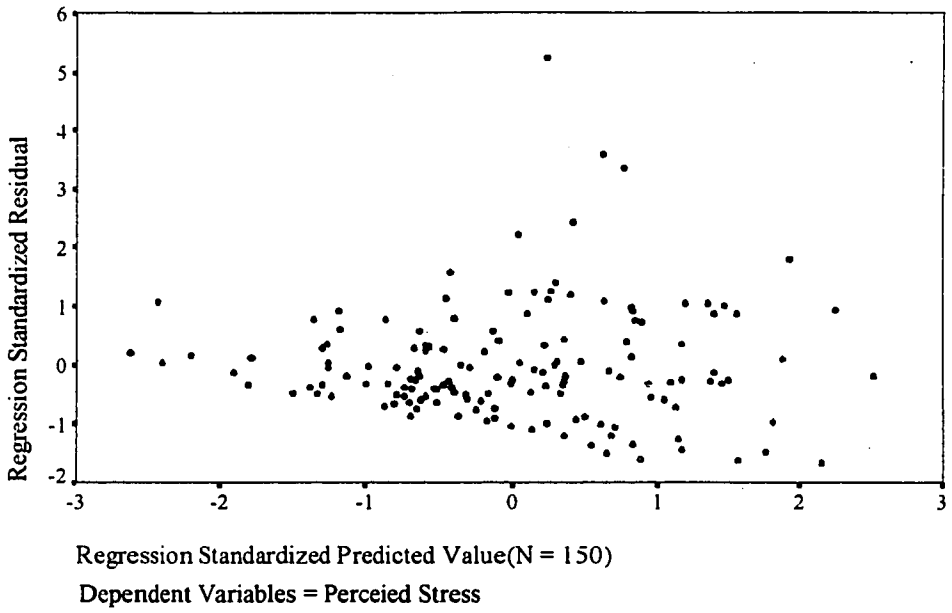

Figure D.5 Scatterplot of Predicted Values of Perceived Stress against Residuals from the Reduced Empirical Model for Predicting Well-being of Older Adults with NIDDM (Figure 4.4), Showing Residuals Distributed in a Trpezoid Shape which Indicates when the Predicted Value Increased the Residuals Scattered Wider, the Error of Prediction of Perceived Stress Increased.

Appendix E

Tables Related to the Examination of

Statistical Assumptions

Table E.1 Bivariate correlation between Residuals of Predicted Variables in each Equation

	EFPZRE	FSZRE	STRZRE	PsyWZRE	HbA1cZRE
EFPZRE	1.000				
FSZRE	.170*	1.000			
STRZRE	.093	.000	1.000		
PsyWZRE	.000	.000	.000	1.000	
HbA1cZRE	-.087	.000	.000	-.093	1.000

Note. EFPZRE= Standardized residuals of expectation of filial piety. FSZRE= Standardized residuals of family support. .STRZRE= Standardized residuals of perceived stress. PsyWZRE= Standardized residuals of psychological well-being. HbA1cZRE= Standardized residuals of Glycosylated Hemoglbin.
*p = .04.

Table E.2 Bivariate Correlation between Residuals of Predicted Variable and its Predicting Variables in each Equation of Figure 4.2

	EFP	FS	Stress
STRZRE	.086	.000	.000
PsyWZRE	.000	.000	.000
HbA1cZRE	-.081	.000	.000

Note. EFP= Expectation of Filial Piety. FS= Family Support.. Stress= Perceived stress. STRZRE= Standardized residuals of perceived stress. PsyWZRE= Standardized residuals of psychological well-being. HbA1cZRE= Standardized residuals of .glycosylated hemoglobin.

Appendix F

Tables of Standardized Coefficients for the Regression Analysis on Subsamples

Table F.1 Standardized Coefficients (Betas) for the Regression of 5 Dependent Variables (EFP, FS, RLS, LS, and HbA1c) on Selected Subsets of 11 Independent Variables (Female, N = 85)

	Dependent Variables				
Independent Variables	EFP	FS	RLS	LS	HbA1c
Age	-.039	-.111	-.118	.158	-.055
Gender	-----	-----	-----	-----	-----
Education	-.270*	-.007	.274*	.020	.232*
Finance	-.035	.360*	-.173	.150	-.324**
Marital Status	.156	.002	.105	.073	.103
Living Arrangement	.104	-.099	.079	.068	.008
Body Mass Index	-----	-----	-----	-----	.251*
Duration of NIDDM	-----	-----	-----	-----	.393**
Hypertention	-----	-----	-----	-----	-.076
EFP	-----	-----	-----	-.111	-----
FS	-----	-----	-.143	.420***	.211*
RLS	-----	-----	-----	-.375*	.076
AdjR^2	.052	.086	.093	.463	.195
F(df)	F(5,79) = 1.92	F(5, 79) = 2.59*	F(6, 78) = 2.44*	F(8, 76) =10.04***	F(11, 73) = 3.04**

Mathematical Equations for Multiple Regression:

EFP = (NS)AG + (NS)GE + (-.27)ED + (NS)FI + (NS)MS + (NS)LA + e

FS = (NS)AG + (NS)GE + (NS)ED + (.36)FI + (NS)MS + (NS)LA + e

RLS = (NS)AG + (NS)GE + (.27)ED + (NS)FI + (NS)MS + (NS)LA + (NS)FS + e

LS = (NS)AG + (NS)GE + (NS)ED + (.18)FI + (NS)MS + (NS)LA + (NS)EFP + (.42)FS + (-.38)RLS + e

HbA1c = (NS)AG + (NS)GE + (.23)ED + (-.32)FI + (NS)MS + (NS)LA + (.25)BMI + (.39)DN + (.21)FS + (NS)RLS + e

Note. EFP = Expectation of Filial Piety , FS = Family Support, RLS = Recent Life Stress, LS = Life Satisfaction, HbA1c = Glycosylated Hemoglobin, AdjR^2 =Adjusted R square.
For mathematical equation, NS = Non Significant, AG = Age, GE = Gender, ED = Education,FI = Finance, MS = Marital Status, LA = Living Arrangement, BMI = Body Mass Index, DN = Duration NIDDM, HT = Hypertension.
*p< .05. **p<.01. ***p<.001

Table F.2 Standardized Coefficients (Betas) for the Regression of 5 Dependent Variables (EFP, FS, RLS, LS, and HbA1c) on Selected Subsets of 11 Independent Variables Standardized Regression (Male, N=65)

	Dependent Variables				
Independent Variables	EFP	FS	RLS	LS	HbA1c
Age	.044	-.045	-.263*	-.147	.004
Gender	-----	-----	-----	-----	-----
Education	-.238	.148	.277*	-.061	-.142
Finance	.119	-.265	.072	.197*	.096
Marital Status	-.183	-.058	-.039	.105	.024
Living Arrangement	-.061	-.093	-.109	-.085	.025
Body Mass Index	-----	-----	-----	-----	.041
Duration of NIDDM	-----	-----	-----	-----	.104
Hypertention	-----	-----	-----	-----	.258
EFP	-----	-----	-----	.088	-----
FS	-----	-----	-.184	.555***	-.147
RLS	-----	-----	----	-.305**	.184
AdjR^2	.044	.032	.138	.518	.037
F(df)	F(5, 59) =1.59	F(5.59) =1.418	F(5.59) =2.713*	F(8, 56) =9.615***	F(10, 54) =1.25

Mathematical Equations for Multiple Regression:

EFP = (NS)AG + (NS)GE + (-.24)ED + (NS)FI + (NS)MS + (NS)LA + e

FS = (NS)AG + (NS)GE + (NS)ED + (NS)FI + (NS)MS + (NS)LA + e

RLS = (-.26)AG + (NS)GE + (.28)ED + (NS)FI + (NS)MS + (NS)LA + (NS)FS + e

LS = (NS)AG + (NS)GE + (NS)ED + (.20)FI + (NS)MS + (NS)LA + (NS)EFP + (.56)FS + (-.31)RLS + e

HbA1c = (NS)AG + (NS)GE + (NS)ED + (NS)FI + (NS)MS + (NS)LA + (NS)BMI + (NS)DN + (NS)FS + (NS)RLS + e

Note. EFP = Expectation of Filial Piety , FS = Family Support, RLS = Recent Life Stress, LS = Life Satisfaction, HbA1c = Glycosylated Hemoglobin, AdjR^2 = Adjusted R square.
For mathematical equation, NS = Non Significant, AG = Age, GE = Gender, ED = Education, FI = Finance, MS = MArital Status, LA = Living Arrangement.
*p< .05 **p<.01 ***p<.001

Table F.3 Standardized Coefficients (Betas) for the Regression of 5 Dependent Variables (EFP, FS, RLS, LS, and HbA1c) on Selected Subsets of 11 Independent Variables (Education < 6years, N=77)

	Dependent Variables				
Independent Variables	EFP	FS	RLS	LS	HbA1c
Age	.057	-.052	-.310***	.064	-.055
Gender	.198	.050	-.108	-.033	-.038
Education	.095	.047	-.029	-.004	.211
Finance	.005	.461***	-.143	.173	-.206
Marital Status	.144	-.064	-.024	-.031	.088
Living Arrangement	.168	-.094	.083	-.086	-.046
Body Mass Index	-----	-----	-----	-----	.170
Duration of NIDDM	-----	-----	-----	-----	.330**
Hypertention	-----	-----	-----	-----	-.069
EFP	-----	-----	-----	-.030	-----
FS	-----	-----	-.350***	.479***	.188
RLS	-----	-----	-----	-.271**	.258*
AdjR^2	-.014	.153	.231	.539	.188
F(df)	F(6, 70) =.818	F(6, 70) =3.28**	F(7, 67) =4.26***	F(9, 67) =10.89***	F(11, 65) =2.60***

Mathematical Equations for Multiple Regression:

FE = (NS)AG + (NS)GE + (NS)ED + (NS)FI + (NS)MS + (NS)LA + e

FS = (NS)AG + (NS)GE + (NS)ED + (.46)FI + (NS)MS + (NS)LA + e

RLS = (-.31)AG + (NS)GE + (NS)ED + (NS)FI + (NS)MS + (NS)LA + (-.35)FS + e

LS = (NS)AG + (NS)GE + (NS)ED + (NS)FI + (NS)MS + (NS)LA + (NS)EFP + (.48)FS + (-.27)RLS + e

HbA1c = (NS)AG + (NS)GE + (NS)ED + (NS)FI + (NS)MS + (NS)LA + (NS)BMI + (.33)DN + (NS)FS + (.26)RLS + e

Note. EFP = Expectation of Filial Piety , FS = Family Support, RLS = Recent Life Stress, LS = Life Satisfaction, HbA1c = Glycosylated Hemoglobin, AdjR^2 = Adjusted R square.
For mathematical equation, NS = Non Significant, AG = Age, GE = Gender, ED = Education, FI = Finance, MS = Marital Status, LA = Living Arrangement, BMI = Body Mass Index, DN = Duration NIDDM, HT = Hypertension.
*p< .05 **p<.01 ***p<.001

Table F.4 Standardized Coefficients (Betas) for the Regression of 5 Dependent Variables (EFP, FS, RLS, LS, and HbA1c) on Selected Subsets of 11 Independent Variables (Education > 6years, N=73)

	Dependent Variables				
Independent Variables	EFP	FS	RLS	LS	HbA1c
Age	-.006	-.098	-.122	-.039	.079
Gender	.034	-.058	.143	.061	.228
Education	-.276*	-.099	.206	.048	-.031
Finance	.027	.100	.019	.192	-.261*
Marital Status	-.007	.089	.071	.107	.017
Living Arrangement	.029	-.038	-.224	-.056	-.040
Body Mass Index	-----	-----	-----	-----	.148
Duration of NIDDM	-----	-----	-----	-----	.160
Hypertention	-----	-----	-----	-----	.188
EFP	-----	-----	-----	.017	-----
FS	-----	-----	-.017	.457***	-.056
RLS	-----	----	-----	-.394***	.114
AdjR^2	-.001	-.048	.022	.333	.101
F(df)	F(6, 66) =.98	F(6, 66) =.84	F(7, 65) =1.24	F(9, 63) =4.99***	F(11, 61) =1.73

Mathematical Equations for Multiple Regression:

EFP = (NS)AG + (NS)GE + (-.28)ED + (NS)FI + (NS)MS + (NS)LA + e

FS = (NS)AG + (NS)GE + (NS)ED + (.32)FI + (NS)MS + (NS)LA + e

RLS = (NS)AG + (NS)GE + (NS)ED + (NS)FI + (NS)MS + (NS)LA + (NS)FS + e

LS = (NS)AG + (NS)GE + (NS)ED + (NS)FI + (NS)MS + (NS)LA + (NS)EFP + (.46)FS + (-.39)RLS + e

HbA1c = (NS)AG + (NS)GE + (NS)ED + (-.26)FI + (NS)MS + (NS)LA + (NS)BMI + (NS)DN + (NS)FS + (NS)RLS + e

Note. EFP = Expectation of Filial Piety , FS = Family Support, RLS = Recent Life Stress, LS = Life Satisfaction, HbA1c = Glycosylated Hemoglobin AdjR^2 = Adjusted R square.
For mathematical equation, NS = Non Significant, AG = Age, GE = Gender, ED = Education, FI = Finance, MS = Marital Status, LA = Living Arrangement, BMI = Body Mass Index, DN = Duration NIDDM, HT = Hypertension.
*p< .05 **p<.01 ***p<.001

Appendix G

Chinese Version of Questionnaires, Measures

基本資料

以下是一些您的個人資料，這些資料將幫忙我進一步了解您的生活經驗。請您在適合您的答案方格內打 v，並在劃線的空格內寫上您的答案。

1. 性別：□ 男 □ 女

2. 年齡：您今年_____歲（實歲），患糖尿病已_____年_____月。

3. 婚姻狀況：您目前的婚姻狀況是：
   □ 已婚，已結婚_____年（或月） □ 已分居_____年（或月）
   □ 已離婚_____年（或月） □ 鰥（寡）_____年（或月）

4. 教育狀況：
   過去曾接受_____年的正式學校教育
   □ 不識字 □ 未曾上學，但識字 □ 小學畢業 □ 初中畢業
   □ 高中畢業 □ 專科畢業 □ 大學畢業或以上

5. 工作狀況：（若是退休，再就業，請兩項都填）
   □ 我目前有工作，每週工作_____天，我的職業是_____（包括家管）
   □ 我目前已退休，我過去的職業是_____。

6. 家庭組成和居住狀況：
   您家裡有那些人？（父母，配偶，子女，孫子女？最大的孩子幾歲？畫出 family tree）

請問您目前與誰同住（在 family tree 上圈出同住者）

7. 我目前住的地方是 □ 我自己家 □ 我兒子家 □ 我女兒家
□ 其它_____。

8. 依您自己的看法，您目前的健康狀況是 □ 非常好 □ 好 □ 普通
□ 不太好 □ 很不好。

生理測量資料

身高_____公分、體重_____公斤、血壓_____mmHg、HbA1c_____。

用藥：

□ diet control
□ oral hypoglycemic
□ Insulin

以下是一些人在日常生活中會碰到的一些瑣事經驗，常對人造成不同程度的困擾、擔心或焦慮，請您衡量每一項，在您「最近一個月」的生活中，對您所造成的困擾程度。

如果是完全沒有發生過請圈選〝無此經驗〞；若曾發生，請圈選〝有此經驗〞；

並請續填困擾程度：　若未對您造成困擾或擔心焦慮，請圈選〝不困擾〞；

若造成輕度困擾，請圈選〝輕度困擾〞；

若造成中度困擾，請圈選〝中度困擾〞；

若造成最重的困擾，請圈選〝最重困擾〞。

這些項目純是經驗與感受的表達，答案並無對錯之別。所以最重要，最好的答案就是您的〝真正感受〞。謝謝您提供寶貴的經驗。

最近一個月有無下列經驗：

1. 家人生病
   □無此經驗
   □有此經驗；困擾程度：□不困擾 □輕度困擾 □中度困擾 □重度困擾

2. 不喜歡您的工作
   □無此經驗
   □有此經驗；困擾程度：□不困擾 □輕度困擾 □中度困擾 □重度困擾

3. 對朋友感到失望
   □無此經驗
   □有此經驗；困擾程度：□不困擾 □輕度困擾 □中度困擾 □重度困擾

4. 在工作上，與上司之間有衝突
   □無此經驗
   □有此經驗；困擾程度：□不困擾 □輕度困擾 □中度困擾 □重度困擾

5. 在同一時段，有太多的事要做
   □無此經驗
   □有此經驗；困擾程度：□不困擾 □輕度困擾 □中度困擾 □重度困擾

6. 您所做的，被視為理所當然，好像被吃定了似的
   □無此經驗
   □有此經驗；困擾程度：□不困擾 □輕度困擾 □中度困擾 □重度困擾

7. 與家人在財物的使用與處理上意見不和或有衝突
□無此經驗
□有此經驗；困擾程度：□不困擾 □輕度困擾 □中度困擾 □重度困擾

8. 您的貢獻或功勞，遭人忽視
□無此經驗
□有此經驗；困擾程度：□不困擾 □輕度困擾 □中度困擾 □重度困擾

9. 做事情時，因為不能做到自己想要的那麼好而掙扎
□無此經驗
□有此經驗；困擾程度：□不困擾 □輕度困擾 □中度困擾 □重度困擾

10. 休閒的時間不夠
□無此經驗
□有此經驗；困擾程度：□不困擾 □輕度困擾 □中度困擾 □重度困擾

11. 責任多而且重
□無此經驗
□有此經驗；困擾程度：□不困擾 □輕度困擾 □中度困擾 □重度困擾

12. 對工作不滿意
□無此經驗
□有此經驗；困擾程度：□不困擾 □輕度困擾 □中度困擾 □重度困擾

13. 沒有足夠的時間去履行您認為應盡的義務
□無此經驗
□有此經驗；困擾程度：□不困擾 □輕度困擾 □中度困擾 □重度困擾

14. 對您的身體功能狀況不滿意
□無此經驗
□有此經驗；困擾程度：□不困擾 □輕度困擾 □中度困擾 □重度困擾

15. 財物上的負擔或經濟上的壓力
□無此經驗
□有此經驗；困擾程度：□不困擾 □輕度困擾 □中度困擾 □重度困擾

16. 您的工作表現被低估，比您認為應得的還低
□無此經驗
□有此經驗；困擾程度：□不困擾 □輕度困擾 □中度困擾 □重度困擾

17. 遭受嚴重的噪音干擾
□無此經驗
□有此經驗；困擾程度：□不困擾 □輕度困擾 □中度困擾 □重度困擾

18. 適應居住環境的改變（如：搬家，或換了同住的人）
□無此經驗
□有此經驗；困擾程度：□不困擾 □輕度困擾 □中度困擾 □重度困擾

19. 遺失東西或找不到您要的東西
□無此經驗
□有此經驗；困擾程度：□不困擾 □輕度困擾 □中度困擾 □重度困擾

20. 與家人意見不和或有衝突
□無此經驗
□有此經驗；困擾程度：□不困擾 □輕度困擾 □中度困擾 □重度困擾

21. 投資的資金遭到風險
□無此經驗
□有此經驗；困擾程度：□不困擾 □輕度困擾 □中度困擾 □重度困擾

22. 買東西時被詐欺，或被敲竹槓
□無此經驗
□有此經驗；困擾程度：□不困擾 □輕度困擾 □中度困擾 □重度困擾

23. 您的工作（或所做的事）遭到無謂的干擾或妨礙
□無此經驗
□有此經驗；困擾程度：□不困擾 □輕度困擾 □中度困擾 □重度困擾

24. 與親戚、朋友的往來或交遊不夠
□無此經驗
□有此經驗；困擾程度：□不困擾 □輕度困擾 □中度困擾 □重度困擾

25. 對您的住屋狀況不滿意
□無此經驗
□有此經驗；困擾程度：□不困擾 □輕度困擾 □中度困擾 □重度困擾

26. 未能得到本來應該得到的錢。
□無此經驗
□有此經驗；困擾程度：□不困擾 □輕度困擾 □中度困擾 □重度困擾

27. 為治療疾病需執行許多醫囑，例如吃藥，多方面限制飲食。
□無此經驗
□有此經驗；困擾程度：□不困擾 □輕度困擾 □中度困擾 □重度困擾

28. 本身遭人說閒話
□無此經驗
□有此經驗；困擾程度：□不困擾 □輕度困擾 □中度困擾 □重度困擾

29. 對現代科技感到適應上的困難
□無此經驗
□有此經驗；困擾程度：□不困擾 □輕度困擾 □中度困擾 □重度困擾

30. 為保養與維護住屋而勞累
□無此經驗
□有此經驗；困擾程度：□不困擾 □輕度困擾 □中度困擾 □重度困擾

以下是一些有關個人與家人相處情況的敘述。 在一般情況下，有許多人覺得與家人相處狀況不盡理想或家人在某些方面不夠體貼，有些人則覺得相當滿意，請您細讀每一，依據您個人的狀況，評量每一項敘述是否描述您與家人的相處狀況，然後選出您同意的程度。這些項目的答案並沒有對錯之分，您的真實感受就是最好的答案。

1. 有些家人讓我覺得親近且有安全感
□完全同意 □有點同意 □不同意也不反對 □有點不同意 □完全不同意

2. 在家裡我覺得我是重要的，且有所屬感
□完全同意 □有點同意 □不同意也不反對 □有點不同意 □完全不同意

3. 家人讓我覺得我都把自己的事（如：工作、家事）做好
□完全同意 □有點同意 □不同意也不反對 □有點不同意 □完全不同意

4. 我不能指望我的家人幫我處理或解決問題
□完全同意 □有點同意 □不同意也不反對 □有點不同意 □完全不同意

5. 我和某些家人有足夠的相處，他們讓我覺得我們的關係是重要的
□完全同意 □有點同意 □不同意也不反對 □有點不同意 □完全不同意

6. 我和某些家人一起從事我們的共同興趣
□完全同意 □有點同意 □不同意也不反對 □有點不同意 □完全不同意

7. 我少有機會可以對家人付出和照顧他們
□完全同意 □有點同意 □不同意也不反對 □有點不同意 □完全不同意

8. 我的家人讓我曉得他們喜歡和我共處
□完全同意 □有點同意 □不同意也不反對 □有點不同意 □完全不同意

9. 如果我生病了，既便是長期的，家裡也有人會好好照顧我
□完全同意 □有點同意 □不同意也不反對 □有點不同意 □完全不同意

10. 在家裡我找不到可以談心的人
□完全同意 □有點同意 □不同意也不反對 □有點不同意 □完全不同意

11. 我和家人們都相互幫忙
□完全同意 □有點同意 □不同意也不反對 □有點不同意 □完全不同意

12. 我有機會可以鼓勵我的家人發展他們的興趣和技能
□完全同意 □有點同意 □不同意也不反對 □有點不同意 □完全不同意

13. 我的家人讓我知道我對家庭的運轉有重要的貢獻
□完全同意 □有點同意 □不同意也不反對 □有點不同意 □完全不同意

14. 既使我不回報我的家人，他們還是會繼續幫助我
□完全同意 □有點同意 □不同意也不反對 □有點不同意 □完全不同意

15. 當我難過或不順利時，家裡總有人可以讓我以自己的方式表達情緒
□完全同意 □有點同意 □不同意也不反對 □有點不同意 □完全不同意

16. 我覺得家裡沒有人和我有同樣的問題
□完全同意 □有點同意 □不同意也不反對 □有點不同意 □完全不同意

17. 我喜歡多盡一點力量，讓我的家人生活過得愉快些
□完全同意 □有點同意 □不同意也不反對 □有點不同意 □完全不同意

18. 我家裡總有人樂意幫我做家事、買東西、或跑腿
□完全同意 □有點同意 □不同意也不反對 □有點不同意 □完全不同意

19. 我家裡的氣氛不太和諧
□完全同意 □有點同意 □不同意也不反對 □有點不同意 □完全不同意

20. 家裡總有人疼惜我，關心我
□完全同意 □有點同意 □不同意也不反對 □有點不同意 □完全不同意

21. 某些家人會和我一起玩，或一起參加社交活動
□完全同意 □有點同意 □不同意也不反對 □有點不同意 □完全不同意

22. 我有責任幫忙滿足家人的需要
□完全同意 □有點同意 □不同意也不反對 □有點不同意 □完全不同意

23. 如果我需要一些建議，家裡總有人可以幫我出主意、想辦法
□完全同意 □有點同意 □不同意也不反對 □有點不同意 □完全不同意

24. 我有被家人需要的感覺
□完全同意 □有點同意 □不同意也不反對 □有點不同意 □完全不同意

25. 家人認爲我身爲家裡的一份子，未盡本份，做得不夠好
□完全同意 □有點同意 □不同意也不反對 □有點不同意 □完全不同意

26. 如果我病了，我的家人會告訴我如何照顧自己
□完全同意 □有點同意 □不同意也不反對 □有點不同意 □完全不同意

27. 經濟上，若有需要，我的家人會長期負責供給
□完全同意 □有點同意 □不同意也不反對 □有點不同意 □完全不同意

28. 只要在家裡，我就覺得輕鬆自在
□完全同意 □有點同意 □不同意也不反對 □有點不同意 □完全不同意

29. 當我感到苦惱、疲勞、或身體不適時，我的家人總能馬上察覺到我的異樣
□完全同意 □有點同意 □不同意也不反對 □有點不同意 □完全不同意

30. 整體來說，我認為我的家人對我關心和支持的程度是
□很支持 □相當支持 □有點支持 □不太支持 □完全不支持

31. 我目前和我的配偶的總收入，每個月是
□少於 3,000元 □3,000-4,999 □5,000-9,99 □10,000-14,999
□15,000-19,999 □20,000-49,999 □多於 50,000

32. 我認為我的家庭經濟狀況是屬
□富裕 □小康 □收支剛好平衡 □入不敷出

33. 最主要的收入來自_____

我們常會回顧自己的過去，通常有滿意也有失意。以下是一些對生活感受和回顧的敘述。請您細讀每一項，如果您認爲那是確實說中您的感受，請鉤「同意」；若不同意，請鉤「不同」；若不很確定、或不同意也不反對，請鉤「？」。

答案沒有對錯，您的眞實感受就是最好的回答。

1. 隨著年歲漸長，我覺得事情好像比我想像中的還好
   □同意 □ ？ □不同意

2. 和其他認識的人比起來，我這一生比他們幸運
   □同意 □ ？ □不同意

3. 現在是我一生中最討厭的時期
   □同意 □ ？ □不同意

4. 我現在和我年輕時候一樣快樂幸福
   □同意 □ ？ □不同意

5. 在想像中，我的人生可以比現在更快樂幸福
   □同意 □ ？ □不同意

6. 現在是我一生中最好的時期
   □同意 □ ？ □不同意

7. 我所做的事，大多是單調無聊的
   □同意 □ ？ □不同意

8. 我期待以後會發生一些有趣和令人愉快的事
   □同意 □ ？ □不同意

9. 我對目前所做的事，覺得和往常一樣有意思
   □同意 □ ？ □不同意

10. 我感到老了，而且覺得累了
    □同意 □ ？ □不同意

11. 我感到年紀大了，但我並不因此而受困擾
    □同意 □ ？ □不同意

12. 當我回顧我的人生，覺得有點滿意（差強人意）
    □同意 □ ？ □不同意

13. 既使我過往的人生能再更改，我也不會去改變它
□同意 □ ? □不同意

14. 與我這一輩的人比起來，我覺得我比其他人多做了許多傻事
□同意 □ ? □不同意

15. 與我這一輩的人比較，表面看來我還不錯
□同意 □ ? □不同意

16. 我對一個月或一年以後想做的事，心裡已有所計劃（盤算）
□同意 □ ? □不同意

17. 回顧這一生，我想要的重大事物，大部份都沒有完成
□同意 □ ? □不同意

18. 我比別人容易沮喪
□同意 □ ? □不同意

19. 我一生中想要的，大部份都有了
□同意 □ ? □不同意

20. 不管別人怎麼說，一般人的情況只會愈來愈糟不會愈來愈好
□同意 □ ? □不同意

對於成年子女該如何對待父母，為人父母者都會有一些自己的期待。下列各項是父母們可能期待子女做的一些事，您是否在某種程度上也期待您的子女做到呢？請您細讀每一項，如果完全沒有期待您的子女做那一項，請勾選"不需要"。對於其它您認為至少有某種程度的期待的項目，請您衡量一下，您的子女需要執行的程度。按照您的看法，請分別勾選"有點需要"；"相當需要"，"非常需要"。答案沒有對或錯，您的看法就是最好的回答。而且我會將您的回答絕對保密。

1. 我交待的事，他們立刻做
□完全不需要 □有點需要 □相當需要 □非常需要

2. 在我的面前，避免和兄弟姊妹吵架
□完全不需要 □有點需要 □相當需要 □非常需要

3. 留意並照顧我的飲食和生活起居
□完全不需要 □有點需要 □相當需要 □非常需要

4. 我忙碌時，主動來幫我的忙
□完全不需要 □有點需要 □相當需要 □非常需要

5. 與我交談、聊天，了解我的想法和感受
□完全不需要 □有點需要 □相當需要 □非常需要

6. 留心我的身體健康
□完全不需要 □有點需要 □相當需要 □非常需要

7. 出門前或返家後能告訴我一聲，以免讓我掛念
□完全不需要 □有點需要 □相當需要 □非常需要

8. 聽從我對他們的教誨
□完全不需要 □有點需要 □相當需要 □非常需要

9. 讓我感受到我的重要
□完全不需要 □有點需要 □相當需要 □非常需要

10. 不論我過去如何待他們，他們都能善待我
□完全不需要 □有點需要 □相當需要 □非常需要

11. 關心我、了解我
□完全不需要 □有點需要 □相當需要 □非常需要

12. 對我說話時，溫和有禮
□完全不需要 □有點需要 □相當需要 □非常需要

13. 我生病時，子女能親自照顧我
□完全不需要 □有點需要 □相當需要 □非常需要

14. 和我信仰同樣的宗教
□完全不需要 □有點需要 □相當需要 □非常需要

15. 爲了聽我的忠告，可以對他們的朋友不守諾言
□完全不需要 □有點需要 □相當需要 □非常需要

16. 選擇職業或工作時，以便於照顧我的工作爲優先考慮
□完全不需要 □有點需要 □相當需要 □非常需要

17. 子女能避免和我不喜歡的人交往
□完全不需要 □有點需要 □相當需要 □非常需要

18. 選擇職業和工作時，遵從我的意見
□完全不需要 □有點需要 □相當需要 □非常需要

19. 結婚成家後，和我住在一起
□完全不需要 □有點需要 □相當需要 □非常需要

20. 爲了傳宗接代，至少生一個兒子
□完全不需要 □有點需要 □相當需要 □非常需要

21. 子女選擇結婚對象時，尊重我的意見
□完全不需要 □有點需要 □相當需要 □非常需要

22. 我生病時，全力設法醫治我的病情
□完全不需要 □有點需要 □相當需要 □非常需要

23. 子女奉養我，使我生活舒適
□完全不需要 □有點需要 □相當需要 □非常需要

24. 子女有好吃的東西時，爲我留一份
□完全不需要 □有點需要 □相當需要 □非常需要

25. 子女在外言行小心，少惹麻煩，以免增加我的困擾
□完全不需要 □有點需要 □相當需要 □非常需要

26. 子女避免做不道德的事，以免讓我丟臉
□完全不需要 □有點需要 □相當需要 □非常需要

27. 子女做讓我引以爲榮的事
□完全不需要 □有點需要 □相當需要 □非常需要

28. 在我面前，子女避免和他們的配偶吵架
□完全不需要 □有點需要 □相當需要 □非常需要

29. 爲了保護我的面子，子女爲我說話或找台階下
□完全不需要 □有點需要 □相當需要 □非常需要

30. 子女避免做對不起我的事
□完全不需要 □有點需要 □相當需要 □非常需要

31. 子女努力學習或做事，讓我高興
□完全不需要 □有點需要 □相當需要 □非常需要

在這一次的面談中，我要與您先談談您患糖尿病後的一些有關糖尿病控制的生活經驗與感受。其次要請您談談一般生活中，對過去與現在的一些重要的或映象深刻經驗，以及對未來的看法。對於我問的問題，請儘量回答，您所談到的事除將來供研究分析外我絕對保密，研究報告上絕不會有您的個人資料。若有些問題您不願多談則請告知，不必勉強做答。

1. 請告訴我在那情況下，您的糖尿病會控制比較好？家人對您的血糖控制有什麼影響嗎？糖尿病對您的意義是什麼？您認為影響糖尿病控制好壞最重要的人是誰？

2. 請談談在您過去的經驗裡，那些狀況使您的糖尿病加重？

3. 請談談您如何看待老年期的"病"、"痛"？

4. 有些人告訴我他們的一生中受某些人的影響很深，請您談談對您影響深重的人以及他們如何影響您？

5. 請談談在您的一生中，您認為印象最深的幾項經驗，包括好和不好的經驗？

6. 可否談談在過去的歲月裡，您是否秉持那些信念以主導您的生活與處世待人？

7. 目前的生活中，那些事讓您感到快樂幸福？怎麼過生活才會比較快樂、幸福、有意義？

8. 請談談目前生活中，什麼事最會使您不快樂或煩惱？

9. 請談談在日常生活與家人的相處方面有那些困難或不方便之處？

10. 請談談您對子女所曾抱持理想和期望？這些期望是否實現了？在老年期您認為子女或家人該為您做的最重要的事是什麼？

11. 請談談在家裡，那些事最可能使您不快樂或生氣？

12. 在您目前的生活中，您感到最擔心掛慮的是什麼？

13. 您對自己將來在經濟財物方面是否覺得安穩無憂？

14. 將來若有一天您的年紀很大了無法照顧自己，在經濟和住處的安排方面您有什麼計劃？

Vitae

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