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LOMA LINDA UNIVERSITY
School of Nursing
in conjunction with the
Faculty of Graduate Studies

Predictors of Health in Adult Child Caregivers of Parent Stroke
Survivors in China

by

YuQin Pan

A Dissertation submitted in partial satisfaction of
the requirements for the degree
Doctor of Philosophy in Nursing

June 2014

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Each person whose signature appears below certifies that this dissertation in his/her opinion is adequate, in scope and quality, as a dissertation for the degree Doctor of Philosophy.

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ABBREVIATIONS

ADL	Activities of Daily Living
BCE	Before the Common Era
CES-D	Center for Epidemiologic Studies Depression Scale
FAS	Filial Attitude Scale
FBS	Filial Behavior Scale
FCA	Family Caregiver Alliance
HRQoL	Health-related Quality of Life
MCS	Mental Component Summary
MS	Mutuality Scale
MSPSS	Multidimensional Scale of Perceived Social Support
PCS	Physical Component Summary
PSS	Perceived Social Support
SF-12v2	Second Version of Standard 12-item Health Survey
WHO	World Health Organization

ABSTRACT OF THE DISSERTATION

Predictors of Health in Adult Child Caregivers of Parent Stroke Survivors in China

by

YuQin Pan

Doctor of Philosophy, Graduate Program in Nursing
Loma Linda University, June 2014
Dr. Patricia S. Jones, Chairperson

Strokes are the leading cause of adult disability and death in China. The prevalence is 6 - 9% among adults over 65 in urban areas. It is estimated that currently there are more than 7.5 million stroke survivors with an annual increase of 2.5 million new cases. These stroke survivors are in great need of care during their rehabilitation. The tradition of filial piety involves adult children in caregiving to their parent stroke survivors; however, the caregiving responsibility becomes more challenging due to shrinking family size and modernization; thus caregiver health is often compromised. Data were collected by face-to-face interviews at hospital units or participants' homes using structured questionnaires of the 15-item Mutuality Scale, the 4-item Filial Attitude Scale, the 8-item Filial Behavior Scale, the 12-item Multidimensional Scale of Perceived Social Support, the 10-item Center for Epidemiological Studies Depression Scale, and the Second Version of the Standard 12-item Health Survey. SPSS 17 was used for data analysis. After adjusting for caregiver age and gender, mutuality and filial attitude were associated significantly negatively with caregiver depression. Mutuality was significantly positively associated with caregiver physical health, and filial attitude and perceived social

support were significantly positively associated with caregiver mental health. After caregivers' number of diseases and care receivers' functional impairment were adjusted, filial attitude significantly predicted age- and gender-adjusted caregiver depression. After caregivers' number of diseases, employment type, and care receivers' functional impairment were adjusted, mutuality significantly predicted age- and gender-adjusted caregiver physical health. After caregivers' monthly income and care receivers' functional impairment were adjusted, none of the independent variables significantly predicted age- and gender-adjusted caregiver mental health. Mutuality, filial attitude, and perceived social support can be viewed as caregivers' resources. Thus, nursing interventions and/or policies that might enhance these resources would be helpful for adult child caregivers of parent stroke survivors. Nurses can assess caregivers' mutuality, filial attitude, and perceived social support as part of caregiver health, and develop strategies to enrich these resources, thereby maintaining caregiver health and caregiving ability.

CHAPTER ONE

INTRODUCTION TO THE STUDY

Preface

The influence of Confucian teachings of filial piety upon Chinese society dates back to 136 BCE. In this ideology, it is understood that one's body exists solely because of one's parents; hence family members are perceived as one body (Huang, 2013). Accordingly, children are obliged to respect their parents, to share resources with one another, and to do their best to satisfy the needs of other family members. Individuals are accustomed to having adequate resources or support from family, and enjoy harmonious intra-familial relationships. This value has survived major historical upheavals (Chow, 1991), including the May Fourth Movement in 1919 (Huang, 2013), the founding of the Communist Party in China in 1949, and the 10-year Cultural Revolution between 1966 and 1976 (Yeh, Yi, Tsao, & Wan, 2013).

Since the post-Mao reformation with its increased openness to the outside world, which officially began with the Communist Party Plenum in December, 1978, China has gone through rapid economic development under the policy of market-oriented economy (Perkins, 1994). Following the enactment of the "one-child" policy in 1979, the Chinese ideology of filial piety, child-parent relationships, and intra-familial support has been greatly challenged. Outside the family, a government-supported elder care system is still developing in Chinese society as a whole (Feng, Wang, & Jones, 2013). Thus, in spite of fewer family resources, the family may still have to play a sustained role in elder care due to insufficient or unaffordable support alternatives. Ignorance of this issue could lead to

a national caregiving crisis in a population with increasing rates of chronic conditions such as cardiovascular accident or stroke (Glass, Gao, & Luo, 2013).

Background

Epidemiology of Strokes

Strokes are the leading cause of adult disability and death in China (Strokes, 2011, October; Liu, Wang, Wong, & Wang, 2011). The average age of stroke patients is 63.8 ($SD = 12.9$), as reported by the China nationwide prospective registry (Wang, et al., 2011). Among adults over 65 years old, stroke prevalence in urban areas is 6 - 9%, which is close to that of industrialized countries (Ferri et al., 2011). According to the sixth national population census in 2010 (Peng, 2011), the population aged 65 and older grew from 7.0% to 8.9% during 2000 to 2010, which is expected to reach 20% by 2035, and 25% by 2050. It is estimated that currently there are more than 7.5 million stroke survivors, with an annual increase of 2.5 million new cases (Liu et al., 2011; Wang et al., 2011). The number of stroke survivors needing long-term care is expected to increase markedly in the next few decades.

Family Caregiving of Stroke Survivors

In China, stroke survivors rely heavily on family caregivers. The proportion of stroke survivors who need family caregiving is as high as 44% in rural areas and 54% in urban communities (Ferri et al., 2011). More than 50% of the post-stroke survivors remain dependent 1 year after the incident (Lo et al., 2008; Chen et al., 2010; Tang, Lau, Mok, Ungvari, & Wong, 2011). Spouse and adult child caregivers compose 76.2% and 23.4%, respectively, of the stroke survivors in urban communities (Han, Yuan, Shen, & Yang, 2011) compared to 39.7% and 44.2% in rural areas (Simon, Kumar, & Kendrick,

2009). The percentage is more evenly shared in Hong Kong, where spouse caregivers are 54.5% and adult child caregivers 40.9% (Lau, Tang, Wong, Mok, & Ungvari, 2012). Thus, family members are still heavily involved in the care of stroke survivors in China (Yang, Hao, George, & Wang, 2012).

Adult Child Caregivers and Cultural Aspects

In China, family members, particularly adult children, have a culturally prescribed role as family caregivers which is part of the social orientation reinforced by law (Law of the People's Republic of China, 2012). Major modalities such as familial collectivism, interpersonal relationships, and sensitivity toward the opinions of others (Lin, Tseng, & Yeh, 1995) may help explain this cultural expectation. The Chinese view the reputation of their family as more important than that of the individual members; their behaviors are strongly affected by the opinions of outsiders and social norms, and they also strongly rely on interpersonal relationships through reciprocity to maintain their roles. Thus, adult children often accept caregiving to their parents as an obligation (Smith & Hung, 2012). Providing care to parents is socially acknowledged as being filial, whereas institutionalization is often stigmatized as not filial and shameful (Luo & Zhan, 2012; Smith & Hung, 2012; Zhan, Feng, Chen, & Feng, 2011). Moreover, Chinese tend to seek harmony and deal with difficulties such as long-term family caregiving within the boundary of their family rather than seek support from outsiders (Lee & Mok, 2011). They are not inclined to express their feelings because of concerns about their family's reputation, and fear of being sanctioned if they deviate from the social norm. In short, these cultural characteristics may have the potential to impact both the physical and mental health of adult child caregivers.

Desperate Caregiving Situation for Adult Children

Adult child caregivers are facing an unfavorable caregiving situation in China, with an imbalance between the number of elder care facilities available and the needs of families (Zhang, Guo, & Zheng, 2012). Although the elder care system has developed immensely, with private institutions, aided by the government, growing quickly both in number and scale (Feng, Liu, Guan, & Mor, 2013), elder care facilities are insufficient in staff or equipment, or are costly, thus preventing families from utilizing the services (Chou, 2010; Feng et al., 2011; Feng et al., 2013; Zhou et al., 2013). In addition, aging in place in the family home is popular with Chinese elders but family caregiver support services lag behind. A national survey found that only 20% of urban and 17% of rural elders are willing to live in institutions (Chou, 2010). Although the government advocates home-based care for elders, services like respite care or day care centers for the disabled remain inadequate (Xiao et al., 2014). Currently, no formal support services such as subsidies, sick-leave, or psychosocial consultation are in place to meet the needs of adult child caregivers (Fan, 2007; Lou & Gui, 2012, pp. 187-207).

This challenging situation is and will continue to be exacerbated by the “one-child” policy in China, which has led to the presently dominant 4-2-1 family structure - a married couple with a total of four parents and one child - which in turn undermines intra-familial support. Over the past three decades, economic pressures in China have led to increasing geographic separation between generations as younger couples move to urban areas to find employment. When elderly parents become widowed or ill they often relocate near their children in search of security (Chen, 2005; Yasuda, Iwai, Yi, & Xie, 2011). As the so-called “sandwich generation” (Miller, 1981), married adult children are

severely compromised by balancing the work and care responsibilities for four parents and one child without sibling support. This situation will remain for the next several decades, despite the new 2014 policy of allowing a second child for couples from two single-child families. Consequently, adult child caregivers have to cope with these challenges alone, thus becoming vulnerable to health problems themselves.

Studies of family caregiving globally have explored caregiver resources such as mutuality, preparedness, and balance (Archbold, Stewart, Greenlick, & Harvath, 1990; Schumacher et al., 2008; Shyu et al., 2010). Caregiver resources cover a broad range of personal, family, and community assets (Jones, Winslow, Lee, Burns, & Zhang, 2011). From the view of symbolic interactionism and role theory, the caregiver role is one that is ascribed and distinct within this perspective. Symbols of filial piety and social support are meaningful factors and potentially powerful resources to the adult child caregivers. Filial piety is one of the key variables in the caregiver empowerment model (Jones et al., 2011). Furthermore, the symbol of social support needs to be perceived or interpreted in order to have meaning and impact caregiver well-being. The ability to positively perceive social support varies from individual to individual, and can lead to very different caregiver health outcomes. It is these potentially positive variables of mutuality, filial piety, and perceived social support (Greenwood, Mackenzie, Cloud, & Wilson, 2008) which are examined in this study.

The Problem

Caregiver Health Compromised

As there is currently high demand of the adult children's involvement in caregiving to their parent stroke survivors in China, maintaining the health of adult children needs to

be a priority in order to sustain this family caregiving resource. Despite a few positive rewards, negative outcomes such as depression, role strain, and burden have been reported in Chinese caregivers (Han et al., 2011; Lai, 2009a, 2009b; Xu & Wang, 2012). To illustrate, the depression rate in family caregivers of stroke survivors was reported to be approximately 45% in China (Han et al., 2011). Accordingly, caregiver quality of life has also declined (Ho, Chan, Woo, Chong, & Sham, 2009; Yu, Hu, Efird, & McCoy, 2013). The loss of sustainability in caregiving due to the decline of caregiver health can lead to a crisis for elder care in the nation.

Uncertainty on the Potential Predictors of Caregiver Health

Chinese society has long been reputed to have harmonious intergenerational relationships due to the influence of filial piety. However, there are reports that filial piety has declined or been transformed in recent decades (Cheng & Chan, 2006; Xu, 2012). Modernization has also brought a series of changes in socio-economics such as better conditions and a more developed health care system, but this has been accompanied by shrinking family size, less family support, more family responsibilities, and more competitive work environments. It is not known how the family caregiving situation will evolve in the midst of these complex social changes or how these changes will impact the parent-adult child caregiving role, and thus, caregiver health outcomes.

Problem Statement

Awareness and concern about adult child caregiver health have risen, due in part to the increasing demand for the care of parent stroke survivors. Little is known about what contributes to the self-reported health of adult child caregivers of parent stroke survivors in modern mainland China. This needs to be explored before nursing strategies and

social policies can be developed to help maintain caregiver health and their caregiving capacity.

Purpose Statement

The purpose of this study is to identify predictors of health in adult child caregivers of parent stroke survivors in the Zhejiang province of modern mainland China.

Research Questions

Six research questions about the health of adult child caregivers of parent stroke survivors in the Zhejiang province of mainland China were explored:

1. What is the association between mutuality, filial piety, perceived social support, and caregiver depression after adjusting for age and gender?
2. To what extent do mutuality, filial piety, and perceived social support, after adjusting for caregivers' number of diseases and care receivers' functional impairment, predict age- and gender-adjusted caregiver depression?
3. What is the association between mutuality, filial piety, perceived social support, and caregiver physical health after adjusting for age and gender?
4. To what extent do mutuality, filial piety, and perceived social support, after adjusting for caregivers' type of employment, number of diseases, and care receivers' functional impairment, predict age- and gender-adjusted caregiver physical health?
5. What is the association between mutuality, filial piety, perceived social support, and caregiver mental health after adjusting for age and gender?
6. To what extent do mutuality, filial piety, and perceived social support, after adjusting for caregivers' monthly income and care receivers' functional impairment, predict age- and gender-adjusted caregiver mental health?

Significance of the Study

Significance to Theory

Role theory (Burr, 1979; Goode, 1960) was used as the conceptual framework for this study. Role is an integrated set of social norms which is demonstrated by the adult child's role enactment as caregiver, and role expectations evolve with changes in social structures. A conflict between role expectations and role enactment between caregivers and society will lead to more caregiver role strain, role overload, or even role insufficiency. The findings of this study have implications for whether an adjustment of the role expectations of adult child caregivers might be needed in modern China.

Secondly, symbolic interactionism strongly suggests that individual behavior is directly influenced by perceived meanings and values (Burr, 1979). Perceptions of the meaning of caregiving to parents and how important it is to their situations have a decisive role in caregiver health outcomes. Chinese adult children are faced with the conflict of whether to adhere to the tradition of filial piety or abandon it due to the drastic social changes caused by modernization, the "one-child" policy, and other factors. Lack of available support adds further to the complexity of the situation. It is important to explore how they interpret the meaning of caregiving and how they interact and cope with this challenge.

Thirdly, although role theory synthesizes cultural perspectives into roles, to date filial piety has not been viewed as a caregiver resource (Mui, 1992) in spite of the fact that current authors (Chappell & Funk, 2012) have suggested that filial piety could actually be a personal resource. With the finding of a difference in role strain between Black and White daughter caregivers in the U.S., Mui (1992) claimed that cultural values

such as filial norms could be a salient part in role theory. This is particularly true in Asian cultures where filial piety could have an even greater impact on role, role expectations, and role strain. Since Mui's sample was collected between 1982 and 1984 in the U.S., this study with Chinese adult child caregivers in modern mainland China addresses the issue in a contemporary Asian culture.

Lastly, Pearlin's stress process theory (Pearlin, Menaghan, Lieberman, & Mullan, 1981) indicates that social support is a mediator between stressors and outcomes, and his conceptual model of caregiving stress (Light, Niederehe, & Lebowitz, 1994) acknowledges caregiver role strain as a secondary stressor. Therefore, examining social support in a Chinese sample can provide insights on how caregivers in China view support. Also, because individuals' perceptions of social support vary with different personalities, optimistic caregivers might perceive social support as adequate. Thus, social support could be both an internal and external resource.

In other words, apart from mutuality, it is assumed that both filial piety and perceived social support can be viewed as resources that have the potential to mediate or buffer negative caregiver health outcomes. The inclusion of filial piety as a caregiver resource can be an extension of role theory.

Significance to Research

This study provides knowledge about the association between mutuality and the health of adult child caregivers who care for parent stroke survivors in mainland China, and identifies resources that can contribute to their health. Specifically, the cultural variable of filial piety is examined for its association with caregiver health in a changing society of China. It also investigates the perceived presence or lack of social support in

adult child caregivers when facing desperate caregiving situations. In short, this study provides evidence of the association between filial piety, mutuality, perceived social support, and caregiver health, which can be a basis for further exploration.

Significance to Practice

Knowledge generated by this study can provide evidence for family nurses and other health professionals in identifying negative caregiver health outcomes, and the need to assess adult child caregivers' personal resources to support their family caregiver role. If a caregiver has low scores of filial piety, mutuality, and perceived social support, and a high score of depression, nursing interventions can be designed to ameliorate his/her depression (Lyons, Sayer, Archbold, Hornbrook, & Stewart, 2007; Shim, Landerman, & Davis, 2011). Caregiver education, consultation services, and psychosocial interventions may be considered.

Significance to Policy Making

This study can contribute useful data for the development of social policies in China. Firstly, the level of filial piety, and the association between filial attitude, filial behavior, and caregiver health will be recorded. This will indicate whether nationwide messaging on promoting social expectations of filial piety is necessary to strengthen support for elders with disability, and to influence the next generation (Cheung & Kwan, 2009). Secondly, evidence such as the level of caregivers' perceived social support can be used to advocate for government policies on the relocation of caregiver support resources and on adult child caregiver-tailored support strategies (Montgomery & Kosloski, 2013). Lastly, this study can inform the government on how to support and

sustain the family caregiver role because of its potential national fiscal benefits (Houser & Gibson, 2008; Jacobs, Lilly, Ng, & Coyte, 2013).

Definitions of Major Concepts

Parent Stroke Survivor

A parent stroke survivor is the parent or parent-in-law who is diagnosed with any type of stroke.

Primary Caregiver

A primary caregiver is the family member who deems him/herself as the main person responsible for the care of his/her parent or parent-in-law.

Adult Child Caregiver

An adult child caregiver is the family member who cares for his/her parent or parent-in-law stroke survivor, which includes son, daughter, son- and daughter-in-law.

Mutuality

Mutuality refers to the quality of the relationship between an adult child caregiver and his/her parent stroke survivor in mainland China. In the family caregiving dyad, mutuality is mainly measured by dimensions of reciprocity, sharing, affection, and love (Archbold et al.,1990).

Filial Piety

Filial piety is a family-centered cultural value which reflects the adult child's attitude and behavior towards his/her aging parents. It generally includes respect, obedience, sacrifice, love, and the responsibility of caring for one's parents (Lai, 2010; Mao & Chi, 2011). Since filial piety is a very broad and complex concept, in this study it was explored in two aspects: filial attitude and filial behavior.

Perceived Social Support

Perceived social support is a subjective appraisal of the availability and adequacy of help from within or outside the family.

Health

Health was defined by the World Health Organization (WHO) in 1948 as “a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity” (WHO, 2014b). However, this definition is so widely formulated that health outcomes cannot easily be measured. Although future trends defining health may focus more on an individual’s ability to adapt and to self-manage (Brüssow, 2013; Huber, 2011), physical, mental, and social dimensions of health will still need to be revisited.

Despite the lack of a current clear cut definition, in this study health was operationalized by the SF-36 (Ware & Sherbourne, 1992) or SF-12 (Ware, Kosinski, & Keller, 1996), which covers physical, mental, and social aspects in two components: physical health and mental health. The physical component summary (PCS) addresses physical functioning, role performance in physical activities, bodily pain, and general health. The mental component summary (MCS) measures vitality, social functioning, role performance in emotional activities, and mental health aspects. Moreover, as depression is a prevalent health indicator for caregivers, it might tap other aspects of mental health and therefore is also included.

Finally, in the literature the SF-36 or SF-12 is widely and interchangeably used as a measure of health-related quality of life. Therefore, part of this review and discussion will also include health-related quality of life.

Health-related Quality of Life

Health-related quality of life is defined as a broad, multidimensional construct referring to those aspects of people's lives that relate to their health (Salter, Moses, Foley, & Teasell, 2008). It is primarily a subjective sense of well-being encompassing physical, psychological, social, and spiritual dimensions (Hass, 1999). For most people, there is a great deal of overlap in the definitions of health and health-related quality of life.

Depression

Depression is conceptualized as a persistent feeling of sadness and loss of interest. It affects how one feels, thinks, and behaves. Depression is represented by a series of signs and symptoms such as loss of pleasure or interest, depressed mood, disturbed sleep, and lack of concentration or low energy (Mayo Clinic, 2014; WHO, 2014a).

Role Strain

Role strain is defined as the "felt difficulty in fulfilling role obligations" (Goode, 1960).

Caregiver Burden

Caregiver burden is an individual's subjective perception of overload in one or more of the four perspectives of physical, psychological, social, and financial spheres through the caregiving process (Chou, 2000).

Overview of Remaining Chapters

Chapter 2 reviews the relevant concepts of mutuality, filial piety, perceived social support, quality of life/health-related quality of life, and depression. Pertinent literature for each concept and also the demographic variables is reviewed and critiqued. A summary is provided at the end of each concept and the complete review.

Chapter 3 includes details of the research design as a quantitative, descriptive, cross sectional, correlational study based on a philosophical underpinning of critical realism. A non-probability sampling method, procedures of data collection, and analysis are explicated.

Chapter 4 illustrates the findings of caregiving dyadic demographics, caregiving characteristics, and the relationships between influencing factors and dependent variables. Research questions are each addressed by the findings on the association between mutuality, filial piety, perceived social support, and caregiver depression, physical health, and mental health.

Chapter 5 discusses all the findings as described in Chapter 4. Implications are made for theory, practice, research, and social policies. Limitations of the study are acknowledged with recommendations. Finally, conclusions are made related to this dissertation.

Chapter Summary

This chapter introduced the cultural background of filial caregiving in mainland China and described the research problem addressed in this study. The paragraphs above have covered the purposes, research questions, significance, and concepts of the study. It also provided overviews for Chapter 2, 3, 4, and 5.

Adult child caregivers in mainland China are in high demand but vulnerable as they face major caregiving challenges. Little is known about the positive factors contributing to their health. There is a need to further explore this issue in the context with multiple changes brought by modernization in China.

CHAPTER TWO

LITERATURE REVIEW

Introduction

Maintaining adult child caregivers' health in order to sustain their caregiving ability becomes an increasingly urgent issue for the elder care system in China. This situation is likely to continue for the next couple of decades. Although mutuality, filial piety, and perceived social support (PSS) are factors that in theory have positive effects on caregiver health, because fulfilling the role obligations of an adult child caregiver in mainland China is more challenging due to dramatic social changes, it is not clear whether these factors still have protective effects on caregiver health. As the meaning of the caregiving experience is interpreted within the social roles ascribed by the culture, role theory was selected to guide the examination of these relationships.

This literature review aims to identify the gap in empirically-based knowledge about the associations of mutuality, filial piety, and perceived social support with the health of adult child caregivers of parent stroke survivors in mainland China, while considering other demographic or caregiving factors that might also influence the relationship. It was conducted mainly through database searches of CINAHL, PubMed, Medline, Google Scholar, Health Source, SocIndex, and Ageline, as well as the Chinese database CNKI. This review was initiated by the definition of each concept and followed by a review of its relevant studies. The identified gaps, applications, and significance are summarized at the end of the review of each concept. Finally, a brief discussion of the theory relevant to this topic is described.

Caregiver Health under Study and Its Influencing Factors

Physical health, mental health, and depression were selected as indicators for caregiver health. As the SF-36 or SF-12 was frequently used as a measure under the concept of health-related quality of life (HRQoL) in the literature, HRQoL was then used interchangeably with physical and mental health and briefly reviewed in this study. The indicators in this study were chosen because they have often been reported in family caregivers of those with disabilities (Chen et al., 2010; Chow, Wong & Poon, 2007; Godwin, Ostwald, Cron, & Wasserman, 2013; Kim & Yeo, 2012). This section will review the health outcomes, together with the demographic and caregiving factors.

Health-related Quality of Life

Caring for stroke survivors can be formidable for many family caregivers as they take on responsibilities that lead to physical exhaustion and require relationship management (Saban & Hogan, 2012). Stroke caregivers generally report more depressive symptoms, somatic symptoms, sleep disorders, social isolation (King, Ainsworth, Ronen, & Hartke, 2010), and even more risks in metabolic disorders and cognitive function than prior to caregiving (Brummett, Austin, Welsh-Bohmer, Williams, & Siegler, 2013). Quite often, they experience poorer quality of life than the general population, particularly in mental health (Ho et al., 2009; Lurbe-Puerto, Leandro, & Baumann, 2012; Godwin et al., 2013; Yu et al., 2013). This study addresses the concept of health-related quality of life and explores its influencing factors in the target population.

Concept of Health-related Quality of Life

Conceptualization of health-related quality of life is largely based on the understanding of quality of life (QoL), which was defined as “the individuals’ perceptions of their positions in life in the contexts of the cultures and value systems in which they live and in relation to their goals, expectations, standards, and concerns” (World Health Organization Quality of Life Group, 1998). It is primarily a subjective sense of well-being encompassing physical, psychological, social, and spiritual dimensions (Hass, 1999). Thus, the concept of QoL is very broad and can be widely interpreted.

However, researchers were more likely to choose to study various facets and dimensions of quality of life than attempt to define it explicitly (Ilić, Milić, & Arandelović, 2010). Health-related quality of life (HRQoL) has been the focus of a great deal of researcher attention. It has been defined as a multi-dimensional construct referring to those aspects of people’s lives relevant to their health, limited to domains such as physical, mental, emotional, and social functioning that might be affected by diseases or treatments (Salter et al., 2008). Although there is no single definition of HRQoL, a well-accepted tool, the SF-36 (Ware & Sherbourne, 1992), operationalized the concept in two components with eight aspects. The physical component summary (PCS) measures physical health and the mental component summary (MCS) measures mental health.

This operational concept of health-related quality of life (HRQoL) has been validated in Chinese populations (Li, Wang, & Shen, 2003). It has also been used by researchers on caregiving in China (Chen et al., 2010; Shyu, Kuo, Chen, & Chen, 2010;

Yu et al., 2013) which indicated it is suitable for Chinese caregivers. Examining HRQoL can help identify those with poor physical or mental health, and thus guide interventions or policies to improve their health.

Caregiver Health-related Quality of Life and Its Influencing Factors

A number of factors have been reported to influence caregiver health-related quality of life (HRQoL). Inconsistencies in the findings of predictors of caregiver HRQoL are identified across studies. However, this section temporarily focuses on caregiver demographics and caregiving characteristics, and addresses the main factors later in this review.

Age was a significant predictor of the health-related quality of life (HRQoL) of 184,450 adults, including caregivers (16%) in the U. S. (Neugaard, Andresen, Mckune, & Jamoom, 2008). Compared to the same age group of non-caregivers, caregiving had more of an effect on the HRQoL of younger adults < 55 years old (odd ratio, $OR = 1.35$). However, studies on both U.S. stroke caregivers (Clay et al., 2013; McPherson, Wilson, Chyurlia, & Leclerc, 2011) and Chinese stroke caregivers in Hong Kong (Chen et al., 2010; Lui, Lee, Greenwood, & Ross, 2012) claimed that older age was associated with worse physical health. Most data from these studies were collected on a cross sectional basis using convenience sampling, with the SF-36 or SF-12 frequently used to measure HRQoL. Yet none of the studies were reported on the adult child caregivers from mainland China, and McPherson et al.'s study had a small sample ($n = 56$) of partner stroke caregivers; thus, more exploration on the association between age and caregiver HRQoL using SF-12 in mainland China is needed.

Gender was found to be associated with poorer stroke caregiver mental health (Chen et al., 2010) or physical health (Lui et al., 2012) in Hong Kong, and both physical and mental health among general caregivers of Taiwan (Ho et al., 2009) and mainland China (Yang et al., 2012). However, generalizing the relationship between gender and caregiver health-related quality of life could be difficult due to existing cultural differences: for example, Clay et al. (2013) did not find this association among U.S. stroke caregivers.

Other factors have also been reported to influence caregiver health. For example, in Chen et al.'s (2010) study on 123 Hong Kong primary family caregivers, illness rating, measured by the Cumulative Illness Rating Scale (CIRS), (Linn, Linn, & Gurel, 1968), was found to significantly predict caregiver health-related quality of life (HRQoL, SF-36). However, education, length of care (month), time spent on care (h/week), and care receivers' functional status, measured by the Instrumental Activities of Daily Living (IADLs), (Lawton & Brody, 1969), had no significant association with caregiver HRQoL. Conversely, Yu et al.'s (2013) study on 121 stroke caregiving dyads in central mainland China reported that education was positively associated with caregiver HRQoL (SF-36). Also, the number of caregivers' chronic conditions, hours of care per day, and care receivers' functional dependence, measured by the Barthel Index (BI), (Mahoney & Barthel, 1965), were confirmed to correlate negatively with caregiver HRQoL.

Although both were cross sectional studies using the Chinese versions of SF-36 (with slight differences between Hong Kong Version and Standard Version) to measure health-related quality of life (HRQoL), these conflicting findings on the association of education, hours of care per day, and care receivers' functional status with caregiver

HRQoL should be interpreted with caution, since the care receivers in Chen et al.'s study in Hong Kong had less functional impairment, while Yu et al.'s study used a quasi-random, point of reference sample with mostly spouse caregivers (79.3%) from only one city of mainland China.

Furthermore, Yang et al. (2012) reported that caregivers' income level and occurrence of chronic diseases were significant predictors of caregiver health-related quality of life (HRQoL, SF-36). Other factors such as caregiver age, living arrangement, employment type, number of caregivers, and care receivers' activities of daily living (ADLs) measured by Lawton and Brody (1969) predicted either caregiver mental or physical health. In addition, the level of caregiver education and time spent on care each day were correlated with both caregiver physical and mental health. These findings helped inform the current study on how to select the influencing factors of HRQoL because the data were from a large sample ($n = 1,144$) in 15 communities of three eastern cities of mainland China with characteristics close to those of the target population. For example, 16% were stroke caregivers, 60.0% were female caregivers, and 66.5% were adult child caregivers. However, this study did not focus on stroke caregivers, and the many regression tests conducted may have enhanced type I error. Confirmation of the influencing factors of caregiver HRQoL requires further exploration.

Lastly, Salter, Zettler, Foley, & Teasell's (2010) meta-analysis on 15 studies added that duration of care ranging from 1 month to 2 years post stroke was not a significant predictor of caregiver physical health ($d < .2$). This was confirmed by Gaugler's (2010) systematic review of 117 articles on the longitudinal ramifications of stroke caregiving. However, Salter et al. (2010) focused solely on caregiver physical health, and sample bias

might have existed because those caregivers who completed a longitudinal survey may appear healthier than those who dropped out of the study. Gaugler's review, on the other hand, relied on a count of significant or non-significant effects rather than a more advanced meta-analytic approach, which can empirically pool effect sizes to maximize sample size and avoid type I error. Finally, most of the studies (64%) were from U.S. and U.K., with only a couple from China (Chow et al., 2007; Qiu & Li, 2008). Thus, identification of the predictors of caregiver health-related quality of life deserves careful exploration in mainland China.

Summary

The concept of health is broadly defined, covering physical, mental, and social dimensions which need to be further refined. Health-related quality of life (HRQoL) focuses on the health aspects of quality of life, which is a multidimensional concept. In the literature, health and HRQoL were often used interchangeably as they were both measured by the SF-36 or SF-12. In this review, it was found that caregiver HRQoL was generally compromised. Limited studies indicated that findings on the influencing factors conflicting but more consistent on caregiver age, gender, number of diseases, and care receivers' activities of daily living. The caregiver education level, income, and employment type were either inconsistent or less reported. Hours of care per day was retained as it reflected the caregiving demand. Most of these studies were cross sectional with convenience samples of caregivers from a variety of familial relationships; thus, further exploration of HRQoL among adult child caregivers of parent stroke survivors in mainland China is recommended taking these influencing factors into consideration.

Depression

With mental health a key part of an individual's health, depression can serve as an appropriate indicator of psychological health since it has clear symptoms which link the status of health and illness. Depression can damage the caregiver's own health and then compromise quality of care for the care receiver (Smith, Williamson, Miller, & Schulz, 2011); therefore, it is important to understand its prevalence and the influencing factors in the target caregiver population.

Overview of Caregiver Depression

Depression has been identified as the most common negative health outcome resulting from caregiving (Aggar, Ronaldson, & Cameron, 2011; Coe & Van Houtven, 2009; Huang et al., 2009; Kuscu et al., 2009; Qiu & Li, 2008). About 30 - 44.7% of stroke caregivers in countries such as Canada, Finland, Turkey, and the U.S. had signs of depression (Berg, 2010; Cameron, Cheung, Streiner, Coyte, & Stewart, 2006; Epstein-Lubow, Beevers, Bishop, & Miller, 2009; Kuscu et al., 2009). Studies on family caregivers of stroke survivors in mainland China reported a depression prevalence of 39.6 - 48.2% in caregivers before discharge and up to 24 weeks post discharge, with older caregivers more likely to be depressed (Han et al., 2011; Qiu & Li, 2008). A depression rate of 81.6% was reported in a mixed sample of Taiwanese caregivers of both dementia and stroke victims (Huang et al., 2009).

In spite of its prevalence in family caregivers, depression is easily ignored because caregiving is regarded as a familial responsibility in China. Between trying to provide the best possible care for parents and balancing work and other responsibilities, adult child caregivers often sacrifice their own physical and emotional needs (Saban & Hogan,

2012; Shyu et al., 2010). Frequently, negative feelings such as emotional strain, burden, or fatigue develop, which may lead to caregiver depression.

Concept of Depression

Depression is regarded as a mental disorder of mood and affect, which subsequently can distort one's cognition, and thus interfere with how one feels, thinks, and behaves. It is conceptualized by a cluster of symptoms such as loss of interest or pleasure, poor concentration, and disturbed sleep or appetite. If five or more symptoms like these last for at least 2 weeks, the individual should receive professional help (Mayo Clinic, 2014; WHO, 2014a).

Depression has also been described phenomenologically as a disorder of inter-corporeality and inter-affectivity (Fuchs, 2013). Instead of expressing the self, the body is turned into a barrier to all impulses directed to the environment. Consequently, interaction with others is impaired and detachment or segregation may occur, which could substantially affect one's ability to function at work or school, or to cope with daily life. Depression can be chronic or recurrent, and in its most severe form can lead to suicide (WHO, 2014a).

The symptoms listed above can vary by individuals or cultures. For example, many depressed Chinese people do not report feeling sad but express somatic symptoms such as discomfort, pain, or fatigue (Kleinman, 2004; Ryder & Chentsova-Dutton, 2012). Despite possible cultural differences in the conceptualization of depression, Andresen, Malmgren, Carter, and Patrick (1994) operationalized depression by a 10-item scale which was later validated by Boey (1999) in a Chinese population. The 10 items

measuring an individual's feelings and behaviors are applicable to Chinese caregivers (Qiu & Li, 2008; Han et al., 2011).

Caregiver Depression and Its Influencing Factors

Influencing factors of caregiver depression have been explored extensively. Caregiver depression and health-related quality of life (HRQoL) might share a number of demographic factors (Family Caregiver Alliance [FCA], 2012; Yang et al., 2012). For example, female housewives and spouse caregivers with chronic diseases, lower education, lower household income, and who provide care for family members with more chronic conditions generally reported lower HRQoL and higher depression (FCA, 2012; 2014).

Age was significantly positively associated with depression among Hong Kong Chinese caregivers (Lui et al., 2012). However, non-significant correlations were reported by Lau et al. (2012) and Qiu and Li (2008) on both Hong Kong and mainland Chinese stroke caregivers. Additionally, Huang et al. (2009) claimed that age in combination with other demographic factors explained 28% of the variance of depression in caregivers of both stroke and dementia victims in Taiwan. Further, Pinquart and Sorensen's (2011) meta-analysis supported a positive correlation between age and depression in general caregivers, making it difficult to draw a conclusion on the relationship between age and caregiver depression. The research designs of the studies may have contributed to these inconsistent findings.

Both of the studies by Lui et al. (2012) and Lau et al. (2012) were done in Hong Kong caregivers of stroke survivors. However, Lui et al.'s study was a longitudinal design reporting on caregivers of those stroke survivors with a first attack 3 months post

discharge, and excluded if totally dependent or independent. The Hospital Anxiety and Depression Scale (HADS), (Leung, Wing, Kwong, Lo, & Shum, 1999), was used to measure caregiver depression. However, studies by both Lau et al. (2012) and Qiu and Li (2008) were cross sectional studies, using the 15-item Geriatric Depression Scale (GDS), (Tang et al., 2004), and the 10-item Center for Epidemiologic Studies Depression Scale (CES-D 10), (Andresen et al., 1994), respectively, to screen caregiver depression. Qiu and Li did not set requirements on the number of stroke attacks or the degree of functional disability of the stroke survivors in mainland China. These differences may have played a role in the inconsistencies of the findings. Future studies on caregivers of stroke survivors with solid research design but similar measures in mainland China are recommended.

Reports of gender-related incidence of caregiver depression also are inconsistent. Both Lau et al. (2012) and Lui et al. (2012) identified that age was associated with depression in Hong Kong caregivers of stroke survivors. However, Qiu and Li (2008) and Huang et al. (2009) did not find this relationship significant either in mainland or in Taiwanese caregivers of stroke and dementia victims. In spite of the homogeneous Chinese samples in cross sectional studies, subcultural differences could explain these contradictory findings. Also, half of the caregivers in Huang et al.'s study were caregivers of dementia victims, and Lau et al.'s sample was collected years ago (2006 - 2007) in Hong Kong. These limitations suggest further evidence on the association of gender with depression.

Other influencing factors have also been investigated in caregiving literature. In a Finnish study, Burg (2010) argued that care receivers' activities of daily living (ADLs)

continued to be a significant predictor of caregiver depression, while cognitive impairment of the patient alone did not. Prevalence of stroke caregiver depression in spouses (33 - 38%) was reported higher than other caregiver roles such as adult child caregivers (19 - 23%). Level of depression was relatively stable within 18 months. Burg's study design is strong, using a longitudinal research method with a random sample, yet the small sample size ($n = 98$) from one hospital of Finland with only 17 adult child caregivers may limit the generalization of the findings.

Pinquart and Sorensen's (2011) meta-analysis of 168 empirical studies may provide more evidence on the factors influencing caregiver depression. The difference in depression prevalence between the adult child caregiver and spouse caregiver was small ($d = .25$), despite differences in the socio-demographic factors and responsibilities of the two roles. Being a spouse caregiver, age, education, percentage of employment, physical health, hours of care each day, and caregiving tasks significantly predicted his/her depression. Similar to Gaugler's (2010) finding, neither the duration in caregiver role nor the percentage of co-residence were significant predictors. The findings were helpful in deciding which influencing factors were selected for this dissertation study.

Although Pinquart and Sorensen's meta-analysis integrated a large pool of data from 30 studies on caregiver depression, among the total selected 168 studies most (55.3%) were caregivers of dementia patients or physically frail older adults. With 62% of the studies conducted in the U.S., little literature focused on Asian cultures, therefore, generalizing these findings to stroke caregivers of mainland China is difficult. Moreover, caregiver income in the final model was not shown to be a significant predictor of caregiver depression, which was incongruent with findings from Huang et al. (2009), Qiu

and Li (2008), and Wang, Xiong, Levkoff, and Yu (2010). Thus, research on Chinese caregivers may need to consider monthly income as an influencing factor.

These factors were partially supported by Huang et al. (2009), who affirmed that the combination of age, gender, monthly household income, care duration of the caregiver, and behavioral problems of the care recipient explained 28% of the variance in caregiver depression. Also, Lau et al. (2012) reported significant association between gender, finance, being retired, perception of health, and caregiver depression. These are supplemental to decisions about which factors should be controlled in this study.

Another study by Wang et al. (2010) on rural caregivers of mainland China revealed that depression levels in rural caregivers of healthy elder relatives were significantly lower than those of non-healthy elder relatives. Except for caregiver employment and education, it was found that caregiver age, income, and hours of care were significantly associated with caregiver depression. Although it had a stratified random sample with reasonable sample size ($n = 199$), this was a typical rural sample from Jiangxi province with more male caregivers (44.0 %), and the health status of care recipients were reported by the caregivers without formal medical diagnoses.

On the other hand, Qiu and Li (2008) studied stroke caregivers from the urban district of Wuhan city in mainland China, with fewer sons and daughters-in-law (19.5%) but more daughters and sons-in-law (28.8%), family income, stroke survivors' cognitive status measured by the Short Portable Mental Status Questionnaire (SPMSQ), (Pfeiffer, 1975), and functional status measured by Barthel index (BI), (Hsueh, Lin, Jeng, & Hsieh, 2002), were significantly correlated with depression (CES-D), (Andresen et al., 1994). This differs slightly from Burg's (2010) findings, in that the care receivers' activities of

daily living (ADLs) were a better predictor of caregiver depression than their cognitive status. The inconsistencies may be relevant to purposive sampling with a relatively small sample ($n = 92$), single site data collection, and the use of different tools.

Summary

Depression is prevalent in Chinese stroke caregivers but often ignored. Although findings on the influencing factors are conflicting, as suggested mostly by the meta-analysis and cultural insights, factors such as caregiver age, gender, income level, physical health, and care receivers' activities of daily living, and the less frequently identified factors such as caregiver employment, education, and hours of care each day were included in this study. Generally, past studies had a cross sectional design with small convenience samples of all types of family relationships, none of which focused on the adult child caregivers of parent stroke survivors. Therefore, further investigation in this area is recommended.

Main Concepts and Caregiver Health

Mutuality

The concept of mutuality exists ubiquitously in the context of care provision to all parents, but has seldom been described in Chinese culture.

Concept of Mutuality

The concept of mutuality is described as a reciprocal relationship between interdependent entities, including the qualities of correlation, reciprocation, interchange, interaction, and interdependence (Mutuality, n.d.). This concept can generally be used in any relationship characterized by sharing, moving toward a common goal, and satisfaction (Henson, 1997). Further, mutuality was synthesized in a concept analysis as

a connection with/or understanding of another which facilitates a dynamic joint exchange between people. Conceptually, it is positioned between autonomy and paternalism, or between reciprocity and collaboration.

Mutuality in family caregiving dyads was introduced by Hirschfeld (1983) on caregivers of persons with dementia. In this context, it was described as the caregiver's ability to find gratification in the relationship with his/her care receiver and the meaning derived from the caregiving situation. Later, Archbold et al. (1990) defined it as the positive quality of relationship in the caregiving dyad and operationalized it in four dimensions: affection, reciprocity, sharing values, and sharing pleasant activities.

Attributes of mutuality include feelings and actions of intimacy or affection, understanding of another, connection, reciprocity, commonality, interdependence, sharing, respect, and personal becoming (Curley, 1997; Henson, 1997; Steadman, Tremont, & Davis, 2007). Mutuality also implies community and unity through interaction and exchange but does not require symmetry or equality (Baumann, Kuhlberg, & Zayas, 2010; Curley, 1997; Jordan, 2008). In psychology, the essence of mutuality seems to be sharing between people (Aron, 1996; 2013). When applied to parent-child dyads, it usually means shared positive affect, responsiveness, and cooperation, which are important components of family socialization (Aron, 1996; 2013). In short, these attributes are closely relevant to the family caregiving context of this target population.

Mutuality has been shown to protect caregivers from adverse outcomes such as role strain, burden, anger, or depression, and to be associated with a higher level of rewards (Archbold et al., 1990; Ball et al., 2010; Kayser, Watson, & Andrade, 2007; Lyons, Stewart, Archbold, & Carter, 2009; Schumacher et al., 2008; Shyu et al., 2010), life

satisfaction (Ostwald, Godwin, & Cron, 2009), and caregiving satisfaction (Iecovich, 2011). It is also an important ingredient for dyadic coping (Cecil, Thompson, Parahoo, & McCaughan, 2013), and contributes to the growth of both members of a caregiving dyad (Curley, 1997).

Mutuality is familiar to Western populations but rarely used to describe the parent-child relationship in China (Wang, 2014), because cultural tradition may have emphasized a hierarchical relationship with parents and thus lessened the potential for parent-child mutuality. Mutuality differs from filial piety in that it is built on intimacy, understanding, and mutual satisfaction rather than an exchange of rights and obligations. Differences between the two concepts will be explained in the section on filial piety. With the declining authority of parents in China (Yeh, 2003), mutuality is gaining researchers' attention and has been explained in parent-adult child caregiving dyads in Taiwan (Shyu et al., 2010; Yang, Liu, & Shyu, 2014).

Relevant Studies on Mutuality and Critiques

In Western countries, the direct protective effect of mutuality on family caregiver health such as role strain, depression, anger, and tension was reported by a number of studies (Archbold et al., 1990; Lyons et al., 2009; Godwin, 2012; Ostwald et al., 2009; Schumacher et al., 2008; Shim et al., 2011).

Archbold et al. (1990) reported that mutuality was significantly negatively associated with most caregiver role strain. In this study, family caregivers were those caring for frail old adults in the U.S. The Mutuality Scale and Role Strain Scales from the Family Caregiving Inventory (Archbold & Stewart, 1986) were used. Although it had a small convenience sample ($n = 78$), and a large number of regression analyses might

have increased the probability of Type I errors, the longitudinal design found that caregiver mutuality at 6 weeks post discharge predicted most role strain at 9 months. Moreover, caregiver age, female gender, spouse caregiver, degree of impairment of the care receiver, and amount of direct care tasks were adjusted, which serves as strong evidence for the selection of the influencing factors.

Similarly, Schumacher et al. (2008) supported that mutuality was significantly negatively associated with caregiver depression ($r = -.43, p < .01$), and also with anger, tension, and role strain in 87 family caregivers of cancer patients. The researchers posited that poor relationship quality can create a difficult caregiving situation leading to negative caregiver health. By controlling for caregiver age and gender, the findings were more reliable, yet this cross sectional study shared a few limitations with Archbold et al.'s study, such as a small sample from the U.S. and too many regression analyses. Comparisons among similar studies could be difficult since it adopted the Profile of Mood States (POMS-SF), (McNair, Lorr, & Droppleman, 1992), to measure depression. Thus, evidence is needed to confirm the association between mutuality and caregiver health.

Both the studies of Archbold et al. (1990) and Schumacher et al. (2008) used role theory as a framework and the 15-item Mutuality Scale to measure mutuality, but these were not applied to family caregivers of stroke survivors. Godwin (2012) reported that caregiver mutuality at 6 months was inversely related to caregiver depression at 12 months post discharge in a convenience sample of 159 stroke caregiving dyads. This raises both a question on the stability of mutuality and an interest on its interaction with depression longitudinally. These concerns were answered by Godwin et al.'s (2013)

study, which followed caregivers ($n = 30$) to more than 2 years post stroke of their spousal care receivers. The concepts of mutuality, depression, and health-related quality of life were measured respectively by the 15-item Mutuality Scale (Archbold et al., 1990), the 15-item Geriatric Depression Scale (GDS), (Yesavage et al., 1983), and the SF-36 (Ware & Sherbourne, 1992). Caregiver mutuality was found to decline continuously but not significantly from baseline to all time points till 3 to 5 years ($M = 4.68$), whereas caregiver depression decreased constantly till 12 months, then increased significantly to the end of follow-up. Stroke specific health-related quality of life decreased significantly from 12 months to the end of follow-up.

This study sheds light on the stability of mutuality and the sustained stroke-related negative health outcomes among the caregivers. However, while Godwin et al.'s (2013) study was longitudinal with a long period of follow-up, it was a small sample ($n = 30$) of spouse caregivers from the U.S. Also, generalization of findings should be approached carefully due to the influence of caregiver age and illness on spousal caregiver health, as well as possible differences in cultures and relationships (Pinquart & Sorensen, 2011).

The dynamics of mutuality in the caregiving process and its interaction with depression can be supported by studies of both Lyons et al. (2007) and Shim et al. (2011). Both studies used Radloff's 20-item Center for Epidemiological Studies Depression Scale (CES-D) (1977) and Archbold's 15-item Mutuality Scale to measure depression and mutuality. No significant decline of mutuality was confirmed in family caregivers over 1 year or to 20 months. Lyons et al. (2007) indicated that depression scores declined after the 10-month time point, and changes in caregiver depression scores significantly

predicted changes in his/her mutuality scores. This association between depression and caregiver mutuality ($r = -.30, p < .001$) was confirmed by Shim et al. (2011).

Another finding from Lyons et al. (2007) also deserves attention, specifically, that changes in caregiver physical health were significantly positively associated with changes in caregiver mutuality. Worsening health was associated with declines in mutuality. This study used only one item from the SF-36 (Ware & Gandek, 1998) to measure physical health. A similar association between caregiver mutuality and physical and mental health was identified by Lyons, Zarit, Sayer, and Whitlatch (2002), this is interesting because mutuality was found mostly relevant to caregiver mental health.

These studies indicated that caregivers who had higher levels of mutuality and physical health were less likely to be depressed and more likely to provide care for a longer period; hence, it was suggested that caregiver mutuality could be promoted by ameliorating caregiver depression and by improving physical health. However, although these were longitudinal studies with repeated measures, and the sample in Lyons et al.'s (2007) study was systematically selected, the nature of the secondary data analysis with relatively small samples ($n = 91$ and $n = 103$) for care receivers with Alzheimer's or Parkinson's disease (AD or PD), or frail adults, and the use of only a single item self-report measure of physical health should be carefully considered in the design of future studies.

All the previously discussed studies were conducted in Western countries, and merely a few studies have been done on family caregiver mutuality in China. The impact of mutuality in Chinese culture was informed by several studies from Taiwan (Wang, Shyu, Chen, & Yang, 2011; Shyu et al., 2010; Yang et al., 2014), which reported the

protective role of mutuality in depression, role strain, reward, and the mental health of family caregivers of patients with dementia.

Shyu et al.'s (2010) study may be more representative among the studies on caregiver mutuality in Taiwan. The researchers used role theory to explore the association between mutuality and well-being on caregivers of dementia patients in a cross-sectional, correlational study. The Taiwan version of caregiving rewards and mutuality from the Family Caregiver Inventory (Archbold & Setwart, 1986), the mental health subscale from the SF-36, and the 20-item CES-D (Radloff, 1977) were used to measure caregiving rewards, mutuality, mental health, and depression. After controlling for caregiver age, gender, and care receivers' cognitive function, mutuality was also found to associate negatively with caregiver depressive symptoms and positively with caregiver rewards and mental health.

The strengths of this study included a power of .90 with 176 respondents and a respondent rate of 70.4% via a mailing method. The caregiver sample, recruited from the hospital and including 73.3% adult child caregivers at a mean age of 51.63 ($SD = 12.43$), is close to that of the target population of this dissertation study. However, factors such as hours of care each day, previous living arrangements, and employment status were not provided. Moreover, several insufficiencies call for more investigation of mutuality in Chinese culture, since mutuality shared only a 3.2% variance of the depressive symptoms after controlling for demographics; physical health was not included in this design. Furthermore, differences might exist in the socio-economic and political environments between Taiwan and mainland China (Yeh et al., 2013) and in the nature of caregiving between dementia care and stroke care.

Additionally, a moderation effect of mutuality was reported between caregiving demand and role strain (Yang et al., 2014) among caregivers of dementia patients in Taiwan. A similar effect was supported by Lin, Chen, and Li (2013), who claimed that satisfaction from the parent- child relationship (Chun & Li, 2008) moderated the relationship between burden and levels of depression in adult child caregivers of elderly parents in Taiwan. According to the conservation of resources theory (Hobfoll, 1989), this moderator can serve as a resource to help caregivers manage the stresses associated with caregiving.

Rarely has mutuality been studied with filial piety, but Kao and An's (2012) cross sectional, correlational study of 193 convenience-sampled Mexican American family caregivers of older adults showed that mutuality (Crist, Escandon, Stewart, & Archbold, 2008) was strongly associated with older adults' expectation of family loyalty ($r = .45$, $p < .001$). Dyadic mutuality was a good indicator of a caregiver's filial values. Both the validated 9-item bilingual Mutuality Scale (Kao, Lynn, & Crist, 2013) and the 13-item Expectation of Family Loyalty of Children Toward Elderly Relative Scale (EFLCTERS), (Kao, Mchugh, & Travis, 2007), were used to measure mutuality and filial loyalty in the culture. However, since these findings were derived from Mexican American caregivers, the concept of mutuality and its scale need more investigation among the target population of Chinese caregivers in this study.

Mutuality was also explored with social support in a cross sectional study of 91 convenience-sampled family caregivers of hospitalized cancer patients in Taiwan (Yeh, Wierenga, & Yuan, 2009; Yeh & Chang, 2012). The resiliency model of family stress (McCubbin & McCubbin, 1993) was adopted as a theoretical framework in these studies.

The dyadic relationship was affirmed to be significantly positively associated with caregivers' health reaction but lack of family support had the opposite association. These variables were measured respectively by the subscales of caregiver esteem, lack of family support, and impact on health of the Caregiver Reaction Assessment (CRA), (Given et al., 1992).

The studies provided more insights on the relationship between mutuality, family support, and caregiver health outcomes in Chinese culture; however, it ignored the element of filial piety in the context of caregiving in China. Also, cancer patients in this study generally were only slightly to moderately impaired in their activities of daily living, which might not reflect the caregiving demands of stroke survivors. Lastly, some issues such as Taiwanese convenience sample, use of different measures, caregivers with all familial relationships, and patients with different diseases suggest further study on these variables to be conducted on caregivers in mainland China.

Park and Schumacher's (2013) systematic review of 34 articles summarized that mutuality was associated with caregiver emotional health outcomes and may decrease over time with caregiving for those with chronic illnesses. Archbold et al.'s Mutuality Scale, and the Mutuality and Interpersonal Sensitivity Scale (Lewis et al., 2008) were the two most frequently adopted tools in caregiving research. The researchers recommend that future research should be directed to develop specific theory around mutuality, since this factor is now often incorporated with other theories such as stress and coping theory, role theory, the labor of caregiving framework, or a model of acculturation. An exploration of mutuality in diverse cultures and populations has been encouraged.

Summary

Mutuality is defined as the quality of relationship between members of a caregiving dyad, which was measured mainly by the 15-item Mutuality Scale. Role theory was more frequently applied as a framework in the studies on mutuality, which has been consistently reported to relieve role strain, burden, depression, and mental health; however, scant research has been identified on the relationship between mutuality and caregiver physical health. Emerging knowledge on the moderating effect of mutuality and its relationship with filial piety and family support was reported. This review found that little research has been done on the topic of adult child caregivers of parent stroke survivors in modern mainland China. Thus, it is suggested that further research in this area should be conducted, taking into account other contextual variables such as filial piety and perceived social support.

Filial Piety

Filial piety is a long-lasting cultural legacy of China. However, this concept may have undergone transformation in recent decades with modernization and strengthening of the economy. Hence, it is meaningful to explore the concept of filial piety and its association with health in the target population in mainland China today.

Concept of Filial Piety

Filial piety, or “Xiao,” refers to a prominent, family-centered cultural value that adjusts children’s attitudes and behaviors towards their parents to ensure parents’ well-being (Lai, 2010; Mao & Chi, 2011). It evolved as part of a structured social order in the time of Confucius thousands years ago in China (Liu, Ng, Weatherall, & Loong, 2000).

Adult child caregivers often interpret caregiving as “being filial,” “Chinese tradition,” and “moral responsibility” (Wong & Chau, 2006) when taking up the caregiver role.

Filial piety was described as “reverence for parents, considered in Chinese ethics as the prime virtue and the basis of all right human relations” (Filial piety, n.d.). When Yu (1983) interviewed Chinese Americans for filial beliefs and behaviors towards their aged parents, four components were derived: concern for parental health, financial support, housing needs, and respect for parental authority. Material help to parents was important in adult children’s concept of filial piety. However, among adult children in Hong Kong caring for their end-of-life parents, filial piety was interpreted as reciprocal relationships, mutual support, compassionate duty, emotional connections, and appreciation and forgiveness (Chan et al., 2012). Thus, Kuo (2010) summarized that filial piety included emotional, physical, economic, informational, and spiritual support.

Ho (1994) described a more authoritarian view of filial piety in which the son should treat his father with honor, obedience, devotion, and respect from the perspective of a native Chinese. Later, Yeh and Bedford (2003) developed a dual model which integrated both reciprocity and authoritarianism. Recently, Wong and Lo (2012) published a model of multidimensional filial piety which included four factors: hierarchy-based filial piety, and affect-based filial piety including gratitude and respect, emotional care, and material care. These concepts may be more applicable to young adults since they observe the transition away from familial authority or hierarchy.

Filial piety has been studied by scholars from other cultures or groups such as Koreans, Mexican Americans, and Arabians. Sung (1995) defined children’s filial piety in a positive way in Korean culture, including both behavioral and emotional dimensions

with attributes of sacrifice, responsibility, repayment, harmony, love and affection, and respect. The motivations behind Mexican American adult children's care behaviors were reflective of Sung's interpretation, with the addition of the desire to preserve family harmony (Kao & Travis, 2005; Kao et al., 2007). Similarly, Khalaila's (2010) study on filial piety in Arabic culture also covered elements of face-saving, intergenerational exchange, and family unity. However, despite the shared commonalities, filial piety in Chinese parents' views was based more on respect and material or financial assistance (Cheng & Chan, 2006; Luo & Zhang, 2012). Therefore, concepts of filial piety across cultures share some similarities but with a few differences.

Scholars have assumed that filial piety is universal. Gallois et al. (1996) take filial piety as an attitude not restricted to Asian populations but also to Westerners. They developed a 6-item measure of filial piety, including obligations toward the elderly as "look after," "assist financially," "respect," "listen patiently," "please and make happy," and "retain contact with" one's parents. This was applied to young adults across eight countries in the Pacific Rim (Gallois et al., 1996), including Chinese families in New Zealand (Liu et al., 2000), and in elders in Hong Kong (Cheng & Chan, 2006). In addition, Jones, Lee, and Zhang (2011) explored filial concepts across five cultural groups of African-, Asian-, Euro-, Latino-, and Native Americans, developing a measure (the Filial Value Index) that can be used cross-culturally in those groups. Factor analysis of the measure identified three factors: care, responsibility, and respect.

The evidence above indicates that the universality of filial piety can be questioned in some cases. Cultural or even subcultural differences were illustrated. Chappell and Funk's (2011) cross cultural study on 315 caregivers of Caucasian Canadian, Chinese

Canadian, and Hong Kong Chinese showed that the three groups were distinct in filial responsibility, actual caregiving behaviors, and health, particularly in emotional support, providing companionship, and financial support. In this study, filial responsibility was measured by the 5-item Filial Expectancy Scale (Lee & Sung, 1997; Kim & Lee, 2003) and filial piety by the 6-item Filial Behavior Scale (Gallois et al., 1996). This study illustrated that variations in filial piety do exist among subcultural groups.

Moreover, Yeh et al. (2013) investigated contemporary filial piety in three Chinese societies of Taiwan, Hong Kong, and mainland China of 5,779 Chinese adults. In spite of the shared background of Confucian cultural values, the original two factors (reciprocal and authoritarian) of the 6-item Dual Filial Piety model (filial attitude) (Yeh & Bedford, 2003) were supported by the Taiwan and Hong Kong respondents but not by their Chinese counterparts. This subcultural difference was further supported by Cheung and Kwan (2012), who conducted a survey on 1,219 older Chinese in six cities in mainland China, the researchers found that social norms of filial piety varied substantially among old people of the cities. Therefore, concept of filial piety differs by subcultures, which leads to assume that the motivations for parental care and filial behaviors (Liang, Li, & Zheng, 2013) might be diversified.

Finally, there is a need to differentiate filial piety from mutuality and reciprocity. These concepts are all about relationships, shared domains of reciprocity, respect, and love, and have similar consequences such as family harmony and satisfaction; however, they differ in scope or boundaries. More often, filial piety refers to intergenerational relationships, whereas mutuality and reciprocity can be applied in a broader dimension like public communications (Kezar, 2012, pp. 88-104; Mer sham, Skinner, & Rensburg,

2011). Secondly, reciprocity is one of the domains of mutuality and filial piety (Carruth, 1996; Archbold et al., 1990), equality of perceived investments and outcomes is crucial in reciprocity (Prins et al., 2008) while it is not emphasized in filial piety (Kao & An, 2012) or mutuality (Markova, Graumann, & Foppa, 1995). Finally, the elements of duty and ethics in filial piety are distinguishable from both mutuality and reciprocity (Chan et al., 2012; Kao & An, 2012). Thus, clarifications of these concepts may help in their application to the caregiving context.

This review made it clear that conceptualizations of filial piety vary by age, culture, and theory, but were more convergent than divergent. Definitions of filial piety with a variety of dimensions all seem to include love, respect, and care towards one's parents (Laidlaw, Wang, Coelho, & Power, 2010), cultural values that are embodied in filial attitudes and demonstrated by behaviors. Consequently, filial piety leads to family harmony, parent well-being, and support exchange (Chow, 2001; Zhan, 2004), and enhances life satisfaction of aged parents (Guo & Chi, 2010). However, filial piety has often been understood as one concept and measured in a single measure.

The concept of filial piety has been extensively applied to caregiving contexts, which implies an increasing necessity to study it via different perspectives. Filial piety was declared to have drastically declined in recent years both in China and other countries (Cheng & Chan, 2006; Cheung & Kwan, 2009; Khalaila & Litwin, 2011; Wang, Laidlaw, Power & Shen, 2009). The perceived least performed behavior or the most discrepant with parental expectations in Hong Kong was paying attention to parents when they were ill or distressed (Cheng & Chan, 2006). Others (Dong, Chang, Wong, & Simon, 2012; Yeh et al., 2013; Chan et al., 2012; Cheung & Kwan, 2009) argued that

filial piety is still important in Chinese culture. However, in recent years it may have shifted from authoritarian to more reciprocal, or with a discrepancy between attitudes and behaviors in Chinese adults (Chan et al., 2012; Chen, Bond, & Tang, 2007; Xu, 2012; Yeh, 2003), or more related to functional support, such as providing financial care to parents (Luo & Zhan, 2012). Therefore, it could be meaningful to study the dimensions of filial piety, filial attitudes, and filial behavior in adult child caregivers in modern mainland China.

Relevant Studies on Filial Piety and Critiques

Research has shown the association of filial piety with caregiver health to be mixed (Funk, Chappell, & Liu, 2013; Hsueh, Bachman, Richardson, Cheng, & Zimmerman, 2014; Lee, 2005; Sun, Ong, & Burnette, 2012; Zhan, 2006). Uncertainty about the impact of filial obligation on the health of Chinese caregivers could be answered by Zhan's (2006) study of 110 Chinese, which showed that strong filial responsibility was positively related to depression ($r = .20, p < .05$). However, social pressure was negatively correlated with social rewards among caregivers of physically dependent parents or parents-in-law in mainland China. Filial responsibility was measured by patrilocal norms (relevant to the marriage pattern that the couple lives with the husband's family), which were constructed with items from Montgomery (1996), Gallois et al. (1996), and Choi (1993) adjusted to Chinese culture. The 10-item CES-D was used to measure depression. As very few articles from mainland China focused on this topic, this sample, which was collected from three large cities a decade ago, could serve as a reference. Because Zhan's study used a cross sectional design and snowball sampling to recruit caregivers from the northern part of China, and the concept of filial piety might

have been transformed, the findings may no longer be relevant. Therefore, further exploration of the perspectives of filial piety in contemporary mainland China is recommended.

A similar study done by Tang (2006) in mainland China reported that filial piety might have no association or a negative association with caregiver well-being; this was supported by Pinguart and Sorensen (2005), Tang, Li, and Liao (2007), Lai (2009b), Zhan (2006), and Funk et al. (2013). Tang (2006) used a cross sectional, correlational design with a convenience sample of 316 adult child caregivers of elders more than 80 years old in Guangzhou. No significant association was reported between the obligation of filial piety and psychological well-being of the adult child caregivers, but a higher obligation of filial piety tended to be associated with a higher caregiver burden and lower levels of well-being. In this study, Gallois's 6-item Filial Piety Scale (filial obligations) was used to measure filial piety. Negative or null association of filial obligation on caregiver health was illustrated.

The strengths of Tang's study included a mixed method research design with adequate sample size from a typical modern city of south China, and measures with acceptable validity and reliability. Nevertheless, the elders in this group may still have the ability of adequate self-care; hence the caregivers' experience could differ from that of caregivers for the functionally disabled. This could be explained by the lower level of obligation of filial piety and burden, thus, had low influence on caregiver well-being (Shim et al., 2011). Finally, this study confirmed that the concept of filial piety, filial obligation, or responsibility should be treated separately since their impact may be contradictory.

Further, Funk et al. (2013) conducted a cross cultural and cross sectional correlational study with a convenience sample of 315 caregivers of elders in Canada (Caucasian Canadian $n = 100$, Chinese Canadian $n = 90$, Hong Kong Chinese $n = 125$). Symbolic meanings and subjective appraisals were studied in these cultural groups. After adjusting for the demographics of the caregiving dyads and caregiving characteristics, stronger filial expectancy was found to be associated with lower perceived caregiver health both in the entire group ($OR = .79, \beta = -.80, p < .001$) and in the Caucasian Canadian subgroup ($OR = .71, \beta = -1.14, p < .01$). Stronger filial piety attitudes were associated with higher caregiver well-being ($\beta = .12, p < .05$) in the entire group. Tools used in this study included the 5-item Filial Expectancy Scale (Lee & Sung, 1997; Kim & Lee, 2003) for filial responsibility, and the 6-item Filial Piety Scale (Liu et al., 2000) adapted from Gallois et al.'s Filial Piety Scale for filial piety attitude, the 7-item Personal Well-being Index (Lau, Cummins, & McPherson, 2005), and a single item of perceived health to measure caregiver well-being and health. This study provided evidence that since caregiver attitude about filial piety or filial expectancy might have important cultural differences and complexities, their relationships to the health outcomes of Chinese caregivers need more study.

Funk et al.'s (2013) cross-cultural sample is a strength of the research, as well as its use of Gallois et al.'s Filial Piety Scale (Cronbach's $\alpha .80$), which was validated and used appropriately in this context. Relationship quality, measured with three items from Lee and Sung (1997), was taken into consideration and controlled as a covariate. However, caregivers were those caring for healthy elderly adults and some (75.3% in the Hong Kong Chinese subsample) were even not primary caregivers, therefore, their caregiving

tasks might not be as demanding as those for the functionally impaired. Moreover, the 5-item Filial Expectancy Scale had a slightly low Cronbach's α of .76, and the single item measure of self-rated perceived health with dichotomous choices might not be sufficient, which may have impacted the results. Another question is whether the null relationships found between the main variables among the Hong Kong Chinese and Chinese Canadian groups were due to the small subsamples ($n = 125$, and $n = 90$), transformation of filial piety, or acculturation. Finally, it is important to remind that Gallois et al.'s Filial Piety Scale was used interchangeably as a measure of filial attitude or filial behavior (obligation or responsibility) in the literature, which makes the conclusion unclear on the impact of filial attitude or filial behavior in Chinese population.

In spite of the direct association between filial piety and caregiver health, the relationship could also be indirect (Hsueh et al., 2014). Lai (2010) examined the relationship of filial piety with the appraisal of caregiving burden in Chinese-Canadian family caregivers. A randomly selected group of 339 caregivers of elderly family members were surveyed by telephone interview. The 6-item Gallois et al.'s Filial Piety Scale (1996) and the Zarit Burden Interview (ZBI), (Chan, 2002, October), were used to measure filial piety attitude and caregiver burden. Analysis of the structural equation model found that filial piety indirectly affected caregiving burden by altering appraisals of the caregiver role. Filial piety served to reduce the negative effects of stressors and enhance the positive effect of appraisal factors on caregiving burden. This study had a random sample but the telephone interviewing method might have excluded respondents who did not have telephone lines and did not use a Chinese surname. Moreover, findings

from Chinese Canadians may not fully represent that of mainland Chinese due to differing caregiving situations and social changes.

Such indirect effects of filial piety were supported abundantly in the literature. With a negative relationship found between burden and caregiver physical and mental health (Ho et al., 2009; Yang et al., 2012), and a positive association between caregiver burden and caregiver depression (Khalaila & Litwin, 2011; Lai, 2009a; Phillips, Gallagher, Hunt, Der, & Carroll, 2009; Rigby, Gubitz, & Phillips, 2009), filial piety was found to affect caregiver health through caregiver burden in Arabic Israelis (Khalaida & Litwin, 2011) and mainland Chinese (Tang, 2006), and through reward and coping among Chinese Americans (Hsueh et al., 2014).

Also, literature shows that the association of filial piety with caregiver health can be predicted by the motivations and meanings of caregiving. Quinn, Clare, and Woods's (2010) systematic review of caregivers of dementia patients revealed that caregiver health was influenced by their motivations for providing care, which was impacted by cultural norms and caregivers' kin relationships to the care recipients. Finding meaning also had a positive effect on caregiver well-being. Therefore, filial piety is pervasive to caregivers' motivations to provide care, hence, affecting caregiver health.

The above assertion on the effect of cultural values such as filial piety can be further supplemented by Tang's (2011) study with 113 Chinese American family caregivers of elderly relatives. Cultural values in combination with caregiver background and stressors were shown to have a direct effect on positive aspects of caregiving. About half the caregivers reported the importance of elder care, the enactment of filial obligation, and feeling good about their role as caregivers. A mixed method design and a

sample of adult child caregivers (75.2%) were both methodologically sound and informative to this dissertation study. However, the possibility of acculturation in respondents may have been a confounding variable. Also, the cultural value scale that blended obligation to provide care, family values, intergenerational relationships, and patrilocal norms may not be specific in measuring aspects of this concept.

The cultural and ethnic impact on caregiving and hence to caregiver health outcomes was summarized by Sun et al.'s (2012) systematic review, which integrated 18 articles on Chinese American family caregivers of members with dementia. It was claimed that the practice of filial piety permeated caregivers' attitudes and behaviors toward caregiving, which impinges on key elements of the caregiving process such as caregivers' appraisal of stress, coping strategies, and informal and formal support. These findings are in accordance with Aranda and Knight's (1997) sociocultural stress and coping model, which incorporates ethnic/cultural values in the caregiving process. Thus, caregiver health needs to be studied within the sociocultural background of the caregivers.

As the concept of filial piety has transformed and gaps between adult children's attitudes and their filial behaviors grow (Chen et al., 2007; Cheng & Chan, 2006; Chan et al., 2012; Lim, Bryant, & Garnham, 2012; Xu, 2012), components of filial piety should be explored separately in research of caregivers in China. Xu (2012) reported the findings from a national survey of China (China General Social Survey 2008) including Hong Kong, which recruited a representative stratified sample of 3,208 native Chinese of all age groups. Tools of a 4-item Filial Piety Attitude Scale with a Cronbach's α of .80 and a 3-item Filial Piety Practice (behavior) from Gallois et al.'s Filial Piety Scale were

used to measure filial attitudes and filial behaviors. It was found that the general Chinese population expressed a remarkable level of filial piety. However, filial piety was only significantly correlated with the behavior of emotional support, but not financial assistance or practical assistance. These findings support a culture-specific evaluation of an imbalance between attitude and actual behavior (Chen et al., 2007; Wang et al., 2009) and the weaker influence of financial assistance. Nevertheless, this study did not explore the effect of filial piety on population health, particularly among caregivers. Details on the psychometrics of the filial piety scales were not mentioned.

Clearly, the effect of filial piety is multidimensional. Generally, filial piety can have a positive impact on caregiver health, yet strong filial obligations were associated with negative subjective outcomes among caregivers (Knight & Sayegh, 2009; Lyonette & Yardley, 2003; Quinn et al., 2010). On one hand, stronger filial obligations could impose greater burdens on caregivers, who may feel obligated to do so but guilty if they are not able to play their parts as children. They may continue to be involved in long-term care although their parents were institutionalized (Tang, 2011; Zhan et al., 2011). On the other hand, some caregivers can easily accept and integrate caregiving to their parents as part of their own responsibility (Zeng, Zhou, Li, & Zhou, 2011). In short, the impact of filial piety on caregiver health depends on how the individual interprets it; thus, filial piety can be viewed as a personal resource (Chappell & Funk, 2012).

This review has indicated a number of rationales for this dissertation study. Firstly, it is not clear whether the protective role of Chinese traditional ideology of filial piety is still present. As reported by Tang et al. (2007), Lau et al. (2012), Tang (2011), and Huang et al. (2009), the depression rate of family caregivers of those with stroke still

remained high. Also, it was seen that in a society with a strong emphasis on familism, caregiving-based obligations and social sanctions may not immunize caregivers against emotional distress (Funk et al., 2013) but increase it (Pinquart & Sorensen, 2005). Strong norms of parental authority, hierarchy in family, associated conflicts, and social stigma may further contribute to emotional distress in Chinese caregivers, but this has been changing with modernization.

Secondly, filial piety did not consistently strengthen the utility of familial elder care (Cheung & Kwan, 2012). As the effect of a social norm varied substantially among the cities in mainland China, it was claimed that the social norm of filial piety would not sustain individual filial piety or family elder care. Thus, some scholars believe that filial piety can be viewed as a personal resource for caregivers (Chappell & Funk, 2012) but needs to be studied in various subcultural groups.

Thirdly, tools relevant to the caregiver population need to be carefully selected or developed. Although measures of filial piety as a single concept are available, some (Yeh & Bedford, 2003; Wong & Lo, 2012) were more applicable to young Chinese adults. The universally used scale by Gallois et al. (1996) could not reflect the cultural differences of filial piety such as confiding/financial support to parents between Western and Eastern cultures (Chappell & Funk, 2012; Funk et al., 2013), and it was often misused as a measure of either filial attitude or filial behavior. Thus, appropriate tools for the target population need to be chosen to capture the cultural changes in contemporary China.

Summary

Filial piety is a broad and complex concept, which could make operationalization of filial piety difficult. Available tools such as the dual model of filial piety, including authoritarian and reciprocal, might be derived from very different views and cultural backgrounds and not relevant to the target population in this study. Moreover, the concept may have been transformed with discrepancies between filial attitudes and care behaviors. Although filial piety has been extensively explored using a variety of relevant concepts, mixed effects on caregiver health were identified. In addition, little has been reported currently on the topic with adult child caregivers of parent stroke survivors in mainland China. Thus, exploration of the influence of filial piety on caregiver health by using tools that can measure both filial attitude and filial behavior is recommended. Nevertheless, it must be emphasized that filial attitude and filial behavior are only parts of filial piety, and is worthy of efforts to comprehensively measure filial piety as a whole in other cultures.

Perceived Social Support

Caregivers of parent stroke survivors are likely to be deprived of social support since most of their time and energy is dedicated to the tasks of caregiving. Thus, understanding the concept of perceived social support and its effect is important in caregiver research.

Concept of Perceived Social Support

Social support is usually considered a protective factor for stressful life situations, helping to maintain an individual's physical and psychological health (Gottlieb & Bergen, 2010; Uchino, 2009; Umberson & Montez, 2010; Thoits, 2011). Of the three

forms of social support: network resources, social behaviors, and appraisal of support, only the latter is subjective in nature (Kruithof, Mierlo, Visser-Meily, Heugten, & Post, 2013; Shumaker & Brownell, 1984).

The subjective level of satisfaction with received support is referred to as perceived social support. It consists of one's perceptions of the availability of support and satisfaction with the supportive relationships (Chappell & Reid, 2002; Kuscu et al., 2009). For example, in domestic caregiving contexts family members, friends, and acquaintances usually support the caregivers. Thus, perceived social support covers both the individual's perception of support from network associates, and the evaluations of the quantity and/or quality of received support (Gottlieb & Bergen, 2010). In short, definitions of perceived social support unanimously refer to the appraisal of aspects of support, such as the availability and adequacy of family and friend assistance or relationships.

The concept of perceived social support has been widely applied in Chinese caregivers. Inadequate social support perceived by caregivers leads to higher levels of caregiver burden and lower levels of physical and mental health, and well-being (Chien, Chan, & Morrissey, 2007; Lau et al., 2012; Liu, 2010; Yu et al., 2013).

Relevant Studies on Perceived Social Support and Critiques

Perceived social support has been extensively studied and various forms of association such as direct, mediation, and moderation have been reported. Direct association between perceived social support and caregivers' burden, burnout, depression, and health-related quality of life (HRQoL) were identified but with a few inconsistencies (Chiou, Chang, Chen, & Wang, 2009; Chappell & Funk, 2011; Lai &

Thomson, 2011; Hayslip, Han, & Anderson, 2008; Kuscu et al., 2009; Shyu, Chen, Liang, & Tseng, 2012).

Kuscu et al. (2009) used a cross sectional correlational design to explore the association of perceived social support with psychological well-being in a convenience sample of family caregivers of cancer patients in Istanbul, Turkey. Perceived social support was found to be a significant predictor of caregiver depression, with 35.4% of the caregivers at risk for clinical depression, but support from friends was not a significant predictor of caregiver well-being. In this study, the Multidimensional Scale of Perceived Social Support (MSPSS), (Zimet, Dahlem, Zimet, & Farley, 1988), and the Beck Depression Inventory (Beck, Steer, & Brown, 1996) and State-Trait Anxiety Inventories (Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983) with acceptable psychometrics were used to measure PSS and depression, respectively. Although the depression rate was similar to that reported in most caregiving studies, findings suggested that family support, friend support, and support from significant others should be examined separately. Moreover, these findings should be interpreted carefully due to the small sample size ($n = 51$) and use of a different depression scale. Caregivers of cancer patients in Turkey may have varied stressors compared to adult child caregivers of parent stroke survivors in China.

The direct positive association between perceived social support (PSS) and caregiver well-being was further convinced by Hayslip et al.'s (2008) study, in which predictors of caregivers' depressed mood and burden were investigated among both the active family caregivers and the not-as-yet caregivers of those with Alzheimer's disease in the state of Texas in the U.S. The Expressive Support Scale (ESS), (Pearlin et al.,

1990), the Geriatric Depression Scale-Short Version (GDS-S), (Sheikh & Yesavage, 1986), and the Caregiving Burden Scale (CB), (Lawton, Kleban, Moss, Rovine, & Gliksman, 1989), were used to measure the perceptions of social support, depression, and burden. Lack of social support was revealed as a strong predictor of depressed mood of the not-as-yet family caregivers of spouses or parents with dementia. Lack of social support was also a predictor of burden for active caregivers in the study. This finding is congruent with Kim, Duberstein, Sorensen, and Larson's (2005) finding underscoring the buffering impact of PSS on caregiver well-being. However, generalization of the result may be limited due to the small convenience subsamples ($n = 42$ and $n = 38$), and differences in cultures and caregiving experiences of types of diseases. Thus, a longitudinal study with a larger sample size with active caregivers could be more relevant.

The studies discussed above were not conducted in a Chinese cultural setting, so Han et al.'s (2011) study of 164 family caregivers of stroke survivors in mainland China provided very useful information to this dissertation study. Levels of caregiver depression were found to be lower, but perceived social support (PSS) was significantly higher after discharge ($p < .001$). Among the depressed caregivers, perceived social support was significantly lower than that of those not depressed ($p < .05$). Depression was measured by Andresen et al.'s (1994) Center for Epidemiological Studies Depression Scale, and PSS was measured using the Multidimensional Scale of Perceived Social Support (Zimet et al., 1988). One strength of this study is its longitudinal design, which indicates that low PSS can result in caregiver depression. It is implied that caregiver depression can be alleviated when perceived social support is increased.

Nevertheless, these findings might not be representative of adult child caregivers, since it recruited 76.2% spousal caregivers; neither is it possible to determine if there is a subcultural difference because the sample was from Hubei province. Secondly, this study did not have a theoretical framework or control for any covariates, and caregiving dyadic relationships were not considered in the design. Finally, no definitions of caregivers, caregiving workload, or the care receivers' degree of disability were provided. In order to achieve more reliable findings, these limitations will need to be addressed in future studies on the topic.

Family support is a key element of perceived social support in Chinese culture. As indicated by Han et al.'s study, family support before discharge ($M = 5.62$, $SD = .95$) and 24 weeks post-discharge ($M = 5.92$, $SD = .75$) was higher than support from friends or others at any stage on a 7-point scale. Both Yeh et al. (2009) and Yeh and Chang (2012) affirmed that family support was a significant positive predictor of caregiver health in Taiwan. Research with elders in mainland China also showed that perceived future help from family members significantly predicted the life satisfaction of the elderly adults (Shen & Yeatts, 2013). Yet despite the importance of family support, it is not clear what association it could be between perceived social support and caregiver health when taking into account mutuality and filial piety in the target population of contemporary China.

In addition, the association of perceived social support with caregiver health-related quality of life (HRQoL) was contradictory. Shyu et al.'s (2012) study supported the positive relationship between perceived social support and caregiver HRQoL (SF-36) with 135 Chinese caregivers in Taiwan. Most dimensions of caregiver HRQoL improved at 12 months post-discharge compared to that after 1 month. However, scores of

caregivers' general health and mental health were significantly lower at 12 months, which may be explained by the low emotional and positive interaction supports in this caregiver group. Although this was a longitudinal study with mostly adult child caregivers, generalizing findings to mainland Chinese caregivers of stroke survivors might be difficult due to the convenience sample of caregivers of patients suffering from hip-fracture, use of data from the early 2000s, and use of the Medical Outcomes Study Social Support Survey (MOS-SSS), (Sherbourne & Stewart, 1991), to measure perceived social support.

Conversely, Yu et al.'s (2013) study did not find a positive association between perceived social support (PSS) and caregiver health-related quality of life (HRQoL) in a quasi-random sample of 121 caregivers of stroke survivors in central mainland China. The respondents in this cross sectional study were mainly spouse caregivers (79.3%). The SF-36 and the Multidimensional Scale of Perceived Social Support Scale (MSPSS) were used to measure HRQoL and PSS. The null relationship between PSS and caregiver HRQoL could be explained that older spouse caregivers have less social support available from their family and friends or other resources. Thus, further study with alternate caregiver groups is needed to clarify the relationship.

Other forms of a mediation or moderation effect of perceived social support on caregiver health were identified as well. Regarding mediation effect, social support is in the middle of the pathway between stressors and outcomes (Kim, Han, Shaw, Mctavish, & Gustafson, 2010; Swickert & Hittner, 2009). Flannery's (2002) review of general medical and elder medical findings indicated that social support was an important component of quality of life and overall health in both healthy individuals and those with

a variety of diseases. Perceived social support acted as a buffer for illness by altering caregiver perspectives such as appraisals and coping mechanisms, which is in accordance with what Lazarus and Folkman's stress and coping model (1984) described.

The mediating effect of perceived social support has been reported by a number of studies. Perceived social support was said to work on caregiver depression in mainland China through pre-coping and positive emotion (Luo, 2012), or to mediate between the meaning of caregiving and the level of depression in family caregivers in Taiwan (Yen & Lundeen, 2006). Yet there were conflicts in these findings. Perceived social support was not reported as a mediator between caregiver appraisal and quality of life in family caregivers of elderly stroke patients in Korea (Lee, 2005). Lee's study had a typical sample of Asian family caregivers, with 147 mixed caregivers, 55% adult child caregivers, 77.6% female caregivers, and 71.4% unemployed. Cultural differences may have contributed to the inconsistent findings.

Another type is the moderating effect of perceived social support (PSS), which means that PSS interacts with stressors to show its effect on psychological outcomes (Huang et al., 2009; Hwang, Fleischmann, Howie-Esquivel, Stotts, & Dracup, 2011; Kim et al., 2010; Ownsworth, Henderson, & Chambers, 2010; Wilks & Croom, 2008). People with strong social support tend to have better health than those with weak social support. It was found that non-spousal caregivers had less family support and perceived less social support (Hwang et al., 2011). Satisfaction of social support buffers the impact of the care receivers' functional impairment on caregivers' psychological well-being (Ownsworth et al., 2010). Perceived social support further moderated the relationship between patients' comorbid conditions and positive aspects of caregiving, thus contributing to a lower rate

(11%) of clinical depression and a higher level of health-related quality of life among family caregivers.

Accordingly, Liu, Insel, Reed, and Crist (2012) and Liu (2010) found that perceived social support (PSS), measured by MSPSS-C (Chou, 2000), had both direct and indirect positive associations with Chinese caregiver health-related quality of life (HRQoL), measured by the Chinese version of SF-36 (Li et al., 2003). The moderating effect of PSS on caregivers' psychological dimension was through its relationship with caregiving satisfaction and coping. This study contributed to this dissertation study on the relationships among PSS, familism, and caregiver health. However, familism differs from filial piety in that it describes strong identification and attachment, and also measures aspects of familial honor and subjugation of self to family (Liu, 2010). In addition, this study used a small convenience sample of caregivers of dementia patients. It would be more thorough to explore perceived social support in other caregiver groups considering the influence of mutuality and filial piety in Chinese culture.

Amidst the arguments about the association of perceived social support with caregiver health, the cultural factor may be worthy of deeper consideration and research (Thoits, 2011). This complicated phenomenon was elucidated by Cheng, Lam, Kwok, NG, and Fung's (2013) study on family caregivers of dementia patients in Hong Kong. It appeared that the caregivers in the study had a small network of four people in their perceived social network. Caregivers may end up isolated and disappointed when expectations of family support are not met. Sangalang and Gee's (2012) study suggested a need to consider social strain and social support, as well as their sources in the caregiving context. The Chinese culture of familism and collectivism were said to have

been transformed and filial attitudes were argued to be an individual matter rather than an ethical issue (Chappell & Funk, 2012). Therefore, these factors further contributed to the reasoning behind this dissertation study.

Summary

Perceived social support is defined as the appraisal of availability and adequacy of social support. Despite a few contradictory studies, mostly positive association of perceived social support with caregiver health were reported, and mediation and moderation effects were also identified. However, few studies have been conducted on adult child caregivers of parent stroke survivors in the context with dramatic socio-economic changes in mainland China, and the influence of culture on caregiver perceived social support and health is under debates; thus, perceived social support deserves further exploration in the target population while considering the influence of mutuality and filial piety in the context. As the research questions concern, direct association of perceived social support is the focus of this dissertation study.

Theoretical Framework

A theoretical framework is used to guide the development of the study and to better explain, describe, and/or predict the phenomena of interest. Among the identified theoretical frameworks in the literature, role theory (Burr, 1979; Goode, 1960; Mui, 1992) was considered an appropriate foundation upon which to base this dissertation study.

Rationales for Selection of Role Theory

Several rationales supported this selection. First, the interactionist framework introduced numerous concepts such as role expectation, role enactment, role overload,

and role strain, which focus on the role itself (Burr, 1979). Not only can this be easily applied to the caregiving role but it also provides new insights into how family members actually fulfill their caregiving roles apart from their other roles. Nursing interventions based on role theory suggest ways to assist family caregivers with effective role supplementation (Archbold et al., 1990; Burr, 1979; Schumacher et al., 2008; Shyu et al., 2010).

Second, role theory (Burr, 1979) employs the concept of strain as distinguished from stress. Stress is often taken as an external event, whereas strain is the stress felt by an individual (Morycz, 1985). Perception of stressors plays a crucial part in the degree of strain the individual experiences. The outcomes of caregiving may largely be determined by the degree to which the caregiver perceives his/her role as problematic in the interactive situation affiliated with the caregiving role. Hence, rather than viewing the family caregiving role as a stressor, it is instead viewed as a complex phenomenon.

Third, role theory emphasizes the importance of relationships, represented in this study by mutuality, and its effect on caregivers with multiple roles. Although prior relationships influence current mutuality, role theory stresses the dyadic mutuality in the situation whether as a background or a contextual factor. The negative health outcomes in caregivers due to caregiving could be mediated by dyadic mutuality in this theory (Quinn, Clare, & Woods, 2009). In other words, mutuality could protect caregivers from role overload.

Introduction of Role Theory

Role theory (Goode, 1960) was developed from symbolic interactionism (Burr, 1979) which is one of the major theoretical perspectives in sociology, beginning with the

German sociologist and economist Max Weber and the American philosopher George H. Mead, both of whom stressed the subjective meaning of human behavior in the social process. Concepts of this theory that are particularly useful in guiding this study are role and role strain.

Role theory describes human behavior as guided by subjective expectations held by an individual and the others with whom they interact (Burr, 1979; Goode, 1960; Mui, 1992). Role is defined as an integrated set of social norms that are distinguishable from other sets of norms making up other roles (Burr, 1979; Goode, 1960). Under the influence of symbolic interactionism, human behaviors are understood by their meanings and values. Role strain, including cognitive, affective, and physiological reactions to stress, is related to the availability of internal or external resources (Mui, 1992). In the caregiving context, resources could be positive caregiving dyadic mutuality, the caregivers' strong filial piety, and their positive perception of social support (Burr, 1979, Goode, 1960; Mui, 1992; Pearlin et al., 1990; Cloninger & Zohar, 2010). From the perspective of Chinese culture and filial piety, caregiving is an expected role for maintaining the survival and order of societal institutions.

Application to the Current Study

Viewing caregiving as their role, along with many other role demands, adult children feel the obligation to provide care to their aging parents with or without functional disabilities (Wang et al., 2011). Goode (1960) hypothesized that family caregiver role strain was associated with demographic characteristics, caregiving resources, caregiving role-demand overload, and role-conflict variables. This dissertation study aims to explore the caregiving resources of mutuality, perceived social support, and

filial piety as predictors of caregiver health outcomes, which might contribute positively to maintaining the caregiver role.

However, symbolic interactionism (Burr, 1979) proposed that different interpretations of the caregiver role will have an impact on role performance and role strain. In the current situation in China, caregivers face the tradition of filial piety, combined with modernization, competitive employment, and other roles, and struggle to resolve the tension of role expectations and role enactments. Thus, the manifestation of role strain is multidimensional, which could prove to be more serious than depression.

Moreover, informed by the works of Pearlin et al. (1990) and Jones et al. (2011), mediators of social support and filial piety are integrated into role theory. In the complexity of modern China, with its advances in the health care system and the potential transformation of filial piety, effects of these resources such as null association, direct association, and mediation or moderation effect on caregiver health are important areas to be explored. Mechanisms of the effects will also imply nursing strategies to facilitate better caregiver role enactment and positive health outcomes.

Conceptual Model of the Study

Based on the above analysis and application of role theory, the conceptual model of this study is shown in Figure 1.

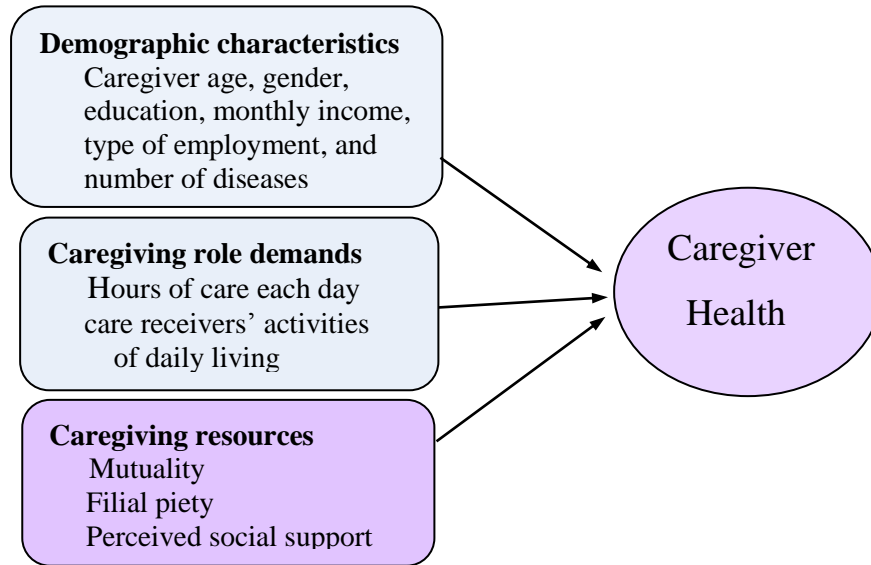


Figure 1. Conceptual model of the study

Chapter Summary

Adult child caregivers play a key role in elder care system in modern China. Exploring factors that have the potential to positively contribute to caregiver health and thus sustain family caregiving has great significance to the health care system. This literature review identified inadequacy or inconsistency in the associations between mutuality, filial piety, perceived social support, and caregiver health. Further investigation of these variables in adult child caregivers of parent stroke survivors will generate useful information to guide future clinical practice, research, education, and policy development in the evolving family caregiving context of modern China.

CHAPTER THREE

METHODS

This chapter details the process of how the study was conducted, guided by the philosophical underpinning of critical realism. The sampling process, tool selection, data collection, and analysis are described. Strategies for human rights protection are also addressed.

Research Design

A non-probability, cross sectional, descriptive correlational design was used to examine the association of mutuality, filial piety, and perceived social support (PSS) with the self-reported health of adult child caregivers of parent stroke survivors. Several considerations led to the select of this design.

One consideration was the number of unique subcultures in China. The social norm of filial piety varies greatly in different parts of the country (Cheung & Kwan, 2012; Yeh et al., 2013). Accordingly, the effect of filial piety on the target population may also differ substantially among the regions. Thus, examination of a caregiver sample from a specific region, Zhejiang province, is valuable in understanding the associations between the variables under study in this particular subculture of mainland China.

A second consideration is the representativeness of Zhejiang province as one of the most modernized areas in China, and one of the fastest growing areas in southern China. It has a population of 53 million people and a gross domestic product (GDP) per capita of \$6,084, the fourth largest in China (Fu, Bao, & Meng, 2010). In the health care system, Zhejiang province had 1,200 community primary health-care service centers in 2008, an

increase of 56% compared to 2004. Community nursing in Zhejiang province grew not only in numbers but also by the greatly improved infrastructure and primary health care services in the communities.

A final consideration was limited time and resources. Since China is a densely populated country, an appropriate sampling method and carefully followed procedures can still produce reliable information. Therefore, this non-probability, cross sectional, descriptive correlational design was chosen in consideration of the varied social norms in the subcultures representative of modern China.

Assumptions Pertinent to this Study

Critical realism was adopted as the philosophical underpinning of this research. Critical realism positions itself in the middle between constructivism and positivism, acknowledging the independent existence of objective reality but asserting the constructedness of human knowledge about the nature of that reality (Bhaskar, 1979). In other words, a mind-independent world will be reached or understood by highlighting mind-dependent aspects of the world. Contemporary critical realist Bhaskar developed both a general philosophy of science that was described as transcendental realism and a unique philosophy of the human sciences which was called critical naturalism. The two terms were combined by scholars to form the umbrella term critical realism. Both concepts are based on the ontological belief in the existence of an objective world.

In the physical world, critical realism posits there is a transcendent reality, which means the existence of the object of scientific investigation. Knowledge is presented in its content, but reflects the essence of the object. The content of knowledge offers us the fundamental categories, such as time, space, structure, relations, and behaviors, in terms

of how we view the world. These concepts are so basic that they can hardly be further reduced. Thus, knowledge content gives us the constitution of the world, only from which are we able to see the existence of the physical world.

Bhaskar (1975) clarified his ontological assumption in social science that reality is the social structure, a stratified open system with layered structures, human agents, events, and mechanisms (Bhaskar, 1978). These structures can be transformed and reproduced by social actors, emerging from the actions of human agents and then exerting a causal influence over human agents (Bhaskar, 1998). Knowledge is obtained by understanding the interplay of human agents and other multiple layered structures (Kempster & Parry, 2011). Thus, critical realism proposes to investigate and identify the relationships among the experience, outcomes of the event, and its mechanism. Methodology for knowledge development in critical realism includes both qualitative and quantitative methods (Yeung, 1997).

Relevant to this research, I believe there is an objective reality about the relationships among the variables under study in adult child caregivers of parent stroke survivors in China. Filial piety, mutuality, perceived social support, health, adult child caregivers, and their parents all belong to different domains and layers of these social structures. Within the interactions among these structures, different outcomes on caregiver health will occur due to the varied interactions in individual caregiving situations. These outcomes create the content of knowledge, and the caregivers' interpretation of their own health, which reflects the objective reality of the relationships among the variables. In this study, the researcher's goal is to find the truth about reality

through mind-dependent data, as well as the caregivers' interpretations measured by various tools and analyzed by statistical methods.

In conclusion, critical realism posits that there is an objective, ontological reality both in science and in the human world. The reality of this dissertation study is the relationships among the variables under study, which will be revealed by participants' interpretations. Critical realism is reflected in the whole research plan which is described below.

Purpose Statement

The purpose of this study is to identify predictors of health in adult child caregivers of parent stroke survivors in the Zhejiang province of modern mainland China.

Research Questions

Six research questions about adult child caregivers of parent stroke survivors in the Zhejiang province of mainland China were explored:

1. What is the association between mutuality, filial piety, perceived social support, and caregiver depression after adjusting for age and gender?
2. To what extent do mutuality, filial piety, and perceived social support, after adjusting for caregivers' number of diseases and care receivers' functional impairment, predict age- and gender-adjusted caregiver depression?
3. What is the association between mutuality, filial piety, perceived social support, and caregiver physical health after adjusting for age and gender?
4. To what extent do mutuality, filial piety, and perceived social support, after adjusting for caregivers' type of employment, number of diseases, and care receivers' functional impairment, predict age- and gender-adjusted caregiver physical health?

5. What is the association between mutuality, filial piety, perceived social support, and caregiver mental health after adjusting for age and gender?

6. To what extent do mutuality, filial piety, and perceived social support, after adjusting for caregivers' monthly income and care receivers' functional impairment, predict age- and gender-adjusted caregiver mental health?

Methods

Sampling

Non-proportional quota sampling strategy (Morrow et al., 2007; Sarkar & Liang, 2010) was used for this study. According to the number of respondents calculated below, a minimum of 124 adult child caregivers of parent stroke survivors was required to make up the sample. Five of the 11 districts in Zhejiang province, China, were selected by simple randomization as the areas for data collection.

Hospitals were identified from the regional hospital list in the government web pages. A convenience sample from tertiary, secondary, and primary hospital was selected respectively in each district. The stroke units of the hospitals were the recruitment sites for participants. Approximately eight caregiver respondents were recruited from each level of the hospitals, totaling 25 respondents from each district. All eligible respondents willing to participate in the study were included in this investigation until the expected number of respondents in each district was met. A total of 42 respondents from 15 primary hospitals, 41 respondents from 10 secondary hospitals, and 43 respondents from 14 tertiary hospitals were recruited.

The total number of the study participants was calculated by two different methods. The first method was using rule of thumb by Green (1991) to determine regression

sample size: Green (1991) suggested $N > 50 + 8m$ (m is the number of independent variables). With 10 predictors, including four main variables (mutuality, filial attitude, filial behavior, and perceived social support) and six covariates (age, gender, monthly income, type of employment, number of diseases of the caregiver, and activities of daily living of the care receiver), the sample size was calculated to be 130.

The second method for determining sample size was consultation with an expert statistician. For a type III F test of four predictors adjusting for the other six covariates (excluding the intercepts) in a regression model with a significance level of .05, assuming a conditional model with fixed predictors and a R^2 of .3 in the full model, a sample size of 124 was required to obtain a power of at least .8 to detect R^2 difference of .1. Actual power was .803. In this calculation, the R^2 of .3 was based on the average of the relationships among the variables under study (Chen et al., 2010; Huang et al., 2009; Khalaila & Litwin, 2011; Shyu et al., 2010).

The inclusion criteria for this study were (a) being an adult child caregiver ≥ 18 years old, (b) who considers him/herself as the primary caregiver of his/her parent or parent-in-law stroke survivor, (c) who has been providing care at home for at least one month post discharge of his/her care receiver, (d) who meets other criteria but currently is providing care at the hospital due to repeated stroke incidents of his/her care receiver, (e) is able to read or speak Chinese, and (f) is willing to participate in this study.

Excluded were family members without direct caregiving tasks or adult child caregivers who were currently receiving psychological consultation for relief of stress.

Protection of Human Subjects

The study was approved by the Loma Linda University Institutional Review Board Human Subjects Committee (IRBHSC) prior to data collection. Permission to access the stroke units or community residential boards was obtained from the directors or head nurses of the units or the residential boards through disclosure of the research and the investigator based on the conversation script. A flyer was developed for the recruitment of respondents, which included information on the purpose of the study, recruitment criteria, minimal risk, a brief overview of the procedure, protection of privacy, gratuity, and the researcher's contact number. Flyers were kept in the stroke units or residential boards accessible to respondents and convenient for referrals. After referral by the medical staff at each site, the potential respondent was contacted by the investigator to confirm his/her eligibility for this study. The research purposes and procedures were then explained to the respondent, and his/her questions concerning to the research were answered by the investigator. When the caregiver indicated his/her willingness to participate in the study by verbal agreement, an appointment at a mutually agreed upon time and location for the interview was arranged. Most frequently, it was at the respondent's home or the stroke unit.

At the interview session, the researcher repeated the explanation of the purpose, the procedures, and the minimal risks of the study to the caregiver in detail. Again, any questions regarding the research were clarified. Verbal consent was obtained before the questionnaires were delivered to the caregiver. The respondent was assured of his/her freedom to decline during the process if they so desired.

The survey was anonymous. However, the survey form for each respondent was labeled with a number while his/her name was kept in the researcher's notebook. The respondent was reassured of his/her autonomy and safety while completing the questionnaires. After completion of the survey, questionnaires were stored in the researcher's locked office, accessible only to the researcher. After data entry, data were stored in an encrypted file in the researcher's personal computer. Identifiers (list of names) and the hard copies of questionnaires will be destroyed immediately after completion of the study. However, data will be kept for 3 years after completion of the study.

Minimal risk to the caregiver respondents was anticipated, except for the caregivers' devotion of about 30 minutes to complete the questionnaires. The researcher was sensitive to caregivers' signs of reluctance or fatigue while collecting data. A potential benefit of participation was that the interview might have provided an opportunity for the investigator to share the respondent's caregiving experience, which may be slightly therapeutic. Moreover, the information that he/she provided might potentially benefit him/her as the adult child caregiver in the future, since study findings might serve as evidence for a policy regulation on family caregiving. Finally, on completion of the questionnaires, a 10-Yuan RMB or a small gift of equal value was given as a gratuity with warm verbal appreciation for his/her participation in the study.

Procedure

The investigator met with the director or the head nurse of the stroke unit in each hospital and talked with him/her according to the conversation script. The purposes of the dissertation study were explained and the flyer distributed. When verbal permission

to access the stroke unit was obtained, the director or head nurse assigned a member of the unit medical staff to help refer the respondents to the researcher. Flyers were also left on the units for easy access by the respondents.

In the face-to-face interview sessions, a detailed description of the purpose and procedures were again explained to the caregiver by the investigator. Caregivers were asked whether they had any mental consultation appointments for stress relief before; those who answered in the affirmative were excluded. Verbal consent from the eligible respondent was further confirmed. The questionnaire packet was given to the caregiver with instructions on how to complete the forms. The caregiver was asked to fill in the questionnaires in a quiet place by her/himself, and the researcher assisted by reading the questions to the caregiver if there were any difficulties in completing the questionnaires. The survey was returned to the researcher upon completion.

Measures of Concepts

All concepts/variables and measures are listed in Table 1 (p. 72), and all survey forms are included in Appendix C on page 195-211.

Table 1

Concepts/Variables and Measures

Variables	Measures	Descriptions	Language
Demographics and caregiving characteristics	Demographics and caregiving characteristics	Caregiver age, gender, marriage, education, family role, type of employment, monthly income, number of diseases Living arrangement, duration of care, hours of care each day, number of co-carers Care receiver age, gender, times of stroke attacks, duration after the stroke attack, duration after discharge, type of medical payment	Chinese
Caregiving demands Care receivers' functional impairment	Activities of Daily Living (ADLs)	14 items, alpha = .91 ^E , .95 ^C	English, Chinese
Caregiving resources Mutuality	Mutuality Scale (MS)	15 items, alpha = .91 ^E , .94 ^C	English, Chinese
Perceived social support	Multidimensional Scale of Perceived Social Support (MSPSS)	12 items, alpha = .88 ^E , .89 ^C	English, Chinese
Filial piety	Filial Attitude Scale (FAS)	4 items, alpha = .80 ^C	Chinese
	Filial Behavior Scale (FBS)	9 items*, Factor alpha = .70 - .79, 75% variance explained by 3 factors	Chinese
Caregiver outcomes Physical and mental health	SF-12v2	12 items, alpha = .83 ^C 6 items, alpha = .89 ^E , .82 ^C (PCS) 6 items, alpha = .86 ^E , .80 ^C (MCS)	English, Chinese
Depression	Center for Epidemiological Studies Depression Scale (CES-D)	10 items, alpha = .78 ^E , .79 ^C	English, Chinese

Note: *Alpha not-applicable; ^C = Chinese; ^E = English.

PCS = physical component summary (physical health); MCS = mental component summary (mental health).

Mutuality

The mutuality scale (Archbold et al., 1990) is a 15-item subscale from the Family Care Inventory (Archbold & Stewart, 1986) with four dimensions: (a) love and affection, (b) reciprocity, (c) sharing pleasant activities, and (d) shared values. It was originally developed using qualitative data from family caregiving dyads of non-Hispanic White older adults (Archbold et al., 1990). Each item is rated on a 5-point Likert scale ranging from 0 (*not at all*) to 4 (*a great deal*). Examples are “how attached are you to him or her?” and “to what extent do you enjoy the time the two of you spend together?” The mutuality scale is scored by calculating the mean across all items. The 6-month and 9-month Cronbach’s α were .91 respectively with a correlation (r) .79.

The scale has been used in numerous studies with reports on its validity and reliability. It was validated with 106 primary family caregivers of relatives with cancer in Australia. Two factors, devotion and reciprocity, were extracted with Cronbach’s α .83 and .93 respectively (Hudson & Hayman-White, 2006). A 9-item bilingual mutuality scale was derived among Mexican American caregivers of elderly relatives (Crist et al., 2008; Kao et al., 2013; Kao & An, 2012), with two factors identified as interaction between the caregiving dyad and reaction from the care recipient. Cronbach’s α for each scale was .87, test-retest reliability estimates through intraclass correlation (ICC) (r) across a 3-week interval were .93 and .94, respectively.

The Chinese version of Archbold et al.’s mutuality scale (Yang et al., 2013) was used in this study. The Chinese version of the mutuality scale has also been validated on caregivers of aging people with dementia in Taiwan (Shyu et al., 2010; Yang et al., 2013). Shyu et al. reported a Cronbach’s α of .94 for the 15-item mutuality scale. Details

about the psychometric test among Taiwanese caregivers of victims of dementia were confirmed by Yang et al. (2013) with a test-retest (r) .72 ($p < .01$) across a 10-month interval and a Cronbach's α .94. Criteria related validity was detected with role strain ($r = -.36$) ($p < .01$) and with CES-D ($r = -.23$) ($p < .01$). A model with three factors of shared happiness, reciprocity, and shared values had satisfactory construct validity. Thus, this Chinese version of the scale is applicable to the target population in this study.

Filial Piety

Filial attitude. A 4-item filial piety attitude scale from Xu's (2012) study was used in this study. The 7-point Likert scale ($1 = strongly\ agree$, $7 = strongly\ disagree$) of filial piety attitude, which was used in a large sample in the 2008 China General Social Survey conducted by Renmin University of China and Hong Kong University (Xu, 2012), asks questions such as "one should be appreciative of one's parents' loving kindness," "one should treat one's parents kindly regardless of how she/he has been treated," "one should provide for one's parents well," and "one should honor one's parents and make them proud." Cronbach's α of this scale was .80 (Xu, 2012). The scale is scored by calculating the mean of all item scores.

Filial behavior. A 9-item Filial Behavior Scale (Cheng & Chan, 2006) was used in this study. Among the nine items of Filial Behavior Scale, six were adapted from the Filial Obligation Scale (Gallois et al., 1996), which was developed as a universal obligation of filial piety toward the elders across cultures. These items include to "look after," "assist financially," "respect," "listen patiently," "please and make happy," and "retain contact with" one's parents. Each item is rated on a 5-point Likert scale ranging from 1 (*never*) to 5 (*almost always*). The scores of the six items are added together and

calculated for its mean. This scale has been widely used in 1,445 young people in eight countries around the Pacific Rim, in two groups of family members with mean ages of 46.9 and 16.9 years old among New Zealand Chinese immigrants (Liu et al., 2000), and in urban adult residents in mainland China with Cronbach's α .92 (Cheung & Kwan, 2009).

The other three items, including "taking the parent to the doctor when ill," "providing personal care when ill," and "listening to problems," were added with reference to the local situation and to the literature. The total nine items of filial behaviors were validated in a study of Hong Kong elders (Cheng & Chan, 2006). The items were rated at a 5-point Likert scale ranging from 1 (*never*) to 5 (*almost always*). The scale is calculated by averaging the scores of the items. It was indicated that about 75% of the variance in a factor analysis with oblique rotation could be accounted for by three moderately correlated factors such as daily maintenance, respect, and sickness care with Cronbach's α of .70, .79, and .91 respectively. The higher the score, the more frequent the filial behaviors the adult child has.

The 9-item Filial Behavior Scale described above was used at the start of this study and had a modest Cronbach's α of .75. Further exploration by examining the item-to-total correlation indicated that the item "being obedient to parent in important matters" had a poor r of .07. Thus, this item was deleted and a Cronbach's α of .78 was achieved with the remaining eight items. In spite of minimal improvement, the item-to-total correlations of all the other eight items were generally satisfactory. Thus, the 8-item filial behavior scale was adopted for analysis of the final results.

Perceived Social Support

The 12-item Multidimensional Scale of Perceived Social Support (MSPSS), with three factors of family support, friend support, and support from significant others, was originally developed on university students of the U.S. to assess subjective social support (Zimet et al., 1988). It asks the respondents to assess their degree of agreement on the statements using a 7-point response format with 1 (*very strongly disagree*) to 7 (*very strongly agree*). There are four items for each subscale. The scale score is calculated by summing the total item scores, which range from 12 to 84. Examples of scale items include statements like “I get the emotional help and support I need from my family” and “I can count on my friends when things go wrong.” The higher the score, the more social support was perceived.

The MSPSS was reported to have a Cronbach’s α of .88 for the total scale and .81, .85, .91 for each subscale of family, friends, and significant others. Test-retest reliability was .85 for the total scale, and .72 to .85 for the subscales. Construct validity was demonstrated through its negative relationships with depression and anxiety (Zimet et al., 1988). It was later validated in a wide range of samples, including university students (Zimet, Powell, Farley, Werkman, & Berkoff, 1990; Dahlem, Zimet, & Walker, 1991), college adolescents (Canty-Mitchell & Zimet, 2000), adolescent psychiatric patients (Kazarian & McCabe, 1991), and older adults (Stanley, Beck, & Zebb, 1998) with satisfactory psychometric properties.

The Chinese version of the 12-item Multidimensional Scale of Perceived Social Support (MSPSS-C), (Chou, 2000), was used to measure perceived social support (PSS) in this study. Chou (2000) used a translation and back-translation process and tested in a

sample of Chinese adolescents. Two factors of friends support and family support were derived by exploratory factor analysis, which demonstrated excellent Cronbach's α .89 for the total scale and .94 and .86 respectively for each subscale. Construct validity was confirmed by its negative relationships with depression and anxiety, also by its positive relationship with the Lubben Social Network Scale (Lubben, 1988). Chou (2000) explained that because the significant others of adolescents were more likely to be their peers, items related to support from friends and significant others were highly associated.

This scale is commonly used in both Hong Kong and mainland China. In Hong Kong it was tested on new immigrants from mainland China (Wong, Chou, & Chow, 2012). It was also used in samples of university students (Luo, 2012), stroke caregivers (Han et al., 2011), and type II diabetes patients in the community (Yang, Li, & Zheng, 2009) in mainland China. The scale was pilot tested in the latter two studies with the Cronbach's α of the total scale ranging from .92 to .88. All studies analyzed perceived social support with the original three factors as support from family, friends, and significant others. Thus, the three factors were also used for analysis in this study.

Physical and Mental Health

The Second Version of the 12-item Health Survey (SF-12v2, 4-week recall) (Ware, Turner-Bowker, Kosinski, & Gandek, 2002) is a shortened form of the SF-36 (Ware & Sherbourne, 1992) which was derived from a sample of the U.S. general population. In order to improve the usefulness of the SF-36, an abbreviated version with 12 items was first selected by multiple regression to explain the largest proportion of the total variance in the SF-36 physical component summary (PCS) and mental component summary (MCS) scores (Ware, Kosinski, & Keller, 1996). As the SF-36 was later revised to

improve the layout, clarify language, and differentiate the response options, it was re-named SF-36v2. Accordingly, SF-12 was then adapted to include the corresponding changes and became the Standard SF-12v2 (Ware et al., 1996; Ware et al., 2002). The SF-12v2 is also composed of two summary scores: PCS, which addresses physical functioning, role-physical, bodily pain, and general aspects, and MCS, which includes vitality, social functioning, role-emotional, and mental health aspects.

A sample question of this scale is “how much of the time during the past four weeks have you had any of the following problems with your work or other regular daily activities as a result of your physical health?” (a) accomplished less than you would like, (b) were limited in the kind of work or other activities. Items are rated at a 5-point Likert scale ranging from 1 (*all of the time*) to 5 (*none of the time*). The PCS and MCS of SF-12v2 were calculated by summation of the scale scores with the weights of the principal component factor coefficients derived from factor analysis. Cronbach’s α for PCS was .89 and .86 for MCS (Ware et al., 1996; Ware et al., 2002). SF scoring software V4.5 is now available in QualityMetric Incorporated (QualityMetric, 2014) to minimize scoring errors. The PCS and MCS scores range from 0-100, with the higher score indicating better perceived physical and mental health.

The Chinese Version of the Standard SF-12 was tested as valid and equivalent in a Chinese population (Lam, Eileen, & Gandek, 2005). It explained 82% and 89% of the variance of the SF-36 PCS and MCS scores, respectively. Effect size differences between the standard SF-36 and SF-12 scores were less than .3. The Chinese Version of the Standard SF-12v2 has been applied to different samples. Li, Liu, Liu, Ren, and Gao (2010) used it to measure physical and mental health in a general population sample of

1,365 people in urban Chengdu of mainland China. It was found that the population mean physical component summary (PCS) score of 51.2 ($SD = 6.6$) and the mean mental component summary (MCS) score of 49.9 ($SD = 7.7$) were similar to the means of both Hong Kong and Australia but closer to those of Hong Kong. It was further validated by Ashing, Lam, and Xie (2013) in 74 Chinese American survivors of breast cancer. Cronbach's α at baseline and follow-up were .82, .81 for the PCS, and .80, .79 for the MCS. Additionally, Zhao, Wu, and Xu (2013) reported that the Cronbach's α of the total scale was .83 in a sample of 2,080 Wenchuan earthquake survivors in mainland China. Thus, the Chinese Version of the Standard SF-12v2 was selected to use in this study.

Depression

The 10-item Center for Epidemiological Studies Depression Scale (CES-D 10) was developed by Andresen et al. (1994) on the basis of Radloff's (1977) 20-item CES-D scale. The CES-D 10 showed good predictive accuracy when compared with Radloff's 20-item version (Andresen et al., 1994). It is a self-reported scale applied to identify individuals at risk for depression in the general population. Respondents are assessed for the frequency of depressive symptoms in the past week to tap depressed affect, positive affect, and somatic complaints. Examples of the items are "I had trouble keeping my mind on what I was doing" and "I feel hopeful about the future." The 4-point response format with 0 (*rarely or none of the time*) and 3 (*most of the time or all of the time*) had good specificity and sensitivity (Cheng & Chan, 2005). The scale score was calculated by adding each score of the 10 items, which ranges from 0 to 30. A score of 10 or greater is considered indicative of the presence of clinical depression (Andresen et al., 1994).

The Chinese version of CES-D 10 was validated by Boey (1999) in a large sample of community elders over 70 years old in Hong Kong. It had good convergent validity. The Cronbach's α was satisfactory, with .78 and .79 respectively at baseline and the follow-up. Moderate consistency was demonstrated as the test-retest reliability (r) was .44 ($p < .01$) over 3 years (Boey, 1999). Cheng and Chan (2005) further validated the CES-D 10 in a group of 474 elders aged over 60 years old in Hong Kong.

By using the threshold of 10, the 10-item Center for Epidemiological Studies Depression Scale (CES-D 10) has been applied to measure depression in stroke caregivers in mainland China (Qiu & Li, 2008; Han et al., 2011). Cronbach's α of .79 was reported by Han et al. (2011). Its applicability in a population of middle aged women (45-50 years old) was also confirmed by Brown, Ford, Burton, Marshall, and Dobson (2005) in Australia. Scale validation was reported by Miller, Anton, and Twonson (2008) in younger individuals with traumatic spinal cord injury in Canada. The mean age of the respondents was 40.6 ($SD = 12.6$) years old, Cronbach's α was .86, and test-retest reliability intraclass correlation (ICC) was .85. Thus, this scale with a threshold of 10 was applicable to the target population of this study.

Activities of Daily Living

The 14-item Activities of Daily Living Scale (ADLs) was originally developed by Lawton and Brody (1969), which includes 6-item basic ADLs (BADLs) and 8-item instrumental ADLs (IADLs). The BADLs measure physical self-maintenance activities such as dressing, bathing, toileting, eating, grooming, and general movement. The IADLs include activities such as using the phone, doing housekeeping, taking the bus, preparing meals, shopping, doing laundry, taking medication, and handling personal

finances. Reliability agreement in ratings for pairs of licensed practical nurses was .87, and for two research associates was .91. Respondents are asked to report how difficult they find these activities. Example of the question is “are you having difficulty cooking?” Each item is rated on a 4-point scale with 1 (*without difficulty*) to 4 (*unable to perform*). This scale can be used either as a whole as ADLs or separately as BADLs and IADLs. The sum score ranges from 14-56, or respectively 6 to 24 for BADLs and 8 to 32 for IADLs. Thus, the higher scores indicate more impairment in daily functions.

The Chinese version of the 14-item ADL scale (ADL-C) (He, 1990) was translated and revised based on the ADLs scale developed by Lawton and Brody (1969). The ADL-C demonstrated good reliability and validity when it was validated in a study with 5,055 community-dwelling elders (He, 1990). Test-retest reliability was .50, and convergent validity was indicated by the association between the score of ADL-C and the Mini Mental State Exam ($r = .45, p < .01$). This scale was used in 96 Chinese caregivers of Alzheimer’s disease patients in mainland China with Cronbach’s α .95 (Liu, 2010). Thus, this 14-item ADL-C as one single scale was used to measure the function impairment of the care receivers in this study.

Demographics and Caregiving Characteristics

Along with the measures of the main concepts listed above, a demographic profile of both the caregiver and care receiver, and caregiving characteristics was obtained using a questionnaire constructed for the study. The collected data included information about gender, age, marriage, education, family role, monthly income, type of employment, and number of diseases of the caregiver, and the gender, age, number of stroke attacks, months from last attack, months from discharge, type of medical payment, and activities

of daily living of the care receiver. The questionnaire included items about the caregiving characteristics, which included living arrangement, hours of care each day, duration of caregiving, and number of co-carers. Data on the care receiver were reported by the caregiver.

Analysis Plan

Based on the research questions, bivariate correlation analysis, *t*-test analysis, *ANOVA*, and multiple linear regression analysis were used to analyze the data. First, according to the type of data, a bivariate correlation test, *t*-test, or *ANOVA* was used to explore whether there are correlations between the influencing factors (gender, age, education, monthly income, type of employment, hours of care each day, number of diseases of the caregiver, activities of daily living of the care receiver) and the dependent variables. Those influencing factors which had significant correlations with the dependent variables were selected to be controlled in the regression models. Second, a multiple linear regression analysis was applied separately to test the association between the independent variables (mutuality, filial piety, and perceived social support) and caregiver depression, physical and mental health, adjusting for caregiver age and gender, and then adjusting for other covariates as indicated.

Data Preparation and Management Plan

SPSS 17.0 was used for data analysis. Data were checked for errors and missing data before data entry. No missing data were found. An electric data file and codebook were created as a data dictionary to include miscellaneous data such as identification, variables, and so on. In order to meet the assumptions of the statistical method, depression scores in gender groups were not normally distributed so square root

transformations were conducted, and the transformed depression scores were renamed and stored. For bivariate correlation analysis, normality, homogeneity of variance, and linearity of the variables were checked to meet the assumptions. For *t*-test analysis, assumptions of normality and equal variances were explored ahead of the analysis. For regression test, normality, multi-collinearity, homoscedasticity, and linearity were screened. Nominal data (type of employment) were dummy coded before analysis was run. After the data were entered, they were entered a second time by another research assistant to assure data accuracy. The data were reviewed before processing.

Descriptive Analysis Plan

Descriptive categorical data, such as caregiver gender, marriage, family role, education, monthly income, living arrangement, and type of employment, were processed by frequency (number and percentage) and presented by tables. For numerical data of the key variables (filial piety, mutuality, perceived social support, depression, physical and mental health scores, age, and hours of care each day), means and *SDs* are presented as they were normally distributed. Otherwise, for number of diseases, duration of caregiving, number of stroke attacks, months from last attack, months from discharge, and number of co-carers, median, and range were presented.

Inferential Analysis Plan

For bivariate correlation analysis between interval data (age, hours of care each day, number of diseases, activities of daily living, mutuality, filial attitude, filial behavior, perceived social support) or ordinal data (monthly income, education) with dependent variables at interval level, Pearson's *r* or Spearman's *r* and *p* value were presented. For *t*-test between dichotomous data (gender) and an interval dependent variable, or *ANOVA*

between the nominal data (employment type) and the dependent variable, means and *SDs*, 95% confidence interval (CI) of mean difference, and *p* value were presented. Otherwise, median, range, inter-quartile range, and *p* value were presented if non-parametric tests were applied. Multiple linear regression was used to explore the predictors of caregiver depression and physical and mental health, including mutuality, filial piety, perceived social support, gender, age, education, monthly income, type of employment, hours of care each day, number of diseases of the caregiver, and activities of daily living of the care receiver. R^2 change and *p* values were indicators for significance of the models. *B*, β , and *SE* were presented in a table format.

Summary

In this chapter, the details of how this study was conducted are presented. Research design, sampling method, measurements, procedures, and analyses are all explicated. Assumptions relevant to this study are explained. Despite the limitation that a cross sectional design has when inferring causality, with this quota sampling strategy and strict compliance to the research plan, the rigor of the study has been maximized (Figure 2 Caregiver resources and caregiver health model).

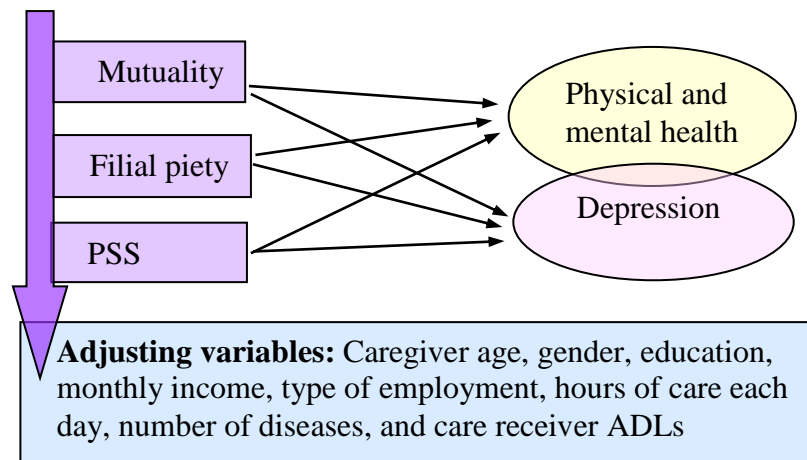


Figure 2. Caregiver resources (mutuality, filial piety, perceived social support) and caregiver health model.

Note: PSS = perceived social support; ADLs = activities of daily living

CHAPTER FOUR

FINDINGS

Introduction

The purpose of this study is to identify predictors (mutuality, filial piety, perceived social support) of the health of adult child caregivers caring for parent stroke survivors. Data collection was conducted from the end of October, 2013 to early February, 2014. Data were entered and analyzed using Statistical Package for Social Science, version 17 (SPSS 17). Mainly, bivariate correlation and univariate regression analyses were completed. The findings are presented according to the following aspects: (a) setting and sample, (b) reliability of the measures, (c) descriptive data analysis of the variables under study, (d) findings addressing the research questions, and (e) summary.

Setting and Sample

Setting

Adult child caregivers of parent stroke survivors were recruited from five randomly selected cities of Zhejiang province, mainland China. These cities with unique characteristics are located respectively in the northeast, southeast, middle, and northern part of Zhejiang province, an area which with a total population of 54.8 million and an east-west or north-south linear distance of 450 kilometers (see Map in Appendix A: Map of data collection sites), (China Connection, 1987). For example, Hangzhou is the capital city of the province with a population of 8.8 million; Ningbo is a coastal city with a population of 7.6 million; Jiaxing has a population of 4.5 million neighboring the metropolitan city of Shanghai; Jinhua is in the middle of the province with a population of 5.4 million; and finally, Lishui in the mountain area has a population of 2.1 million

(The People's Government of Zhejiang Province, Statistics Bureau, 2013). Twenty two to 30 respondents were conveniently recruited in each city through referrals from medical staff in the selected hospitals. Respondents were either recruited and interviewed in the hospital settings (in-patient units) of 14 tertiary and 10 secondary hospitals, or recruited from 15 primary hospitals (community health service centers) and interviewed at the respondents' home settings.

Sample

The sample consisted of 126 adult child caregivers of parent stroke survivors who agreed to participate in this study. Demographic characteristics of these caregivers are presented in Table 2. The mean age of the caregivers was 50.40 ($SD = 9.42$) years old with a range of 24 to 80 years old. About 51.6 % of caregivers ($n = 65$) were in the range of 50 to 60 years old with three ties at 50, 51, and 60 years old ($f = 10 - 12$). The majority of caregivers were married ($n = 112, 88.9\%$), females ($n = 88, 69.8\%$), daughters ($n = 77, 61.1\%$) with a junior middle school education ($n = 56, 44.4\%$), and a monthly income of 2001 to 4000 Yuan ($n = 64, 50.8\%$). The two most frequent employment categories were retired ($n = 41, 32.5\%$) and full time employment ($n = 40, 31.7\%$).

Caregiving characteristics are also presented in Table 2. Almost half of the respondents were living with their parents. The median period of caregiving duration was 36.0 months, with high frequencies at 2 months ($n = 16, 12.7\%$), 12 months ($n = 10, 7.9\%$), and 120 months ($n = 9, 7.1\%$). The mean number of caregiving hours each day was 13.83 ($SD = 8.62$), with high frequencies at 24 hours ($n = 43, 34.1\%$), 2 hours ($n = 17, 13.5\%$), and 16 hours ($n = 13, 10.3\%$).

Table 2

Demographics of Adult Child Caregivers and Caregiving Characteristics (N = 126)

	Range	<i>Mdn</i>	<i>M</i>	<i>SD</i>	<i>n (%)</i>
Age	24 - 80		50.40	9.42	
Gender					
Female					88 (69.8)
Male					38 (30.2)
Marriage					
Married					112 (88.9)
Divorced					9 (7.1)
Widowed					1 (0.8)
Single					4 (3.2)
Education					
Elementary and below					23 (18.3)
Junior middle school					56 (44.4)
Senior middle school					27 (21.4)
College and above					20 (15.9)
Employment					
Not employed					21 (16.7)
Part time job					24 (19.0)
Full time job					40 (31.7)
Retired					41 (32.5)
Monthly income					
< 2000					44 (34.9)
2001-4000					64 (50.8)
4001-6000					14 (11.1)
> 6000					4 (3.2)
Relationship					
Son					37 (29.4)
Daughter					77 (61.1)
Son-in-Law					2 (1.6)
Daughter-in-Law					10 (7.9)
Co-residence					
Yes					62(49.2)
No					64(50.8)

Table 2 (*Continued*)*Demographics of Adult Child Caregivers and Caregiving Characteristics (N = 126)*

	Range	<i>Mdn</i>	<i>M</i>	<i>SD</i>	<i>n (%)</i>
Duration of care (months)	2 - 240	36			
Hours of care each day			13.83	8.62	
Having co-carer or not					
Yes					107 (84.9)
No					19 (15.1)
Number of people helping	0 - 5	1			
Caregiver's spouse					12 (9.5)
Sibling	0 - 5	1			80 (63.5)
Helper					14 (11.1)
The other parent					13 (10.3)
Self-rated health					
Healthy					96 (76.2)
Not healthy					30 (23.8)
Number of diseases	0 - 5	0			

Most adult child caregivers ($n = 107$, 84.9%) had other people sharing their caregiving responsibility. Among all caregivers, 80 (63.5%) had sibling support (mostly one sibling, $n = 37$, 46.3%). Most caregivers ($n = 96$, 90.5%) did not report any diseases. Fifty four percent ($n = 68$) of caregivers were interviewed in a hospital setting and 46% ($n = 58$) in a home setting.

Demographic characteristics of the parent stroke survivors are listed in Table 3. Male and female stroke survivors were almost evenly distributed, with a mean age of 79.11 ($SD = 9.89$). The majority ($n = 59$, 46.8%) had survived two stroke attacks. The duration from most recent stroke occurrence ranged from about ten days to twenty years. Approximately one half of the stroke survivors were still hospitalized but the other half had been discharged. Most of the stroke survivors (95.2%) did not need to pay or only had to partially pay for their health care because they were covered by health insurance or pensions.

Table 3

Demographics of Parent Stroke Survivors (N = 126)

	Range	<i>Mdn</i>	<i>M</i>	<i>SD</i>	<i>n (%)</i>
Age	47 - 98		79.11	9.89	
Gender					
Male					65 (51.6)
Female					61 (48.4)
Number of stroke attacks	1 - 6	2			
Months from last attack	0.3 - 240	5			
Current status					
Hospitalized					67 (53.2)
Discharged					59 (46.8)
Months from discharge	0 - 239	0			
Types of payment					
No need to pay					9 (7.1)
Need to pay partially					111 (88.1)
Need to pay fully					6 (4.8)

Reliability of the Measures

This study aimed to explore the associations of mutuality, filial piety (filial attitude and filial behavior), and perceived social support with depression, physical health, and mental health of the adult child caregivers. Influencing factors of age, gender, education, monthly income, type of employment, hours of care each day, number of diseases of the caregiver, and functional impairment of the care receiver were controlled accordingly. The tools used in the study included (a) Mutuality Scale (MS); (b) Filial Attitude Scale (FAS); (c) Filial Behavior Scale (FBS); (d) Multidimensional Scale of Perceived Social Support (MSPSS); (e) Center for Epidemiological Studies Depression Scale (CES-D 10); (f) Activities of Daily Living (ADLs); and (g) Second Version of the Standard 12-item Health Survey (SF-12v2). Reliability of the measures are presented in Table 4. Each of these measures has corresponding Chinese version which has been used in Chinese samples with acceptable reliability and validity. Therefore, in this study they were only tested for reliability.

Cronbach's α of most of the tools met the criteria of above .80 for the whole scale and .70 for the subscale. The 9-item Filial Behavior Scale was adjusted to an 8-item scale with a modest Cronbach's α of .78. Physical component summary (PCS) and mental component summary (MCS) of the SF-12v2 are taken as subscales, therefore, Cronbach's α of .77 (PCS) or .75 (MCS) was considered acceptable.

Table 4

Reliability of the Measures

Scale name	Number of items	Cronbach's α
Mutuality	15	0.91
Filial attitude	4	0.82
Filial behavior	8	0.78
MSPSS	12	0.92
CES-D 10	10	0.82
SF-12v2 (PCS)	6	0.77
SF-12v2 (MCS)	6	0.75
ADLs	14	0.97

Note: MSPSS = Multidimensional Scale of Perceived Social Support; CES-D 10 = 10-item Center for Epidemiological Studies Depression Scale; SF-12v2 (PCS) = Physical Component Summary of the Second Version of Standard 12-item Health Survey; SF-12v2 (MCS) = Mental Component Summary of the Second Version of Standard 12-item Health Survey; ADLs = Activities of Daily Living.

Descriptive Data Analysis of the Study Variables

Using SPSS 17.0, data were checked for missing data or errors by double entry and running the frequency table for all variables under study. No missing data or errors were identified.

Characteristics of the Measures

The characteristics of the measures are described in two parts. The first part addresses the descriptive analysis of the measures such as ranges, means, and *SDs* of the items and scales (Table 5 and Appendix D: D1-D7). The second part explores the normality of the variables (Appendix B: Graph1-2) to further understand the characteristics of the variables and also to be prepared for inferential analysis.

Ranges, Means and SDs of the Items and Scales

The Mutuality Scale

As the item score of the 15-item Mutuality Scale ranges from 0 (*not at all*) to 4 (*a great deal*), the scale score is averaged by its item scores. The higher the scale score, the higher the quality of the relationship in the caregiving dyads. The actual scale score was between .6 and 4 ($M = 2.34$, $SD = .69$). Thus, it was observed that the level of mutuality in adult child-parent stroke survivor caregiving dyads was moderate but quite dispersed.

The item means and *SDs* of this scale (Appendix D: D1 Item Means and *SDs* of the Mutuality Scale) indicated that the caregiving dyads were very close to each other, as reflected by the highest means in items of closeness ($M = 3.16$, $SD = .74$) and love ($M = 3.25$, $SD = .76$). However, the lowest means and *SDs* were in items describing the expression of feelings of appreciation ($M = 1.98$, $SD = 1.02$), as well as the help ($M = 1.97$, $SD = 1.20$) and comfort ($M = 1.98$, $SD = 1.05$) provided by the parent stroke survivors. In these caregiving dyads, the stroke survivors were either aged and frail, or disabled and bedridden, so the adult child caregivers contributed more to the relationship than their parent care receivers.

The Filial Attitude Scale

As the item score of the 4-item Filial Attitude Scale ranges from 1 (*strongly agree*) to 7 (*strongly disagree*), and the scale score is calculated by the averaging of all item scores. The lower the score, the stronger the filial attitudes shown by the respondents. The actual scale score ranged from 1 to 4 ($M = 1.28$, $SD = .51$). The item means and *SDs* of this scale (Appendix D: D2 Item Means and *SDs* of the Filial Attitude Scale) were very close each other, with a range between 1.21 ($SD = .57$) and 1.38 ($SD = .73$). It was

indicated that the adult child caregivers had strong filial attitudes towards their parent stroke survivors.

The Filial Behavior Scale

The item score of the 8-item Filial Behavior Scale ranges from 1 (*never*) to 5 (*always*), and the scale score is the average of all the item scores. The higher the score, the more frequent the filial behaviors in the adult child caregivers. The actual score ranged from 3 to 5 ($M = 4.27$, $SD = .46$). And the item means and SD s of this scale (Appendix D: D3 Item Means and SD s of the Filial Behavior Scale) indicated that most of the item means were above 4.2. The two items “taking parent to the doctor” and “providing personal care when the parent is ill” had the highest scores, with a mean of 4.75 ($SD = .51$) and 4.73 ($SD = .53$), respectively. The item “giving financial assistance” had the lowest score, with a mean of 3.20 ($SD = 1.16$). Therefore, adult child caregivers demonstrated frequent filial behaviors toward their parent stroke survivors. However, the least frequent behavior, “providing financial assistance to parent,” may not be applicable in this group due to the improved economy and the development in health care coverage in urban residents.

The Multidimensional Scale of Perceived Social Support

The Multidimensional Scale of Perceived Social Support (MSPSS) uses its total item scores for its scale score. Each item score ranges from 1 (*very strongly disagree*) to 7 (*very strongly agree*). The possible total score of this scale is 12 to 84. The actual score ranged from 41 to 82 ($M = 58.10$, $SD = 8.41$), which indicated that the adult child caregivers perceived moderate amount of social support.

The item means and *SDs* of this scale (Appendix D: D4 Item Means and *SDs* of the Multidimensional Scale of Perceived Social Support) illustrated that overall adult child caregivers tended to select the choice of 4 (*neither agree nor disagree*) when rating their perceived social support. Eight item means were within the range of 4 to 5 (*slightly agree*), and only four item means and *SDs* were between 5 (*slightly agree*) and 6 (*agree*), which were all relevant to social support from family, with means between 5.55 (*SD* = .89) and 5.82 (*SD* = .88). Thus, this created the impression that adult child caregivers had relatively sufficient social support from their family but may not be equal to the support from friends or significant others.

The Center for Epidemiological Studies Depression Scale

Depression was measured by the 10-item Center for Epidemiological Studies Depression Scale, which assessed the frequencies of depressive symptoms in adult child caregivers in the past week. The item score ranges from 0 (*no or rarely*) to 3 (*most of the time or all of the time*). The scale score is calculated by totaling the item scores. The possible score of this scale is 0 to 30. The higher the score, the more frequent the depressive symptoms. The actual score ranged from 0 to 27 (*M* = 8.73, *SD* = 4.51), which indicated that the adult child caregivers sometimes had depressive symptoms. Forty-four percent of the respondents had a total score above 10.

The item means and *SDs* of this scale are listed in Appendix D: D5 (Item Means and *SDs* of the 10-item Clinical Epidemiological Scale of Depression). The two items “I felt hopeful about the future” and “I was happy” were reverse coded before analysis was conducted. Means of both items were 1.27 (*SD* = .83) and 1.48 (*SD* = .77) respectively, which showed that frequencies of these symptoms in adult child caregivers were mostly

between 1 (*sometimes*) to 2 (*most of the time*), indicating that adult child caregivers had relatively high frequencies of feeling positive. Means of other items were mostly between .49 ($SD = .63$) and .83 ($SD = .69$), which also showed that the adult child caregivers sometimes had these depressive symptoms. However, the item “my sleep was restless” had a mean of 1.09 ($SD = .92$), which revealed that sleep disturbance was the symptom most frequently reported by the caregivers. This may imply that this group of adult child caregivers had compromised night sleep due to caregiving.

The Second Version of Standard 12-item Health Survey

Physical and mental health were measured by the Second Version of the Standard 12-item Health Survey (SF-12v2). The two major subscales of physical component summary (PCS) and mental component summary (MCS) were used for analyses. The possible subscale score is 0 to 100, with the actual score ranging from 26 to 60 for the PCS ($M = 46.81$, $SD = 7.49$), and 25 to 59 for the MCS ($M = 45.00$, $SD = 7.76$). By looking at these raw means, and also by comparing them with the population norms of mainland Chinese ($M_{PCS} = 51.2$, $M_{MCS} = 49.9$) reported by Li et al. (2010), and (female $M_{PCS} = 52.51$, $M_{MCS} = 54.41$; male $M_{PCS} = 53.36$, $M_{MCS} = 54.45$) reported by Wang et al. (2008), it appeared that this group of adult child caregivers of parent stroke survivors had lower physical and mental health.

The subscale scores and SD s of SF-12v2 are listed in Appendix D: D6 (Subscale Scores and SD s of the Second Version of Standard 12-item Health Survey). Among the subscales, PCS includes physical fitness, general health, role physical, and body pain; and MCS includes vitality, social function, role emotion, and mental health, the mean and SD of physical fitness were the highest at 80.75 ($SD = 23.70$), and the lowest was that of

general health, at 39.33 ($SD = 22.68$). The second lowest was social function, with a mean of 43.45 ($SD = 28.84$). Other means were between 62.90 ($SD = 19.93$) and 69.94 ($SD = 20.63$). These numbers informed that adult child caregivers had poor general health and social function in particular, but relatively good physical fitness.

Activities of Daily Living

The item score of the activities of daily living ranges from 1 (*performed without difficulty*) to 4 (*unable to perform*), and the scale score is calculated for the total of the item scores. The possible scale score is 14 to 56. The higher the score, the more compromised the functions of the parent stroke survivors. The actual score ranged from 16 to 56 ($M = 45.57$, $SD = 12.28$) with item score mean of 3.3 ($SD = .9$). Generally, the parent stroke survivors were fairly impaired in their functional ability.

This scale (Appendix D: D7 Items and SD s of the Activities of Daily Living) also showed that the parent stroke survivors generally had impaired functional status because the means of nine items were above 3 (*performed with assistance*). The most compromised were those items in instrumental activities of daily living, such as shopping ($M = 3.78$, $SD = .59$); meal preparation ($M = 3.65$, $SD = .75$); laundry ($M = 3.66$, $SD = .78$); and housekeeping ($M = 3.63$, $SD = .84$). The least impaired functional ability was eating ($M = 2.77$, $SD = 1.24$). Overall, most of the parent stroke survivors needed a great deal of assistance from their adult child caregivers.

Table 5

Ranges, Means, SDs of the Measures of Mutuality, Filial Attitude, Filial Behavior, Perceived Social Support, Caregiver Depression, Physical Component Summary, and Mental Component Summary of SF-12v2 (N = 126)

	Range		<i>M</i>	<i>SD</i>	Item range
	Possible	Actual			
Mutuality	0 - 4	0.6 - 4	2.34.	0.69	0 - 4
Filial attitude	1 - 7	1 - 4	1.28	0.51	1 - 7
Filial behavior	1 - 5	3 - 5	4.27	0.46	1 - 5
Perceived social support	12 - 84	41 - 82	58.10	8.41	1 - 7
Depression	0 - 30	0 - 27	8.73	4.51	0 - 3
Physical component summary	0 - 100	26 - 60	46.81	7.49	N/A
Mental component summary	0 - 100	25 - 59	45.00	7.76	N/A
Activities of daily living	14 - 56	16 - 56	45.57	12.28	1 - 4

Note: N/A = not available.

Normality of the Study Variables

All the above variables were checked for normality. The decision of normality was made based on the overall impression from Kolmogorov - Smirnov Test (K - S test), a comparison of mean and median, histogram (see Graph 1 in Appendix B: Graphs of analysis), and box plot (Graph 2 in Appendix B: Graph of analysis). K - S test was applied to screen normality of the variables as it is a very sensitive test. A *p* value above .05 indicates that the variable in this sample is normally distributed; otherwise, normality is not achieved. Among all the K - S tests, it was found that mutuality was the only variable that was normally distributed (*p* = .20).

The method of mean and median comparison was also used to check for the normality of the variables. Among them, mutuality (*M* = 2.34, *Mdn* = 2.33), filial behavior (*M* = 4.27, *Mdn* = 4.25), perceived social support (*M* = 58.10, *Mdn* = 57.00), and mental component summary (*M* = 45.00, *Mdn* = 46.00) could be considered as normally

distributed because their means and medians were very close, while others such as filial attitude ($M = 1.28$, $Mdn = 1.00$), depression ($M = 8.74$, $Mdn = 9.00$), physical component summary ($M = 46.81$, $Mdn = 48.79$), and activities of daily living ($M = 45.57$, $Mdn = 50.00$) were assumed that normality was not achieved since the gap between their means and medians was relatively large.

A histogram of the variables was developed (Graph 1 in Appendix B: Graphs of analysis). As Graph 1 illustrated that the filial attitude and activities of daily living were severely skewed so normality was not assumed. Perceived social support and the mental component summary were slightly skewed, which would be decided later after their box plots were checked. The rest of the graphs showed that mutuality, filial behavior, depression, and the physical component summary achieved normality.

The box plots of the variables were finally checked as shown in Graph 2 in Appendix B: Graphs of analysis. It illustrated that the caregivers' filial attitude and the care receivers' activities of daily living (ADLs) were not normally distributed. Filial attitude not only had outliers but also was severely right skewed, and ADLs were quite severely left skewed. Neither was normality achieved by logarithmic and reciprocal transformations of filial attitude, nor was normality obtained by square transformation for ADLs. Both scores of depression and perceived social support had outliers which were within the range of three inter-quartiles from the upper or lower edges of the box; thus, normality can be assumed.

In all, after exploring the variables by K - S test, comparison of mean and median, histogram, and box plot, scores of filial attitude and activities of daily living were diagnosed as non-normally distributed. Non-parametric analysis methods relevant to

these variables would be resorted afterwards. Other variables of mutuality, filial behavior, perceived social support, depression, and physical and mental component summaries were assumed to have acceptable normality. Therefore, parametric analysis methods were chosen for these variables.

Findings Addressing the Research Questions

Exploration of Correlations between the Variables

Correlations between the Influencing Factors and Depression, Physical and Mental Health

Associations were first explored between influencing factors and dependent variables. Gender was analyzed for its association with caregiver depression by comparing the means of depression scores in the gender groups (Table 6). A K - S test ($p = .005$) and box-plot (one serious outlier) showed non-normal distribution of the depression score in the female group (Graph 3 in Appendix B: Graphs of Analysis). The raw depression scores had one zero score so all scores were added with one before square root transformation. After transformation, the histograms and box plots of the square rooted depression scores of the two groups all indicated acceptable normality (Graph 3 in Appendix B: Graphs of Analysis). Thus, an independent sample t - test was used for this analysis. A p value of .28 in Levene's test indicated that equal variances were assumed. Means were 8.12 ($SD = .78$) for male and 9.61 ($SD = .52$) for female respectively. The 95% confidence interval (CI) of the differences in the two means of depression was [- .29, .001]. $t = - 1.78$ ($p = .078$). There was no significant difference in the means of the depression scores of the two groups. This is interpreted as gender having no significant association with caregiver depression.

Table 6

Independent Sample t - Test of Depression, Physical Component Summary, and Mental Component Summary in Gender Groups (Female n = 88, Male n = 38)

	<i>M (SD)</i>	95% CI of mean difference		<i>p</i>
		<i>LL</i>	<i>UL</i>	
Depression				
Male	8.12 (0.78)	- 0.29	0.001	0.078 ^a
Female	9.61 (0.52)			
Physical component summary				
Male	50.35 (5.80)	2.59	7.53	0.00***
Female	45.29 (7.65)			
Mental component summary				
Male	45.37 (8.78)	- 2.45	3.53	0.72
Female	44.83 (7.32)			

Note: ^a = *p* value is based on square rooted depression scores.

P* < .05. *P* < .01. ****P* < .001.

CI = confidence interval; *LL* = lower limit; *UL* = upper limit.

Gender was then analyzed for its association with the physical component summary (PCS) in caregivers with the similar steps as described above (Table 6). Normality of PCS in the two gender groups was explored. The *p* value of K - S test of the PCS scores was .36 for the male group and .25 for the female group, which indicated normality. Histograms and box plots (Graph 3 in Appendix B: Graphs of Analysis) of both groups were also within the acceptable range of normality; thus, an independent sample *t* - test was adopted. Equal variances were not assumed as the *p* value of Levene's test was .006, then, the final result was taken based on the non-assumed equal variances. The mean was 50.35 (*SD* = 5.80) for males and 45.29 (*SD* = 7.65) for females. The 95% CI of the difference between the two means of PCS scores in genders was [2.59, 7.53]. The *p* value for the independent sample *t* - test (*t* = 4.07) was .000, which revealed a significant difference in the means of PCS in the two groups. In other words, gender was significantly associated with caregiver physical health.

Likewise, gender was then analyzed for its association with the mental component summary (MCS) (Table 6). The p value of the K - S test for the male group was .114 and .20 for female group, and the histograms and box plot (Graph 3 in Appendix B: Graphs of Analysis) all indicated normality of the MCS scores in the two groups. Therefore, an independent sample t - test was used. The mean of MCS scores of the male group was 45.37 ($SD = 8.78$) and 44.83 ($SD = 7.32$) for the female group. Equality of variances was assumed as the p value of Levene's test was .103. The 95% CI of the mean difference of MCS scores of the two groups was [- 2.45, 3.53]. The p value of the independent sample t - test ($t = .36$) was .722, which indicated that there was no significant difference in the means of MCS scores between the two gender groups. Gender was not significantly associated with caregiver mental health.

Employment type was analyzed for its relationship with depression (Table 7). Normality was checked by K - S tests in the four employment type groups of not employed, part time job, full time job, and retired, with all p values of .200. Histograms and box plots (Graph 4 in Appendix B: Graphs of Analysis) were within acceptable ranges of normality. Levene's test ($p = .084$) indicated the homogeneity of variances was assumed. One-way analysis of variance ($ANOVA$) was used to run the test. Means and SDs of the four groups were listed in Table 7, which indicated no significant difference in the means of depression in the four employment groups. Therefore, employment type was not significantly associated with caregiver depression.

Table 7

ANOVA or Kruskal-Wallis Test of Depression, Physical Component Summary, and Mental Component Summary in Employment Type Groups (Not Employed $n = 21$, Part Time Job $n = 24$, Full Time Job $n = 40$, Retired $n = 41$, Total $N = 126$)

	<i>M (SD)</i>	95% CI of mean difference		<i>df</i>	<i>F</i>	χ^2	<i>p</i>
		<i>LL</i>	<i>UL</i>				
Depression				3, 122	0.76		0.52
Not employed	9.38 (6.24)	6.54	12.22				
Part time job	8.17 (4.44)	6.29	10.04				
Full time job	8.13 (3.28)	7.08	9.17				
Retired	9.34 (4.60)	7.89	10.79				
PCS ^a				3		14.45	0.002**
Not employed	47.31 (8.21)	43.57	51.05				
Part time job	50.62 (5.73)	48.20	53.04				
Full time job	48.04 (6.06)	46.10	50.00				
Retired	43.13 (7.91)	40.64	45.63				
MCS				3, 122	1.12		0.35
Not employed	42.90 (7.33)	39.55	46.23				
Part time job	44.58 (8.90)	40.82	48.34				
Full time job	46.59 (6.80)	44.41	48.76				
Retired	44.75 (8.09)	42.20	47.31				

Note: PCS = physical component summary; MCS = mental component summary;
CI = confidence interval; *LL* = lower limit; *UL* = upper limit.

^a = Kruskal-Wallis test.

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

The above steps were repeated to analyze the relationship between employment type and the mental component summary (MCS) (Table 7). Normality of the MCS in the four employment types was screened. The p values of K - S tests for all groups were .200 except for part time job (.047), histograms, and box plots (Graph 4 in Appendix B: Graphs of Analysis) gave a general idea of established normality. Levene's test of .338 indicated assumed equal variance. One-way ANOVA was used to run the test. Means and *SDs* of the four groups are shown in Table 7 with $F(3, 122) = 1.12$ and $p = .35$. Thus, no significant difference was identified in the means of MCS in the four employment groups, and employment type was not significantly associated with

caregiver mental health. This is congruent with the finding that employment type was not significantly associated with caregiver depression.

Employment type was also analyzed for its association with the physical component summary (PCS) (Table 7). Normality of PCS in the four employment groups was established by the K-S test each ($p > .05$). Histograms and box plots (Graph 4 in Appendix B: Graphs of Analysis) all gave an overall impression of normality. However, assumption of homogeneity of variances in *ANOVA* was violated as the p value of Levene's test was .015. Transformations were not successful in gaining homogeneity of variances. Thus, the non-parametric Kruskal-Wallis test was used for this analysis. The minimum and maximum of the PCS were 25.75 and 60.26; the inter-quartile range was 40.58 to 52.15. Chi-Square (χ^2) (3) = 14.45, $p = .002$. Therefore, it was concluded there was a significant difference in the means of PCS in the four employment groups; employment type was significantly associated with caregiver physical health.

Monthly income was explored for its association with all the dependent variables (Table 8). As monthly income was ordinal data, a non-parametric Spearman correlation test was applied. Monthly income had a significant positive moderate association only with caregiver mental health as the Spearman's r between monthly income and mental component summary (MCS) was .30 ($p = .00$). Likewise, education was tested for its association with the dependent variables (Table 8). As education was also ordinal data, a Spearman correlation test was used. With the p values for the associations between education and either depression, physical component summary (PCS), or mental component summary (MCS) all more than .05, education was not significantly associated with caregiver depression, physical health, or mental health.

Table 8

Correlations between Caregiver Age, Number of Diseases, Hours of Care Each day, Education, Monthly Income, Mutuality, Filial Attitude, Filial Behavior, Perceived Social Support, Care Receivers' Activities of Daily Living, and Depression, Physical Component Summary, and Mental Component Summary (N = 126)

	Depre- ssion	PCS	MCS	Filial attitude ^a	Filial behavior	PSS
Caregiver						
Age	- 0.05	- 0.43***	0.07			
Number of diseases ^a	0.20*	- 0.39***	- 0.10			
Hours of care/day ^a	0.15	- 0.04	- 0.07			
Education ^a	- 0.09	0.14	0.15			
Monthly income ^a	- 0.09	0.02	0.30**			
Mutuality	- 0.25**	0.20*	0.20*	- 0.08	0.25**	0.21*
Filial attitude ^a	0.31***	0.08	- 0.20*		- 0.14	- 0.01
Filial behavior	- 0.23*	0.02	0.23**			0.06
PSS	- 0.18*	0.01	0.23*			
Care receiver						
ADLs ^a	0.28**	- 0.20*	- 0.24**			
Dependent variables						
Depression		- 0.30**	- 0.57***			
PCS			- 0.09			

Note: ^a Spearman correlation test.

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

PSS = perceived social support; ADLs = activities of daily living;

PCS = physical component summary; MCS = mental component summary.

The rest of the influencing factors of caregiver age, hours of care each day, and number of diseases, and care receivers' activities of daily living were all analyzed for their relationships with the dependent variables (Table 8). They were all interval data and checked for normality, equal variance, and linearity. Among these variables of age, depression, mental component summary, and physical component summary were normally distributed by the overall impression from K - S tests, histograms, and box plots

(See Graphs 1, 2 and 5 in Appendix B: Graphs of Analysis). Scatterplots of these influencing factors with each of the dependent variables were explored respectively for linearity and homoscedasticity. Assumptions of normality, equal variances, and linearity were all met. A Pearson correlation test was selected. Age was found to be significantly negatively associated with caregiver physical health (Pearson's $r = -.43$, $p = .00$) but not with other dependent variables.

When the associations between the following influencing factors and the dependent variables were explored as described in the last paragraph, except for age, hours of care each day, number of diseases of the caregivers, and activities of daily living (ADLs) of the care receivers did not meet the assumptions for Pearson correlation test, either in normality (Graph 2, 5 in Appendix B: Graphs of Analysis), linearity, or homogeneity. Transformations were not successful in meeting the assumptions. Therefore, the non-parametric Spearman's correlation test was chosen.

Spearman correlation test (Table 8) showed that the hours of care each day had no significant association with any of the dependent variables, since the p values of the Spearman's r s were $> .05$. On the other hand, the p values of the Spearman's r s of the correlations between care receivers' activities of daily living (ADLs) and depression, physical component summary (PCS), and mental component summary (MCS) were all $< .05$ (Table 8), indicating that ADLs had significantly weak associations with all of the dependent variables. The more impaired the parent stroke survivors in their ADLs, the more depressive symptoms the adult child caregivers had, and the worse their physical and mental health.

Moreover, Spearman's r_s and their p values between the number of diseases and depression and physical component summary (PCS) (Table 8) revealed that caregivers' number of diseases had significantly positive weak associations with caregiver depression, but significantly negative moderate association with caregiver PCS. The more diseases the caregivers had, the more depressive symptoms the caregivers reported, the worse their physical health was. No significant correlation between the number of diseases and caregiver mental health was shown.

Correlations between Mutuality, Filial Attitude, Filial Behavior, Perceived Social Support, and Depression, Physical and Mental Health

The independent variables of mutuality, filial attitude, filial behavior, and perceived social support (PSS) were analyzed for their relationships with the dependent variables of depression, physical and mental health (Table 8). They were also interval data and checked for normality, equal variance, and linearity (Graphs 1, 2 in Appendix B: Graphs of Analysis). Except for filial attitude, mutuality, filial behavior, PSS, depression, mental component summary, and physical component summary were normally distributed by the overall impression from K - S tests, histograms, and box plots as described in the section of normality of variables under study. Scatterplots of independent variables with each of the dependent variables were explored respectively for linearity and homoscedasticity. As a result, assumptions of normality, equal variances, and linearity were all met. Pearson correlation test was selected for the analysis of mutuality, filial behavior, and perceived social support, while the Spearman correlation test was used for the analysis of filial attitude.

As shown in Table 8, the Pearson correlation tests indicated the independent variables of mutuality, filial behavior, and perceived social support had significantly negative associations with caregiver depression, but significantly positive associations with caregiver mental health (mental component summary, MCS). Mutuality was the only independent variable which had a significantly positive association with caregiver physical health (physical component summary, PCS) (Pearson's $r = .20, p < .05$). Therefore, it can be interpreted that the higher levels of mutuality, the more frequent filial behaviors, the more perceived social support in caregivers, the fewer depressive symptoms and the better their mental health. Higher levels of mutuality also indicated better caregiver physical health.

Further, the Spearman correlation test (Table 8) illustrated that the caregivers' filial attitude had a significantly positive and moderate association with their depression (Spearman's $r = .31, p = .00$), and a significantly negative association with their mental component summary (MCS) (Spearman's $r = -.20, p = .02$). As filial attitude was reverse coded in the measure itself, the findings informed that the stronger the filial attitude in adult child caregivers, the fewer depressive symptoms and better mental health.

Correlations between Mutuality, Filial Attitude, Filial Behavior, and Perceived Social Support

Correlations among the independent variables of mutuality, filial attitude, filial behavior, and perceived social support (PSS) were also explored (Table 8). As it was examined in the last section on the relationships between independent variables and the dependent variables, scores of mutuality, filial behavior, and PSS met the assumptions of

normality, equal variance, and linearity in a Pearson correlation test; thus, a parametric Pearson correlation test was applied in the analysis. Yet since filial attitude failed to meet these assumptions, a non-parametric Spearman correlation test was used. Mutuality was found to have a significantly positive but weak association with filial behavior and PSS (Table 8). Caregivers with higher levels of mutuality had more frequent filial behaviors (Pearson's $r = .25, p < .01$) and perceived more social support (Pearson's $r = .21, p < .05$). Nonetheless, no significant correlations in any other combinations of the four independent variables were found.

Correlations between Depression, Physical and Mental health

As it was explored at the beginning of this section, the dependent variables of depression, physical component summary (PCS), and mental component summary (MCS) met the assumptions of normality, equal variance, and linearity for the Pearson correlation test, so this test was chosen for the analysis. Depression was found to be significantly, negatively, and moderately associated with both caregiver PCS (Pearson's $r = -.30, p = .001$) and MCS (Pearson's $r = -.57, p = .001$). Therefore, it can be interpreted that caregivers with more depressive symptoms had poorer physical and mental health, and impacting more severely on their mental health.

Summary

In conclusion, the above analyses between the influencing factors and the dependent variables revealed that caregivers with more diseases and caring for parent stroke survivors with more impairments in activities of daily living (ADLs) had significantly more depressive symptoms and poorer physical health. Besides, older retired female caregivers had significantly poorer physical health. Caregiver mental

health was only significantly associated with lower caregiver monthly income and more impairments in care receivers' ADLs.

Correlations between the independent and the dependent variables indicated that caregivers with higher levels of mutuality, stronger filial attitudes, more frequent filial behaviors, and perceived more social support had fewer depressive symptoms and better mental health. Caregivers with higher levels of mutuality also had better physical health.

Lastly, in the relationships between the independent variables, it was found that caregivers with higher levels of mutuality had more frequent filial behaviors and perceived more social support. The correlations between the dependent variables showed that caregivers with more depressive symptoms had significantly poorer physical and mental health.

Addressing the Research Questions

Six research questions were answered by the results from the multiple linear regression analyses. Age and gender were controlled in all regression models as indicated by the literature review. Other influencing factors were selected based on their significant relationships with each of the dependent variables in this sample. Physical and mental health were separated as dependent variables in the analyses.

Research question one: What is the association between mutuality, filial piety, perceived social support, and caregiver depression after adjusting for age and gender?

Multiple linear regression analysis was selected to answer this question. All variables in this test met the requirement of the data level being either interval or dichotomous. Assumptions were checked at the same time by running the regression analysis with the "enter" method, in which mutuality, filial attitude, filial behavior,

perceived social support, and caregiver age and gender were entered in the same block. Graph 6 in Appendix B: Graphs of analysis, shows the regression standardized residual histogram, Q - Q plot, and scatterplot of depression, which indicates that the assumptions of normality, homoscedasticity, and linearity were all well met. Multicollinearity was screened with variance inflation factor (VIF) and Cook's distance. Tolerances were between .79 and .95 and VIFs between 1.05 and 1.25 among all variables, which met the criteria of tolerance being more than .2 and VIF less than 10. Therefore, there was no multicollinearity among the independent variables or covariates in this study.

Table 9 shows the multiple linear regression models for caregiver depression ($N = 126$). The model including mutuality, filial attitude, and gender explained 21% of the variance of caregiver depression ($R^2 = .21, p < .001$). Gender was significantly associated with caregiver depression ($B = 2.18, p < .01$), while age was not. After adjusting for age and gender, mutuality ($B = -1.21, p < .05$) and filial attitude (reverse coded) ($B = 2.26, p < .01$) were associated significantly and negatively with caregiver depression. For each unit increase of mutuality, caregiver depression decreased by 1.21 units. For each unit increase of caregiver filial attitude, caregiver depression decreased by 2.26 units. Therefore, caregivers with higher levels of mutuality and stronger filial attitudes had significantly fewer depressive symptoms. Neither filial behavior nor perceived social support were significantly associated with caregiver depression.

Table 9

Multiple Linear Regression Models. Dependent Variable: Caregiver Depression (N = 126)

	Model 1			Model 2		
	<i>B</i>	<i>SE</i>	β	<i>B</i>	<i>SE</i>	β
Constant	15.60	4.75		13.53	4.69	
Mutuality	- 1.21	0.57	- 0.19*	- 1.03	0.54	- 0.16
Filial attitude	2.26	0.74	0.26**	1.78	0.70	0.20*
Filial behavior	- 1.07	0.90	- 0.11	- 1.18	0.83	- 0.12
PSS	- 0.80	0.05	- 0.15	- 0.07	0.04	- 0.13
Gender	2.18	0.84	0.22**	2.12	0.80	0.22**
Age	- 0.03	0.04	- 0.06	- 0.07	0.04	- 0.15
ADLs				0.09	0.03	0.24**
Number of diseases				1.11	0.44	0.21*
R^2			0.21***			0.31***
<i>Adjust R²</i>			0.17			0.27
R^2 change						0.10***

Note: PSS = perceived social support; ADLs = activities of daily living.

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

In answering the research question, after adjusting for age and gender, mutuality and filial attitude were significantly and negatively associated with caregiver depression, but this relationship was not significant between filial behavior, perceived social support, and caregiver depression.

Research question two: To what extent do mutuality, filial piety and perceived social support, after adjusting for caregivers' number of diseases and care receivers' functional impairment, predict age- and gender-adjusted caregiver depression?

Following the analysis of research question one, on the basis of entering the first block with mutuality, filial attitude, filial behavior, perceived social support (PSS), and caregiver age and gender in the regression model, the other two influencing factors

(caregivers' number of diseases and care receivers' activities of daily living) were entered as a second block in the regression model. Since these two variables were all interval data, assumptions of normality, homoscedasticity, and linearity were already checked in research question one. Only tolerance and variance inflation factors (VIFs) were screened for these two added factors. Tolerances of .87 - .94 and VIFs of 1.15-1.06, respectively, met the criteria of no multicollinearity. As Table 9 displayed, gender was still a significant predictor but age was not. Both care receivers' activities of daily living ($B = .09, p < .01$) and caregivers' number of diseases ($B = 1.11, p < .05$) significantly predicted caregiver depression. After further adjusting for these two covariates, caregiver filial attitude significantly predicted age- and gender-adjusted caregiver depression ($B = 1.78, p < .05$), caregivers with stronger filial attitudes were significantly less likely to have depression. The final model with filial attitude, gender, caregivers' number of diseases, and care receivers' activities of daily living was significant in predicting caregiver depression ($R^2 = .31, p < .001$). However, mutuality, filial behavior, and perceived social support did not significantly predict caregiver depression.

Thus, in answering the research question, after caregivers' number of diseases and care receivers' functional impairment (activities of daily living) were adjusted, filial attitude significantly predicted age- and gender-adjusted caregiver depression. Filial attitude along with the covariates of caregiver gender, number of diseases, and care receivers' ADLs explained 31% of the variance of caregiver depression.

Research question three: What is the association between mutuality, filial piety, perceived social support, and caregiver physical health after adjusting for age and gender?

Similar to research question one, multiple linear regression was performed to test the association of mutuality, filial piety, and perceived social support with caregiver physical health (physical component summary, PCS). The interval and dichotomous level data met the requirements of regression analysis. Graph 7 in the Appendix B: Graphs of analysis showed the regression standardized residual histogram, Q - Q plot, and scatterplot of PCS, assumption of normality, homoscedasticity, and linearity were all well met. No multicollinearity existed among the variables because the tolerance ranged from .80 to .95, and the variance inflation factor was within the limit of 1.05 to 1.25. Mutuality, filial attitude, filial behavior, perceived social support, gender, and age were entered as one block. Please see findings illustrated in Table 10.

Table 10

Multiple Linear Regression Models. Dependent Variable: Caregiver Physical Component Summary (N = 126)

	Model 1			Model 2		
	<i>B</i>	<i>SE</i>	β	<i>B</i>	<i>SE</i>	β
Constant	59.31	7.46		54.55	8.28	
Mutuality	2.29	0.90	0.21*	2.14	0.87	0.20*
Filial attitude	0.50	1.16	0.03	1.13	1.12	0.08
Filial behavior	1.13	1.40	0.07	1.45	1.32	0.09
PSS	- 0.01	0.07	- 0.01	- 0.01	0.07	- 0.01
Gender	- 4.06	1.32	- 0.25**	- 3.44	1.33	- 0.21*
Age	- 0.31	0.07	- 0.39***	- 0.22	0.07	- 0.27**
ADLs				- 0.06	0.05	- 0.10
Number of diseases				- 2.36	0.73	- 0.27**
No job ^a				1.77	1.87	0.09
Part time job ^a				1.97	1.98	1.04
Full time job ^a				0.46	1.61	0.03
R^2			0.29***			0.39***
<i>Adjust R²</i>			0.26			0.33
R^2 change						0.10**

Notes: ^a = Dummy coded.

ADLs = activities of daily living; PSS = perceived social support.

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

This model with mutuality, age ($B = - 0.31$, $p < .001$), and gender ($B = - 4.06$, $p < .01$) explained the 29% percent variance of caregiver physical health ($R^2 = .29$, $p < .001$). After age and gender were adjusted, only mutuality ($B = 2.29$, $p < .05$) was found to be associated significantly with caregiver physical component summary (PCS). For each unit increase of mutuality, caregiver PCS increased by 2.29 units. In other words, caregiver physical health improved as caregiver mutuality increased. On the other hand,

filial attitude, filial behavior, and perceived social support were not significantly associated with caregiver physical health.

In answering the research question, after adjusting for age and gender, among the independent variables, only mutuality was significantly associated with caregiver physical health. Caregivers with higher levels of mutuality had significantly better physical health.

Research question four: To what extent do mutuality, filial piety, and perceived social support, after adjusting for caregivers' type of employment, number of diseases, and care receivers' functional impairment, predict age- and gender-adjusted caregiver physical health?

In further analysis of research question three, based on the first block with mutuality, filial attitude, filial behavior, perceived social support, and caregiver age and gender entered in the analysis, caregivers' employment type, number of diseases, and care receivers' activities of daily living were entered as the second block in the regression model. Among these variables, employment type was the only nominal data, and was dummy coded before analysis was conducted. All assumptions were checked and met in research question three except for multicollinearity, which was explored among the variables in the second block. The tolerance ranging from .49 to .91 and variance inflation factors between 1.10 and 2.03 illustrated that there was no multicollinearity among the variables.

As shown in Table 10, age and gender continued to be significant predictors of caregiver physical health (PCS). Among the three added influencing factors in the second block, only caregivers' number of diseases significantly predicted caregiver

physical health ($B = -2.36, p < .01$). Activities of daily living (ADLs) and employment type were not significant predictors of caregiver physical health. This may indicate that the association between ADLs or employment type and caregiver physical health was partly affected by mutuality.

After further adjusting for the three added covariates of caregivers' number of diseases, dummies of employment type, and care receivers' activities of daily living, mutuality significantly predicted caregiver physical health (PCS) ($B = 2.14, p < .05$). In other words, caregiver physical health could be promoted by the improvement of caregiver mutuality. This final model explained a significant R^2 of .39 ($p < .000$).

In answering the research question, after adjusting for caregivers' number of diseases, employment type, and care receivers' functional impairment (activities of daily living), mutuality significantly predicted age- and gender-adjusted caregiver physical health. Caregivers with higher levels of mutuality were significantly more likely to have better physical health. Mutuality, along with the covariates of caregiver age, gender, and number of diseases, explained 39% of the variance of caregiver physical health.

Research question five: What is the association between mutuality, filial piety, perceived social support, and caregiver mental health after adjusting for age and gender?

Similar steps as for research question one were followed. Multiple linear regression was selected for this analysis. The variables of mutuality, filial attitude, filial behavior, perceived social support (PSS), and caregiver age and gender were entered as one block and run in the regression model with mental component summary (MCS). As illustrated in Graph 8 in Appendix B: Graphs of analysis, the regression-standardized residual histogram, Q - Q plot, and scatterplot of mental component summary (MCS) met

the assumptions of normality, homoscedasticity, and linearity of multiple linear regression analysis. No multicollinearity was present among the variables in this analysis as the variance inflation factors ranged from 1.05 to 1.25 and the tolerance was between .80 to .95. As shown in Table 11, the model explained a R^2 of .15 ($p < .01$). Fifteen percent of the variance in caregiver mental health was explained by filial attitude and perceived social support.

Filial attitude (reversed coded) ($B = -2.84$, $p < .05$) and perceived social support (PSS) ($B = .19$, $p < .05$) were significantly and positively associated with caregiver mental health (MCS). For each unit increase in filial attitude, caregiver mental health increased by 2.84 units. For each unit increase in perceived social support, caregiver mental health increased by .19 units. Caregivers with stronger filial attitudes and who perceived more social support were significantly more likely to have better mental health. However, neither mutuality nor filial behavior were significantly associated with caregiver mental health.

In answering the research question, after adjusting for age and gender, filial attitude and perceived social support were significantly associated with caregiver mental health. These two variables explained 15% of the variance in caregiver mental health. Caregivers with stronger filial attitudes and who perceived more social support had significantly better mental health.

Table 11

Multiple Linear Regression Model. Dependent Variable: Caregiver Mental Component Summary (N = 126)

	Model 1			Model 2		
	<i>B</i>	<i>SE</i>	β	<i>B</i>	<i>SE</i>	β
Constant	25.09	8.46		30.22	8.40	
Mutuality	1.09	1.02	0.10	0.90	1.00	0.08
Filial attitude	- 2.84	1.31	- 0.19*	- 2.42	1.26	- 0.16
Filial behavior	2.65	1.56	0.16	2.08	1.51	0.12
PSS	0.19	0.08	0.20*	0.12	0.08	0.14
Gender	- 1.54	1.50	- 0.10	- 1.15	1.46	- 0.07
Age	0.03	0.08	0.04	0.07	0.07	0.09
ADLs				- 0.13	0.05	- 0.21*
Monthly income				2.13	0.90	0.21*
R^2			0.15**			0.24**
<i>Adjust R²</i>			0.11			0.18
R^2 change						0.09**

Note: ADLs = activities of daily living; PSS = perceived social support.

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

Research question six: To what extent do mutuality, filial piety, and perceived social support, after adjusting for caregivers' monthly income and care receivers' functional impairment, predict age- and gender-adjusted caregiver mental health?

Following analysis of research question five, on the basis of the variables of mutuality, filial attitude, filial behavior, perceived social support (PSS), and caregivers' age and gender entered in the first block, another two influencing factors (care receivers' activities of daily living, and caregivers' monthly income) were entered as a second block in the regression model. No special manipulation was needed for data preparation because there was no multiple group nominal data among the variables. Since assumptions of normality, homoscedasticity, and linearity of the regression standardized residual of mental component summary were screened and met in research question five,

only the variance of inflation factors (VIFs) and tolerance of care receivers' ADLs and caregivers' monthly income were checked in this model. Both met the criteria of no multicollinearity with VIFs ranging from 1.06 to 1.16 and tolerances between .95 and .87. As illustrated in Table 11, the model with care receivers' activities of daily living ($B = -.13, p < .05$) and caregivers' monthly income ($B = 2.13, p < .01$) explained a R^2 of .24 ($p < .01$), which indicated that these two covariates were significant predictors of caregiver mental health.

After caregivers' monthly income and care receivers' activities of daily living were adjusted, none of the independent variables was found to significantly predict age- and gender-adjusted caregiver mental health. This could indicate that when the caregiving workload was overwhelming and financial problems became an issue, caregiver mutuality, filial attitude, or perceived social support were no longer able to ameliorate caregiver mental distress.

In answering the research question, after adjusting for the caregivers' monthly income and the care receivers' functional impairment (activities of daily living), mutuality, filial attitude, filial behavior, and perceived social support did not significantly predict age- and gender-adjusted caregiver mental health.

Summary

This chapter described the findings of the analysis of data from a sample of 126 adult child caregivers of parent stroke survivors, collected using a non-proportional quota sampling strategy from both hospitals and communities in five cities of Zhejiang province, China. SPSS-17 was used for descriptive and inferential data analysis.

After adjusting for caregiver age and gender, mutuality was found to be significantly negatively associated with caregiver depression and significantly positively associated with caregiver physical health. Filial attitude was significantly negatively associated with caregiver depression and significantly positively associated with caregiver mental health. Perceived social support was only associated significantly positively with caregiver mental health.

After adjusting for caregivers' number of diseases and care receivers' functional impairment (activities of daily living), filial attitude predicted age- and gender-adjusted caregiver depression. After adjusting for the care receivers' functional impairment (activities of daily living), caregivers' number of diseases, and employment type, mutuality was the only significant predictor of age- and gender-adjusted caregiver physical health. Moreover, after adjusting for caregivers' monthly income and care receivers' functional impairment (activities of daily living), none of the independent variables were significant predictors of age- and gender-adjusted caregiver mental health. This finding calls attention to the fact that when the caregiving workload is heavy and financial problems are an issue, nursing interventions are particularly necessary for these caregivers to prevent them from worsened mental health.

CHAPTER FIVE

DISCUSSION

Introduction

This study explored the association between the independent variables of mutuality, filial piety (filial attitude and filial behavior), perceived social support (PSS), and the dependent variables of caregiver depression, and mental and physical health in Chinese adult child caregivers of parent stroke survivors. The findings were derived from a sample of 126 adult child caregivers from five cities in Zhejiang province, China. The following discussions are organized in six sections: (a) discussions on demographics of the caregiving dyads and caregiving characteristics, (b) interpretations and discussions of the correlations between the influencing factors and the dependent variables, (c) interpretations and discussions of the findings for the research questions, (d) implications of the research findings, (e) limitations and recommendations, and (f) conclusion.

Demographics of the Caregiving Dyads and Caregiving Characteristics

Demographics of Adult Child Caregivers

Few studies were identified on stroke caregiving by adult child caregivers in mainland China, since most of the available literature reported on a variety of family members as caregivers (Han et al., 2011; Qiu & Li, 2008; Yu et al., 2013) with an increasing percentage of spouse caregivers. Thus, a comparison of findings is done largely among similar studies with caregivers of mixed family roles in China and other countries.

In general, the profile of married female caregivers in this study was similar to that found in systematic reviews and meta-analysis of stroke family caregivers in the literature

(Cheng, Chair, & Chau, 2014; Salter et al., 2010), but there were differences in other profiles. The mean age (50.40) of this sample was about 10 years younger than that of spouse caregivers in the U.S. (Godwin et al., 2013; McPherson et al., 2011), and Chinese caregivers with mixed family roles (Han et al., 2011; Lau et al., 2012), but not necessarily younger than those studied by Lui et al. (2012) and Qiu and Li (2008) in mainland China and Hong Kong, respectively. Therefore, mean caregiver age varied by sample.

The age characteristic in this study depicted an accurate picture of the availability of adult child caregivers. Currently in China, the retirement age is 50 or 55 years old for female employees. About 51.6% ($n = 65$) of respondents in this study were between 50 - 60 years old with higher frequencies at 50 and 60. Adult children at these two age points might be more ready for caregiving although it was also possible that caregiving for their parents and baby-sitting for their grandchildren may overlap. Thus, role responsibilities of these caregivers were heavy, which potentially put them at risk for negative health outcomes.

Although this study encompassed adult child caregivers born after 1979 when the “one-child” policy was enacted, only a small percentage (7.1%) of this group was included. This might indicate that depending on an only child for caregiving was hardly possible, or that these parents were relatively healthy in their 60s. Thus, the findings of this study might not fully represent this age group. Despite the new policy of “second child for the two-single couple” started in 2014, it can still remind the government to prepare policies for a growing number of elders with chronic conditions in the next 20 - to 30 years.

Role composition of Chinese family caregivers may be worth mentioning. Though daughters were the majority of caregivers, this differed from Wang et al.'s (2010) report on rural caregivers of elders in mainland China and from Shyu et al.'s (2010) research on Taiwanese stroke caregivers, in which sons and daughters-in-law were the primary caregivers. Nevertheless, increasing numbers of adult children, particularly sons, are occupied with more competitive work due to modernization, which gradually transfers caregiving to the stroke survivors' spouses or daughters (Huang et al., 2009). Yu's (2011) study on dementia care indicated that daughters became the predominant caregivers regardless of urban or rural areas.

The caregivers' education level in this sample was primarily junior middle school, which was similar to that of other stroke caregiver samples (Lui et al., 2012; Qiu & Li, 2008; Yu et al., 2013). However, Zehner Ourada and Walker (2014) reported a higher education level (71% with some college) in general adult child caregivers in the U.S., and also in Taiwanese adult child caregivers of dementia patients (41.2% with some college) (Wang et al., 2011). Still, this was largely dependent on caregiver age and the area where they were selected. Younger urban caregivers usually had more education compared to their rural counterparts (Lau et al., 2012; Zhan, 2006; Wang et al., 2010).

Employment type in this sample indicated only one third of respondents pursued full time work. This was similar to what was described in stroke caregiving literature (Qiu & Li, 2008) in China and in the U.S. (McPherson et al., 2011), but lower than that found in dementia caregivers in Taiwan (Wang et al., 2011) or general caregivers worldwide (Pinquart & Sorensen, 2011). Differences in full time employment rates among studies may have implied that stroke patients were more functionally impaired

than the counterparts with other diseases. Secondly, those fully employed caregivers probably had others to share their care responsibilities during their working hours. Thus, the caregivers' roles in the family, culture, and disease trajectory of care receivers might have compromised caregivers' employment opportunities.

Apparently, caregiving for stroke parents required a great deal of time which could have prevented adult children from seeking full employment or better job opportunities in the current competitive labor system. This issue has been long ignored because caregiving for parents was legally assigned as a family obligation and has long been a norm in Chinese society. Further, the limited government support system for caregivers in China drastically decreased the chance that stroke parents could be cared for at home as they wished.

Closely relevant to employment is economic level. The majority of caregivers had a modest monthly income, which was similar to that found in other stroke caregiving literature in China (Han et al., 2011; Yu et al., 2013), and to Neugaard et al.'s (2008) finding in general caregivers in the U.S. Adult child caregivers in China had full responsibility for their parents, not only involving practical caregiving tasks, but also paying out-of-pocket for extra caregiving costs such as hiring helpers and buying medications, nursing pads, and other rehabilitation services that are not covered by medical insurance. Their financial condition might be further exacerbated if institutionalization is impending (Feng et al., 2011). Thus, policies on financial assistance to those adult child caregivers who keep their parents at home would be very helpful.

The majority of adult child caregivers in this study rated themselves as quite healthy. The number of diseases reported among caregivers was lower than that reported by stroke caregivers in Yu et al. (2012), by U.S. general adult child caregivers at similar ages (Zehner Ourada & Walker, 2014) and by U.S. spouse stroke caregivers (Godwin et al., 2013). The differences among the samples in caregivers' rating of their own health could partly relate to the fact that Chinese adult children often accept caregiving as their duty, and thus make fewer complaints. The other reason might be that these studies used different rating methods or the concepts of health among caregivers varied. Finally, age and role of the respondents may have affected this finding, which was supported by Pinquart and Sorensen (2011) that older spouse caregivers naturally rated themselves as having more chronic diseases. Thus, careful interpretation of the finding is necessary.

In short, similar to most caregiving literature, most stroke caregivers were retired females who were less educated, less employed, and with a modest monthly income. The key difference was that the caregivers in this study were mainly urban daughters rather than female spouses or other family members. Generally, these urban adult child caregivers were younger and healthier which may be related to the recruitment criteria.

Caregiving Characteristics

Co-residence in this study showed an even distribution. This factor was not included in the identified stroke caregiving literature on the Chinese, but the ratio was in line with the findings of Pinquart and Sorensen (2011) and Yang et al. (2012) with general caregivers. This was much higher than that reflected in the living arrangements of healthy elders in present-day China (Chu, Xie, & Yu, 2011). With the strengthening of the economy, adult children usually do not live with their parents but may choose to

live within a short distance from their parents. Thus, this co-residence ratio may indicate that parents were quite functionally impaired, which was reflected by the scores of parents' activities of daily living.

The mean caregiving hours each day in this study was a little higher than that found in Yu et al. (2013), Lau et al. (2012), and Qiu and Li (2008), which revealed that Chinese adult child caregivers were very involved in parental care, and also indicated that stroke survivors with disabilities often depend a great deal on family members for assistance (Lo et al., 2008; Chen et al., 2010; Tang et al., 2011). This has imposed an unprecedented burden on the lives of adult children.

Duration of care ranged from 2 months to 240 months (*Mdn* = 3 years). This was much higher than that reported by Lau et al. (2012) but similar to the findings of Huang et al. (2009) and Yu et al. (2013). This difference among the studies could be due to the selected time points and study sites, or to the family roles of the caregivers. For example, spouse caregivers living with their partners in the community had longer duration of care.

The majority of adult child caregivers shared the caregiving responsibilities with their siblings, spouses, helpers, or the other parents. This was higher than that reported by Huang et al. (2009), indicating that Chinese caregivers in this age group still had a strong network of helpers, particularly siblings, which was also reflected by the caregivers' ratings of family support. Moreover, informal caregiving for stroke parents at home requires a network of caregivers that is sustainable over time.

In summary, the caregiving characteristics in this study were different from those in other stroke caregiving studies in China. The adult child caregivers provided more hours of care, were more likely to co-reside with their parents, and had more sibling

support, which showed that while caregiving to parent stroke survivors was demanding, adequate support made it sustainable.

Demographics of Parent Stroke Survivors

Both similarities and dissimilarities in the demographics of stroke survivors were present among studies in China. The parent stroke survivors in this study were more evenly distributed by gender and about eight to ten years older than those reported in other stroke caregiving studies (Lui et al., 2012; Chen et al., 2010; Yu et al., 2013). This difference probably was due to the fact that hospitalized parents were those who lived longer and had repeated stroke attacks. Thus, prevalence of stroke with age and decreased mortality resulted in more disabled elders who are in need of family care.

Compared to the findings from Yu et al. (2013) and Han et al. (2011), the parent stroke survivors in this sample had shorter median duration since last attack, and had more stroke attacks and more impairment in their functional ability. They were either hospitalized or lived in the community. These differences were due to the varied recruiting criteria of whether the study targeted caregivers in the hospital (Huang et al., 2009; Chen et al., 2010; Qiu & Li, 2008) or in the community (Yu et al., 2013); and this study recruited adult child caregivers with caregiving experiences, so their parents usually had a history of strokes and needed constant assistance.

The majority of the care receivers in this study were covered by medical insurance, which was similar to findings reported by Yu et al. (2013) but very different from Qiu and Li's (2008) findings. This could largely be due to the enactment of a medical care insurance policy in recent years (Zhang et al., 2012), which partially decreased the financial burden to caregiving families in China.

In all, compared to other stroke survivors in China, the parent stroke survivors in this study were more evenly represented by gender, older, had more stroke attacks, were more disabled, and had less period of time since last attack. They were cared for both in the hospital and in the community and covered by medical insurance. Recruiting criteria could have contributed to these differences.

Correlations between the Influencing Factors and Caregiver Depression, Physical and Mental Health

Age

Caregiver age was significantly negatively correlated with caregiver physical health. This association was congruent with the findings on stroke caregivers in Hong Kong (Chen et al., 2010; Lui et al., 2012; Huang et al., 2009), and also on Caucasian and African caregivers in the U.S. (Clay et al., 2013). Moreover, in line with most stroke caregiving literature on Chinese caregivers (Huang et al., 2009; Lau et al., 2012; Qiu & Li, 2008), age was not correlated significantly with caregiver depression.

The number of diseases among caregivers may explain the relationship between their age and physical health. Significant correlations between age and number of diseases, and between number of diseases and caregiver physical health, were found in this study. These analyses supported that the older the caregivers, the more diseases they reported having, and the poorer their physical health. In addition, older caregivers had higher stress from caregiving, probably due to older age, which may reduce adaptation and psychomotor function (Louie, Liu, & Man, 2009). Thus, it is reasonable to understand that the age of caregivers may be associated with their physical health.

Gender

Gender correlated with caregiver physical health, which was consistent with the findings of Lui et al. (2012) on Chinese stroke caregivers, and supported by Pinquart and Sorensen's (2006) systematic review of general caregivers, but different from Chen et al. (2010), in which gender was associated with the mental health of Chinese stroke caregivers. The findings of this study are consistent with Ho et al.'s (2009) findings that general female Chinese caregivers reported more diseases, somatic symptoms, and insomnia, which finally result in poorer well-being. In fact, the mean physical health (45.29) in the female group was much lower than that of the male group (50.35). Moreover, Chinese may express their mental health more frequently by somatic symptoms (Kleinman, 2004; Ryder & Chentsova-Dutton, 2012). Significant differences were also present between genders in physical fitness, role physical, and body pain. Thus, it was implied that caregiving outcomes maybe culture and gender biased.

The lack of association between gender and depression in this study ($p = .078$) was in line with stroke caregiving literature such as the work of Qiu and Li (2008) from mainland China and Huang et al. (2009) from Taiwan, but contrary to the work of Lau, Tang et al. (2012) and Lui et al. (2012) in Hong Kong. Although stroke caregivers were mostly females (Salter et al., 2010) who were more likely to be depressed (Berg, Palomäki, Lönnqvist, Lehtihalmes, & Kaste, 2005; Pinquart & Sorensen, 2006), the adult children's strong filial attitude or mutuality may have protected them from depression. Other reasons could be the use of different depression scales among the studies or the small sample sizes of gender subgroups. This might be particularly true since gender was significantly associated with depression in the regression model in this study. In short,

further exploration of the relationship between gender and caregiver depression is recommended, particularly when the p value of the relationship is close to .05.

Education

In keeping with the findings of Qiu and Li (2008), Huang et al. (2009), Lau et al. (2012), and Lui et al. (2012), no significant correlation between education and caregiver depression was found. However, this finding is incongruent with that of Yu et al. (2013), Dong and Geng (2008), Chen et al. (2010), and Lui et al. (2012) on Chinese stroke caregivers. The difference might be explained due to the homogeneity of the group, with the majority (65.8%) having a middle school education, and experience ($M = 4.7$ years) as caregivers who had developed caregiving skills and were used to caregiving difficulties. In other words, beyond education level, providing care to stroke patients may be more relevant to caregivers' devotion of affection, time, and energy, which could impact caregiver health.

Employment

Similar to age and gender, employment was significantly associated with caregiver physical health but not with caregiver depression. This was contrary to the finding of Lau et al. (2012), who indicated that retirement was significantly associated with stroke caregiver depression in Hong Kong, and also to what was reported by Pinquart and Sorensen's (2011) systematic review that percentage of employment was significantly correlated with caregiver depression. Possibly, retired adult children in these studies may have been expected more on caregiving, and, in reality, spent more time on it. As a consequence, they had less leisure time for socialization, recreation, and maintenance of their own health, and had fewer people with whom to vent their feelings; all these factors

could lead to compromised caregiver physical and mental health. The caregivers in this study, who had sibling support, strong filial attitudes, and moderate mutuality may have been protected against depression.

Interestingly, other findings of this dissertation study could further support the above explanation. The physical health of the retired group was the poorest while that of the part time work group was the best. Caregivers who were employed part time may have had both the advantages of fulfilling their filial obligation but also had time being with their work partners for stress release. Moreover, the retired female adult child caregivers, at the point of gradual health decline, may have more symptoms relevant to physical health (Ho et al., 2009). These findings are helpful for future nursing interventions and policies.

Monthly Income

Monthly income was significantly associated with caregiver mental health. Although the relationship between monthly income and caregiver physical or mental health was seldom reported in stroke caregiving literature, providing care to disabled parents not only required the adult children to sacrifice their own life routine, but also to share extra expenses that were not covered by medical care or insurance. Some of the adult child caregivers were deprived of better or long distance employment opportunities for years, which may be enough to compromise their mental health.

The absence of correlation between monthly income and caregiver depression was contrary to the findings of Huang et al., (2009), Lau et al. (2012), and Qiu and Li (2008) in the literature on Chinese stroke caregivers. This difference could be due to the small subgroup sample size or the financial status of the caregiving dyads. Despite the

caregivers' insufficiency in monthly income, financial strain may not be a key predictor of caregiver depression because the city dwellers in this study had their own pensions and strong family caregiver networks. Also, most of their parents had medical insurance coverage, which may have greatly minimized the financial burden of these children.

An interesting difference might have been noted in the findings between monthly income and caregiver mental health, and between monthly income and caregiver depression. Although a high correlation was found between depression and mental health ($r = .57, p = .001$) with this sample, it was also indicated that the two measures may focus on different aspects of their health. For example, these caregivers rated social function and vitality of the mental component summary quite low compared to other dimensions of the subscale, whereas in the depression scale, sleep disturbance was rated as a main concern by these caregivers, which could also partly explain the difference in the findings.

Hours of Care Each Day

Hours of care each day were not significantly associated with any dependent variables. This was consistent with the findings of Chen et al. (2010) on Chinese stroke caregivers and also of Khalaila and Litwin's (2011) study on Arabic adult child caregivers of elders, but incongruent with the findings of Yu et al. (2013) that hours of care significantly correlated with mental health of Chinese stroke caregivers. Further, Qiu and Li (2008) and Lau et al. (2012) found no correlation between hours of care each day and stroke caregiver depression in China. These differences could be explained by the fact that caregiver depression tended to decline (Godwin et al., 2013) as caregivers became used to the caregiving routines; also, adult children in this study had strong filial

attitudes and moderate mutuality, which may partially buffer their negative health outcomes.

Number of Diseases

In keeping with the findings of Cameron et al. (2006) and Lau et al. (2012), the number of diseases in caregivers had a significant positive correlation with their depression. Health was a major concern for caregivers because they have to maintain well-being in order to fulfill their role responsibilities. It was easily understood that the more diseases the caregivers had, the more depressed they would be.

A significant negative correlation was found between number of diseases and caregiver physical health. This was consistent with the findings of Godwin et al. (2013), who reported on spouse stroke caregivers in the U.S., but different from those of Yu et al. (2013) and Chen et al. (2010) in that the number of diseases correlated with both caregiver physical and mental health in mainland China and in Hong Kong. These differences in the findings in Chinese caregiving literature could be due to demographics of the caregivers in this study; namely, they were younger, had fewer diseases, and were less mentally disturbed (Pinquart & Sorensen, 2011). Although the spouse caregivers in the U.S. and in China were about the same age, the higher level of dyadic mutuality in the U.S. may have protected them from negative mental effects.

Care Receivers' Activities of Daily Living

Care receivers' activities of daily living (ADLs) were significantly positively associated with caregiver depression, while negatively correlated with both caregiver physical and mental health. This was consistent with the findings of Qiu and Li (2008) and Khalaila and Litwin (2011) on Chinese and Arabic stroke caregiver depression, and

also congruent with the findings of Yang et al. (2012) on Chinese caregivers of elders. Yet it differed from Yu et al.'s (2013) findings that care receivers' ADLs were significantly correlated with caregiver mental health. The difference among the studies might be explained by their use of different measures, or the stroke survivors with severe functional disability would require more assistance and more hours from the caregivers, which largely increased the burden of these adult child caregivers.

Findings for Research Questions

For research questions one and two: What is the association between mutuality, filial piety, perceived social support, and caregiver depression after adjusting for age and gender? To what extent do mutuality, filial piety, and perceived social support, after adjusting for caregivers' number of diseases and care receivers' functional impairment, predict age- and gender-adjusted caregiver depression?

Mutuality and Caregiver Depression

Descriptive Analysis of Caregiver Mutuality

Mutuality in this study ($M = 2.34$) was higher than that found in Taiwanese family caregivers of dementia patients ($M = 1.72$) (Shyu et al., 2010; Wang et al., 2011; Yang et al., 2014), but lower than that reported in their U.S. counterparts who provided care for cancer patients ($M = 3.28$) (Schumacher et al., 2008), for elders ($M = 3.24$) (Archbold et al., 1990), or for stroke spouses ($M = 3.31$) (Godwin et al., 2013). Although U.S. caregiver mutuality declined longitudinally (Archbold et al., 1990; Lyons et al., 2007), the lowest level of mutuality at 20 months of follow-up was still higher than that of any Chinese family caregiver samples.

The difference in mutuality between Chinese caregivers and their U.S. counterparts ($p < .000$) deserves attention. Comparing their demographics, the U.S. caregivers generally had higher education, higher percentage of employment, and better economic status than the Chinese counterparts. Additionally, although filial piety is a culturally ingrained tradition (Pharr, Dodge Francis, Terry, & Clark, 2014), and Chinese caregivers are recognized as having strong filial piety towards their parents, the correlation between filial piety and mutuality in this study ($r = .25, p < .01$) was less than that of Mexican American caregivers as reported by Kao and An (2012) ($r = .45, p < .001$). Thus, there is the question of whether filial piety is higher in Western caregivers than in Chinese caregivers. Further study to explore whether it was the effect of culture or caregiver demographics could help answer this question.

The difference in mutuality between caregivers in this study and their Taiwanese counterparts could be due to the disease trajectories in care receivers. Depression was significantly negatively associated with caregiver mutuality (Lyons et al., 2007; Shim et al., 2011), and behavioral problems in care receivers with Alzheimer's disease predicted more caregiver depression than with stroke. In other words, more behavioral problems were present in dementia patients than in stroke patients (Huang et al., 2009; Yeh, 2003). Thus, mutuality in family caregivers of stroke patients might be higher than that of their counterparts caring for dementia patients.

Different family relationships may have contributed to the variance in mutuality as well. Although the concept of mutuality could be applied broadly to any caregiving situation or relationship, the adult child-parent caregiving relationship may distinctly differ from those of other pairs because of the varied characteristics of emotional bonds,

commitment, shared activities, and communications among them (Park & Schumacher, 2013; Pinquart & Sorensen, 2011). Lyons et al. (2007) reported that mutuality in spouse caregivers was higher than that found in other family caregivers, and family roles contributed to varied caregiver health outcomes (Pinquart & Sorensen, 2011). Thus, the finding in this study could serve as a reference. Further study on mutuality in other caregiving dyads such as spouses, in-laws, or helpers and patients is recommended to clarify the differences of mutuality in family roles of Chinese caregivers.

Descriptive Analysis of Caregiver Depression

Caregiver depression ($M = 8.74$) in this study was close to that ($M = 8.53$) of caregivers at 6 months post discharge in Han et al.'s (2011) study. The depression rate (44.4% by threshold of 10) was within the range reported in China (39.6 - 48.2%) (Han et al.; Qiu & Li, 2008) and in other countries (30 - 44.7%) (Berg, 2010; Cameron et al., 2006; Epstein-Lubow et al., 2009; Kuscu et al., 2009). A consensual depression rate was identified despite their differences in age, family roles, and caregiving sites among the samples. This was contrary to the findings in other literature and thus deserves discussion.

It has been argued that age and spouse role were associated with depression in stroke caregivers (Han et al., 2011; Lui et al., 2012). Pinquart and Sorensen's (2011) systematic review on general caregivers identified that spouse caregivers were more depressed because they spent more time caregiving. This could not justify the findings in this study, because the adult child caregivers spent equal or even more hours on caregiving each day and this was not significantly correlated with caregiver depression; age also was not a factor. One possible rationale could be care receivers' functional

disability, which was found to be more impaired than that of other studies. Thus, the difference in depression due to age or role could have been balanced.

Differences in depression among caregivers between stroke patients who are hospitalized and those living in the community post discharge were not clear. Han et al. (2011) reported a significant difference in caregiver depression level between the two caregiving sites; a similar finding was obtained in this study between the caregiver groups interviewed in the hospital and at home ($p < .001$). It was argued that the difference was due to the caregivers' higher perceived social support after discharge (Han et al., 2011), yet this was not present in this dissertation study. Further, reliability of these findings was questioned because Han et al. did not control any covariates, and the subsample sizes in this study were very small ($n = 58$ versus $n = 68$). Nevertheless, Han et al. did not find a significant difference in the caregiver depression rate between the two sites. It was possible that the care receivers' functional impairment prior to and post discharge might have made the difference in caregiver depression rather than social support. Thus, rates of caregiver depression between the two sites need to be clarified with stricter research design.

Inferential Analysis of Mutuality and Caregiver Depression

A significant negative association was found between mutuality and caregiver depression even when caregiver age and gender were controlled. A systematic review of mutuality (Park & Schumacher, 2013) identified a lack of exploration of mutuality in the population this study targeted; therefore, comparison with similar studies could be difficult. However, the association of mutuality with a number of health outcomes was consistent with the findings from many caregiver samples, for example, role strain,

depressive symptoms, life satisfaction, and impact on health in caregivers with different family roles across cultures (Ball et al., 2010; Lyons et al., 2009; Ostwald et al., 2009; Schumacher et al., 2008; Shyu et al., 2010; Wang et al., 2011; Yeh et al., 2009).

Mutuality may have ameliorated negative health outcomes in caregivers by mechanisms affecting their appraisal and coping (Lazarus & Folkman, 1984; Jones et al., 2011).

On the other hand, Godwin et al. (2013) reported that mutuality was not a significant predictor of spouse caregiver depression. As mutuality in spouse caregivers of patients with stroke or older adults tended to decline over time in a 2-year duration post stroke (Godwin et al., 2013; Lyons et al., 2009), their depression tended to decline as well. This inconsistency with other literature on mutuality could be due to the time of data collection.

The studies in mutuality literature were mostly controlled for covariates such as caregiver age, gender, spouse role, amount of direct care (time spent, tasks performed, and amount of assistance), and care receivers' cognitive and physical impairment (Archbold et al., 1990; Schumacher et al., 2008; Shyu et al., 2010). Being a spouse caregiver also implied older age and worsened health status with more chronic conditions. Although age and gender were not significantly associated with caregiver depression in the correlational analyses in this study, these factors were still added to the model as covariates suggested by other literature. Gender was then found to be a significant predictor of caregiver depression, which was consistent with findings in caregiving literature that female caregivers were more inclined to feel depressed. The other reason could be that most caregivers in this sample were females.

Another point that needs to be explained is the use of the 14-item Activities of Daily Living Scale (ADLs) in this study, which includes an 8-item Instrumental Activities of Daily Living Scale (IADLs). IADLs had both physical and cognitive domains and were cross culturally applicable (Ng, Niti, Chiam, & Kua, 2006). It was meant as a substitute of the measure for care receivers' cognitive function, a factor that was often considered as a covariate in caregiving literature. In other words, care receivers' cognitive impairment was also taken into account in this study.

Finally, when care receivers' functional impairment and caregivers' number of diseases were further controlled, the significant association of mutuality disappeared, but gender was still a significant predictor of caregiver depression. Female adult child caregivers with more diseases themselves taking care of parents with worse functional disability did not see the protective effect of mutuality on their depression; that is to say, mutuality did not predict caregiver depression (Lyons et al., 2007). Archbold et al. (1990) and Lyons et al. (2009) supported the finding that mutuality may not reduce role strain of worry, which was closely relevant to depression. Factors such as female caregivers (daughters), who rated their own health poor, and worsened parental ADLs indicated that caregivers might have been overloaded with worries partly due to their personality traits and partly due to their close daughter-parent relationship. In spite of these stable traits, it could be beneficial if nursing strategies in the form of cognitive behavioral stress interventions were developed to alleviate caregivers' role strain and increase mutuality (Lyons et al., 2007).

Filial Attitude and Caregiver Depression

Descriptive Analysis of Caregiver Filial Attitude

Strong filial attitudes among caregivers were identified in this sample. It was considerably distant from the mid-value of 4 ($p < .001$), and that of the general Chinese adult child population ($p < .01$) found by Xu (2012), or that of Arabic adult child caregivers of aged parents with impaired functional ability identified by Khalaila and Litwin (2011). Despite the non-availability of particular literature on the topic, filial attitude in this sample illustrated a relatively higher level over other groups.

The differences in filial attitude among samples were justifiable because adult child caregivers who were willing to devote their time and energy in care provision had already demonstrated a strong filial attitude. Moreover, age might have shown a variance in filial attitude, which might be stronger in older generations than the young due to modernization (Cheng & Chan, 2006; Cheung & Kwan, 2009; Khalaila & Litwin, 2011; Wang et al., 2009). Xu's study had more respondents who were less than 50 years old than this dissertation study, yet the difference in filial attitude due to age could not be confirmed because the number of respondents under 35 years old (the one-child generation) in this sample was inadequate to reach a reliable conclusion on whether younger age predicted weaker filial attitude.

Inferential Analysis of Filial Attitude and Caregiver Depression

A significant negative association was identified between filial attitude and caregiver depression after age and gender, or further care receivers' functional impairment and caregivers' number of diseases were adjusted. This was similar to the findings of Khalaila and Litwin (2011) on general Arabic adult child caregivers. Lazarus

and Folkman (1984) assumed that if a demand or stressor such as caregiving was interpreted positively, positive health outcomes can be facilitated. Also, Jones et al.'s (2011) caregiver empowerment model proposed that caregivers with filial values would appraise caregiving demands more positively, and hence better health outcomes would be more likely to occur. Lastly, Tang (2011) confirmed that cultural values in combination with caregiver background and stressors had a direct effect on positive aspects of caregiving. Thus, nurses can assess filial attitude as an alternative for depression in Chinese adult child caregivers.

In traditional Chinese culture, filial piety beliefs reinforce devotion and respect to parents and motivate family caregiving (Jones et al., 2010). Caregiver health is not only affected by caregiving difficulties (Feinberg, Reinhard, Houser, & Choula, 2011), but also influenced by the sociocultural norms with which the caregivers perceive and respond to their caregiver roles (Pinquart & Sorensen, 2005). As illustrated in this study, filial attitude is often strongly internalized in the caregivers. Regardless of their own health and increased caregiving demands, it is more likely that they view parental care as normative, a way of expressing their gratitude, and it has meaning for them. By accepting their caregiver role and expectations, harmonious relationships within the family were maintained; thus, they had fewer depressive symptoms (Mackenzie & Greenwood, 2012; Pharr et al., 2014; Quinn et al., 2009; Yeh, et al., 2009).

In contrast, the findings in this study may be opposite to those of Zhan's (2006) study which revealed that the stronger the filial attitude, the more depressive symptoms experienced by the adult children. Cultural values can also be a source of stress when they co-exist with other issues such as multiple responsibilities, unemployment, and

deterioration of their own health and their parents' functional status (Zhan, 2006).

Caregivers who have a strong sense of parental care obligations may have deeply internalized the cultural expectation and over-expressed it in their daily activities.

Further, peer pressure and neighbors' praises could have driven the adult children toward greater caregiving involvement, which imposed a larger burden upon them. Thus, higher filial attitude does not always imply better caregiver mental health.

Filial Behavior and Caregiver Depression

Descriptive Analysis of Caregiver Filial Behavior

In this study, filial behaviors ($M = 4.27$) were more frequent than those of the general adult child population (Xu, 2012). The three item means (financial support, practical assistance, and emotional support) in Xu's study were all below its mid-point of 3.5, but were well above the mid-point of 2.5 in this study. Therefore, obvious differences between the two samples in China again illustrated that those caregivers who were willing to provide care to parents had higher filial piety.

Surprisingly, item means of filial behaviors in this sample, except one item of financial assistance, were higher than those reported by Hong Kong parents on their closest children (Cheng & Chan, 2006). Although financial support from children was not expected by older people (Kwan et al., 2003), Hong Kong parents (M age = 73) depended more on their children for financial support than the stroke parents (M age = 79) in mainland China.

Nevertheless, the differences in filial behaviors should be interpreted carefully. The respondents in this sample were adult child caregivers of parent stroke survivors, who were mainly female urban residents in mainland China, while the sample of older

adults aged 60 or over in Hong Kong were mostly healthy, the majority of their identified closest children were sons (around 60%), and the data were collected in 2005. Thus, the gender of the caregivers, the functional disability of the parents, the respondents' role as adult child or parent, the place and time of data collection, and the different health care system of the two sites could have contributed to the differences in adult children's filial behaviors. Comparison would be more meaningful if similar studies were available.

Inferential Analysis of Filial Behavior and Caregiver Depression

A significant negative association was identified between filial behavior and caregiver depression in this study. In literature, the relationship between these two variables was an area less explored. Although filial attitude, filial behavior, and filial expectancy have some overlapping in their concepts, they generally have different meaning (Chappell & Funk, 2012; Xu, 2012). Therefore, positive association between filial attitude and caregiver depression (Zhan, 2006) or negative association between filial expectation and caregivers' self-rated health (Funk et al., 2013) may not fully explain this association. Most probably, adult children expressed great gratitude to their parents by caregiving behaviors, and the satisfaction they felt in doing so was their reward. On the other hand, traditional caregiving behaviors could also be an approach to relieve caregivers' stress from stigma (Tang, 2011).

This association disappeared after adjusting for age and gender or further adjusting for care receivers' functional impairment and caregivers' number of diseases. This was partially supported by another finding of Funk et al.'s (2013) study that the significant association between filial expectation and caregivers' self-rated health was not present in individual subgroups of either Chinese Canadian or Hong Kong Chinese. The small

subsample sizes ($n = 90$, and $n = 125$) in Funk et al.'s study could be part of the explanation, however, the impact of filial behavior was largely determined by the caregiving situations, which combined caregivers' appraisal of stress, coping strategies, and informal or formal supports (Sun et al., 2012). In the caregiving situations of this study, the covariates were more influential than filial behavior on caregiver depression.

Filial attitude was not found to be significantly associated with filial behaviors in the adult child caregivers in this study. This discrepancy between filial attitude and actual behavior was reported in Chinese adult child caregivers (Chan et al., 2012; Chen et al., 2007; Cheng & Chan, 2006; Lim et al., 2012; Xu, 2012). At the present time in China, social conditions have undergone drastic changes, and possibly, adult children's filial piety is also experiencing transformation. However, the association between filial attitude and filial behavior needs to be studied further because scholars found that there might be less association between the two concepts than often assumed (Chappell & Funk, 2012; Xu, 2012).

Finally, the notion of "decline or erosion of filial piety" (Cheung & Kwan, 2009) in Chinese society should be interpreted with caution. The lack of association between filial attitude and filial behaviors does not necessarily indicate a decline of filial piety in adult children. Nevertheless, the concept of filial behavior needs to be adjusted in accordance with the societal context of China. For example, providing less financial support to parents does not mean that the adult children are not filial but perhaps because parents are more affluent in their living status than before. Furthermore, institutionalization of parents does not exactly reflect a reduction of the children's filial piety because they continue their caregiving activities to their institutionalized parents (Tang, 2011).

Apparently, caregiving behaviors were mostly affected by the availability and financial resources of adult children due to changes in present-day China, in which rapid development of the economy and increased living allowances, a competitive work environment and less job security, more institutions for elderly care and paid helpers could lead to the transformation of filial behaviors. Therefore, an exploration of emerging perspectives of filial piety and development of new tools fitting the current social context is suggested.

Perceived Social Support and Caregiver Depression

Descriptive Analysis of Caregiver Perceived Social Support

Dimensional scores of perceived social support in this study were similar to the findings of Han et al. (2011) and Yu et al. (2013) but had dissimilarities in Chinese stroke caregivers. The total item mean of perceived social support (4.84) in this sample was higher than that in Yu et al.'s study (4.18), but lower than that before discharge (4.93) and 6 months post discharge (5.29) in the study by Han et al. Family support was consistently the predominant form of social support while friend support was the least among studies. A smaller gap between friend support and the support of significant others was identified in this study. Incongruent with the findings of Han et al., this dissertation study found no significant difference in caregiver perceived social support between those interviewed at home and those interviewed in the hospital.

The above findings reflect that strong family support still existed in this sample due to centuries of Chinese tradition. Instead of seeking assistance from outsiders (friends or significant others), adult children would rather implement their caregiving tasks independently or call for help from their family networks. Because reciprocity is also

deeply embedded in Chinese culture, repayment for help would impose an extra burden on their already stressful caregiving role. This was in line with study findings by Sun, Mutlu, and Coon (2014) that Chinese family caregivers were less likely to utilize external resources.

Second, the family relationships and ages of the caregiving dyads could have made a difference in perceived social support. The stroke caregiving dyads in Han et al.'s (2011) study appeared younger than those in the work of Yu et al. (2013), and their age gap (55.97 versus 63.97) was smaller. Caregiving dyads at these ages probably remained an adequate support network because they had recently retired. Retired spouse caregivers at younger ages with fewer work demands were possibly more energetic and had more time with their care receivers in socialization within the community. Thus, nurses should build a close rapport with family caregivers in order to provide more effective care.

Inferential Analysis of Perceived Social Support and Caregiver Depression

Perceived social support had a significant negative association with depression in caregivers. This association was consistent with the findings of stroke caregiving literature in China (Han et al., 2011) and in other countries reported by Kuscu et al. (2009) in Turkey, and Lai and Thomson (2011) in Canada. Depressed family caregivers were found to have significantly lower perceived social support.

This association was not established in this study after adjusting for covariates of age and gender or further adjusting for care receivers' functional impairment and caregivers' number of diseases. If mutuality was not included in the same model, social support was significantly associated with depression when adjusting for these four covariates. This indicated that dyadic mutuality had impact on the relationship between

perceived social support and caregiver depression. In addition, female caregivers who had more diseases themselves and took care of their parent stroke survivors with more impaired functional ability did not find perceived social support as having a buffering effect. This could partly be due to that these caregivers were overwhelmed by their caregiving responsibilities, which compromised their social lives, hence they perceived lower social support. Also, it could be that their own declined health limited their utilization of social supports, or simply be due to the depression that they experienced in the complex caregiving situations. Thus, nursing strategies are emphasized in bolstering mutuality, relieving role overload, and helping with utilization of social support to maintain physical and mental health of the caregivers.

In conclusion, mutuality and filial attitude were significantly associated with caregiver depression after adjusting for age and gender. After further adjusting for caregivers' number of diseases and care receivers' functional impairment, filial attitude predicted age- and gender-adjusted caregiver depression, which indicated that strong filial attitude still exists in Chinese caregivers. The non-significant association of perceived social support on age- and gender-adjusted caregiver depression could be due to the impact of mutuality, the decreased social involvement due to caregiving, and the caregivers' declined physical health and depression. Corresponding nursing strategies have been suggested to maintain both caregiver physical and mental health.

For research questions three and four: What is the association between mutuality, filial piety, perceived social support, and caregiver physical health after adjusting for age and gender? To what extent do mutuality, filial piety and perceived social support, after

adjusting for caregivers' type of employment, number of diseases, and care receivers' functional impairment, predict age- and gender-adjusted caregiver physical health?

For research questions five and six: What is the association between mutuality, filial piety, perceived social support, and caregiver mental health after adjusting for age and gender? To what extent do mutuality, filial piety, and perceived social support, after adjusting for caregivers' monthly income and care receivers' functional impairment, predict age- and gender-adjusted caregiver mental health?

Mutuality and Caregiver Physical and Mental Health

Descriptive Analysis of Caregiver Physical and Mental Health

Findings in this study indicated poorer caregiver physical health ($M = 46.81$) and mental health ($M = 44.99$) at an average of 2.8 years post the most recent stroke attack compared to the general population (Li et al., 2010) and the general caregiver population of the elders (Ho et al., 2009; Yang et al., 2012) both in mainland China and Hong Kong. The same pattern was found by McPherson et al. (2011) on Canadian stroke caregivers at average of 2.6 years post stroke attack compared to their norms at the same age. Yang et al. also confirmed that Chinese caregiver mental health was significantly worse than their physical health. Congruent with the findings of Yu et al. (2013), Chinese stroke caregivers were particularly lower in general health, social function, and vitality.

However, adult child caregivers generally had lower scores in all health dimensions than caregivers of mixed family roles (mostly spouse) (Yu et al., 2013). Spouse caregivers had their highest scores in role emotion ($M = 87.33$) and lowest in social function ($M = 51.03$), while adult child caregivers had their highest scores in physical fitness ($M = 80.75$), followed by role emotion ($M = 69.94$), but lowest in general health

($M = 39.33$) in this study. Thus, overall, the characteristics of caregiver physical and mental health were similar among the studies in China but varied among samples.

Stroke caregiver samples in literature were composed of a number of family relationships with many responsibilities, which may deprive them of energy, time, material, emotions and hinder their socialization, recreation, and health maintenance, consequently, leading to poorer caregiver health (Yang et al., 2012). Caregiver roles interpreted health differently. As supported by Pinquart and Sorensen (2011), adult child caregivers had much lower role emotion and general health than spouse caregivers. Therefore, it is suggested that nursing strategies should be tailored to be role-specific.

Contrary to the findings in this study, Godwin et al. (2013) reported no significant differences in general health in caregivers when compared with age-matched controls (at 4.8 years post stroke). Systematic reviews supported that with prolonged duration of caregiving, caregiver depression tended to decline and health-related quality of life (more than physical and mental perspectives) remained similar or increased (Salter et al., 2010, Gaugler, 2010; Pinquart & Sorensen, 2003). Therefore, time of data collection could have explained the difference in physical and mental health among samples. Nursing strategies for caregivers should also be time-specific.

Inferential Analysis of Mutuality and Caregiver Physical and Mental Health

A significant positive relationship between mutuality and physical health was identified in this study even when adjusting for caregiver age and gender. Mutuality was also a significant predictor of caregiver physical health when further adjusted for caregivers' employment type, number of diseases, and care receivers' functional impairment. This was supported by Lyons et al. (2007) and Lyons et al. (2002) with

family caregivers in the U.S. On the contrary, a recent study by Godwin et al. (2013) claimed that mutuality was not a significant predictor of spouse stroke caregiver health in the U.S., and Shyu et al. (2010) reported that mutuality was positively associated with mental health in Taiwanese caregivers of dementia patients; however, caregiver physical health was not included in the study. Finally, a systematic review on mutuality (Park & Schumacher, 2013) confirmed the association between mutuality and caregivers' emotional health outcomes.

It is interesting to note that the correlation between mutuality and caregiver physical health rather than mental health exists in mainland Chinese caregivers. Caregiving experiences could have contributed to the incongruence. Stroke care experience might be drastically different from that of dementia care. Functional status was more compromised in stroke patients who required more of caregivers' physical attendance. While it may be a long time before function disabilities appear in dementia patients, behavioral problems in dementia patients may cause a great deal of mental stress for the caregivers (Huang et al., 2009). Thus, disease trajectories of care receivers could result in different caregiver health outcomes, and should be taken into consideration.

Culture could also have played a role in the difference. Chinese individuals with mental problems tend to complain about somatic symptoms (Kleinman, 2004; Ryder & Chentsova-Dutton, 2012). For example, in this study depressed caregivers were more likely to report sleep disturbances than feeling depressed or lonely. Similarly, caregivers had much poorer general health than any other subscales of mental health. This cultural trait in Chinese could partly explain their more compromised physical health. Also, female caregivers were more inclined to report physical symptoms (Ho et al., 2009). A

significant correlation was found between their number of diseases and physical health in this study. Thus, nurses should be aware of mental health when physical complaints are present in Chinese female caregivers.

Finally, the natural daughter-parent relationship may have had much variance in the model. Daughters are often more caring and have better relationships with their parents. This could help explain why mutuality predicted caregiver health even after considering the other covariates. Therefore, nursing strategies should focus on promoting the caregiving dyadic relationship to maintain caregiver health.

Filial Attitude and Caregiver Physical and Mental Health

Inferential Analysis of Filial Attitude and Caregiver Physical and Mental Health

A significant positive association between filial attitude and mental health in caregivers was identified in this study. The stronger the caregivers' filial attitude, the better the mental health of the caregivers. This association was present even if caregiver age and gender were adjusted. This was supported by the findings of Hsueh et al. (2014) on Chinese adult child caregivers in the U.S., and also congruent with Funk et al.'s (2013) findings on Caucasian Canadian, Chinese Canadian, and Hong Kong Chinese. Filial attitude could affect their motivations to provide care, which would lead to a more positive appraisal of the caregiving experience (Lai, 2010; Quinn et al., 2010; Lee, Yoo, & Jung, 2010). This protective effect of filial attitude illustrates the assumptions of Lazarus and Folkman (1984) and Jones et al. (2011). Therefore, no significant association between filial attitude and caregiver physical health was understood because filial attitude was more of a mental activity.

As mental health was closely related to depression in stroke caregivers (Chen et al., 2010; Chow et al., 2007; Godwin et al., 2013; Kim & Yeo, 2012), the stronger the filial attitude, the fewer depressive symptoms, resulting in better mental health in caregivers. However, the buffering effect of filial attitude was not reported consistently (Zhan, 2006; Pinquart & Sorensen, 2005), which was discussed in the section on filial attitude and depression.

Finally, the significant positive association of filial attitude with caregiver mental health disappeared when further adjusting for caregivers' monthly income and care receivers' functional impairment. This showed that these two covariates had an impact on the relationship between filial attitude and caregiver mental health. When caregivers had lower monthly income and were caring for parents with more functional impairments, the caregivers' filial attitude no longer predicted caregiver mental health. In other words, filial attitude is not a caregiver resource to buffer mental health. Indeed, both caregivers' financial strain and care receivers' ADLs were the two main concerns interfering with the caregivers' mental health (Lau et al., 2012; Huang et al., 2009; Qiu & Li, 2008; Yu et al., 2013). Thus, it implies that in order to maintain caregiver health, nursing strategies and policies should target these factors before they become issues in caregiving situations.

Filial Behavior and Caregiver Physical and Mental Health

Inferential Analysis of Filial Behavior and Caregiver Physical and Mental Health

Filial behavior was only associated with caregiver mental health. Although relevant concepts such as filial piety, filial obligation, or filial expectations were extensively studied with caregiver health (Sun et al., 2012), seldom was filial behavior

alone explored with caregiver health, particularly with physical health in caregivers; thus, this study may have filled that gap, although the comparison is limited due to the unavailability of similar findings. Because filial behavior was correlated significantly with caregiver depression, it was reasonable to assume that filial behavior was also correlated with mental health. Moreover, filial behaviors were ways of expressing filial piety to their parents, not only fulfilling the role responsibilities as adult children but also protecting them from the stress of stigma (Tang, 2011; Zhan et al., 2011).

However, the association of filial behavior with caregiver mental health was not as strong as filial attitude, probably because filial attitude and filial behavior tap very different perspectives of filial piety (Chappell & Funk, 2012). Filial behavior was neither associated with nor predicted caregiver mental health after adjusting for age and gender, or further adjusting for caregivers' monthly income and care receivers' functional impairment. Although age and gender were not significantly associated with caregiver mental health in this model, the findings indicated that older female caregivers might view caregiving behaviors as more of a burden than a relief of their mental strain. Other explanations were also similar to those discussed in the section on filial attitude and physical and mental health. Monthly income and care receivers' activities of daily living were more disruptive and predicted a larger variance in caregiver mental health than filial behaviors.

Perceived Social Support and Caregiver Physical and Mental Health

Inferential Analysis of Perceived Social Support and Caregiver Physical and Mental Health

Perceived social support was significantly positively associated only with mental health in this study, even after adjusting for caregiver age and gender. Again, perceived social support was more of a mental activity so it was not associated with physical health. The findings were in line with other social support research (McCullagh, Brigstocke, Donaldson, & Kalra, 2005, Grant et al., 2006; Liu, 2010; Shyu et al., 2012), but was inconsistent with the findings of Yu et al. (2013). The conflicting findings among the studies could be due to different samples. Older spouse caregivers may experience diminished social networks due to retirement and long engagement in caregiving, hence perceiving insufficient social support, which demonstrated no impact on their better health outcomes. The other rationale could be that fewer social support resources were available for caregivers currently in China.

Three perspectives regarding upgrading Chinese caregiver social support were suggested. It is advocated that supportive resources such as home-care services in the community (day care centers, respite care, care volunteers, trained helpers, nursing consultation or education) and government funds are urgently in need to help these caregivers maintain their health and caregiving capacity. Secondly, as caregivers were mostly confined at home for caregiving, community nurses should assist them to become familiar with available resources. Thirdly, since culturally Chinese family caregivers tend not to trouble others (Ho et al., 2009) and not to avail themselves of formal social

support (Lai, 2010), community nurses could play an important role in promoting caregivers' utilization of available resources and mobilizing resources for their needs. Therefore, it is necessary to assist caregivers to develop their personal capital.

When further adjusting for caregivers' monthly income and care receivers' functional impairment, the association of perceived social support (PSS) with caregiver mental health became insignificant. The two covariates may have been more disturbing to caregiver mental health than PSS. Adult child caregivers who had higher monthly income and cared for parents with less impaired activities of daily living had better mental health regardless of their perceived social support. This is also indicative for nursing strategies or government policies to focus on dealing with the two covariates which could enhance caregiver mental health.

In summary, among independent variables, mutuality was associated significantly with and could be a predictor of caregiver physical health. Filial attitude and perceived social support were significantly associated with caregiver mental health, but none of the independent variables significantly predicted caregiver mental health. These associations were mediated by several covariates. The findings in this study are instructive for future nursing strategies and policies.

Implications

Implications for Theory and Practice

This study supports role theory in that it identifies resources for coping with role strain. Filial piety (specifically, filial attitude) and perceived social support can also be viewed as caregiver resources in the difficult caregiving context (Chappell & Funk, 2012). The relationships between mutuality, perceived social support, and filial behavior

enrich role theory in the resources for promoting caregiver health. With the pervasive filial attitudes in these caregivers and in Chinese culture, filial piety has both meaning and significance in relation to caregiver health outcomes. With a high volume of role enactment, the potential for caregiver role strain and role overload in contemporary China is also great.

For nursing practice, apart from screening for depression and physical and mental health, caregiver mutuality, filial piety, and perceived social support can be part of the routine health assessment by community or family care nurses. Potential negative health outcomes in caregivers with high filial attitude can be identified early. In order to sustain and facilitate family caregiving at home, constructive nursing strategies can be developed. For example, education, training, or consultation can help interpret caregiving meanings to build harmonious caregiving dyadic mutuality in stroke caregivers, and promote an environment rich in filial piety. This could also be useful in locating, utilizing, and linking caregivers to social support. Finally, because Chinese females made up most of the caregiver group, gender oriented and culturally sensitive nursing strategies need to be developed.

Implications for Research

This study contributed knowledge about the association of mutuality, filial piety, and perceived social support with health among adult child caregivers of parent stroke survivors. A Chinese version of the Mutuality Scale was used for the first time in caregivers of parent stroke survivors in mainland China. Future research could be expanded in the following areas:

1. In the area of mutuality, comparative research interest on caregiver mutuality across cultures, or the relationship between cultural values and caregiver mutuality deserves further exploration. In addition, forms of effect such as direct association, mediation, or moderation of mutuality need to be examined. It is recommended that the association between mutuality and caregiver physical health be further confirmed and discussed. Lastly, interventional studies are encouraged on how to promote the adult child-parent caregiving relationship at home, or in long-term care situations such as with institutionalized parents, or among other caregiving dyads.

2. In the area of filial piety, re-examination of the concept is necessary because it may have undergone a transformation in the rapid modernization in China. Qualitative research on how caregivers interpret their caregiver role, what role expectations are, and what the most frequent caregiving behaviors are in contemporary China could be a significant contribution. As some caregivers' perception of filial piety is an expectation, the possibility of it being a stressor instead of a rewarding role could affect caregiver health outcomes, future studies could use stress theory for this type of research.

Moreover, a mediation or moderation effect of filial attitude or filial behavior is a salient avenue of future caregiving research. Finally, clarification of the association between filial obligation, filial responsibility, filial attitude, filial behavior, filial piety, and caregiver health needs endures efforts in the changing society of China. Cross cultural, cross generational, and urban and rural comparative studies are also important to fully understand these concepts and relationships.

3. In the area of perceived social support, because perceived social support in caregivers was relatively low in the area of support from friends and significant others,

research should be directed on how to promote the access or utilization of other forms of social support, such as formal social support for caregivers. Besides, similar mediation or moderation effects of perceived social support on caregiver health outcomes are of great interest.

4. As for the inclusion of respondents, because of the increasing number of stroke survivors who will be cared for in institutions in the future, further studies should include caregivers such as helpers, spouses and other family caregivers to make comparisons in the relationships of these variables under study in different groups.

5. In the area of covariates, this study indicated that age, gender, number of diseases, type of employment, monthly income of the caregivers, and functional impairment of the care receivers were the factors affecting adult child caregivers' health. Future study can also explore the relationship between caregiver employment, co-residence, care receiver age, gender, and caregiver health.

Implications for Policy

Family caregivers will continue to be an irreplaceable force in the care of elders with chronic conditions in China. The findings in this study have shown that caregivers with lower mutuality, weaker filial attitude, and less perceived social support experienced more depressive symptoms, and had poorer physical and mental health. Six covariates were larger influences on the impact of mutuality, filial piety, and perceived social support on caregiver depression or physical and mental health. Therefore, the current study suggests the following social policies to support adult child caregivers' efforts to care for their aging and disabled parents:

1. Use the media to inform the public on the importance of the caregiving relationships, filial attitudes, and social support necessary to sustain family caregivers. For example, use public media to spread information about access to available social resources.
2. Provide financial assistance to family caregivers such as subsidizing caregiving hours, and/or flexible working hours for the employed caregivers.
3. Provide adequate medical coverage or insurance for both the care receivers and their caregivers, particularly when institutionalization is inevitable.
4. Establish respite care organization and volunteer groups to support respite care.
5. Increase the number of accessible and affordable day care centers and home services to relieve caregivers' burden in the long term.

Limitations and Recommendations

This study limited the respondents specifically to adult child caregivers of parent stroke survivors; therefore, it provided insight into the health status and contributing factors of this group of current Chinese adult child caregivers caring for their aging and disabled parents. This and several other limitations should be kept in mind.

1. Sampling. Sampling bias may have existed in this study. Although cities were randomly selected, the hospitals or the community health centers were conveniently selected. Findings could be more generalizable if random selection had been more consistent.

Respondents were experienced caregivers providing care at home, or in some case previously provided care at home but currently provided care in the hospital due to their

parents' repeated episodes of stroke. A more homogeneous group of experienced caregivers at either home setting or hospital setting could be recruited for future studies.

Moreover, it was not known whether these caregivers were primarily urban residents or if some were rural residents who had moved to the city to provide care for their hospitalized parents. Characteristics of urban and rural caregivers could be quite different (Yu, 2011; Wang et al., 2010), such as levels of filial piety, support network, or caregiving ability. Their places of residence could have been recorded, and thus provide more insights on the differences of the relationships among the variables between caregivers of urban and those of rural areas.

2. Sample size. Although the minimum sample size calculated was 124 and the final sample was 126 respondents, a larger sample size might achieve more reliable findings. In addition, due to the small subgroup sample sizes, hospital-interviewed caregivers and community-interviewed caregivers were not able to compare for their differences in health outcomes.

Therefore, a larger sample size with randomly selected respondents from either the hospital or the community may provide more representative findings and greater generalizability in modern Chinese society.

3. Data collection. Data collection method could have had a self-selection bias. Respondents were caregivers who were willing to participate in the study, which may imply that they were on good terms with their parents, with stronger filial attitudes, and fewer negative health outcomes. Those who were conflicted about their caregiving role or who had health problems may have chosen not to participate.

In addition, this study used face-to-face interviews for data collection, and some respondents may have answered the questions, particularly those on mutuality and filial attitude, according to cultural expectations so bias may have occurred.

Therefore, using a random sample with take-home questionnaires, developing a trust rapport with the respondents and their families, or recruiting nurses who have worked with them for a period of time might contribute to more reliable findings.

4. Filial behavior scale. For the filial behavior scale used in this study, no detailed psychometrics were done on caregivers, and no solid reliability was reported in previous explorations. Cronbach's α was tested in this study after eliminating one item, whereas no confirmatory factor analysis (CFA) was further explored.

Thus, further psychometric studies of the filial behavior scale are necessary. Other filial piety scales with strong psychometrics, or developing a new filial piety scale which fits the Chinese caregiving situation can also be considered as alternatives.

5. Research design. Cause and effect relationship could not be derived as this was a cross-sectional correlational design. Therefore, a longitudinal design would allow researchers to observe the dynamic changes among the variables in the family caregiving dyads. In that way, the associations of the variables could be examined to see whether they are significant predictors over time.

In summary, future studies should include a longitudinal or comparative design with a larger sample size. Consideration of the differences among the community, hospital, and elder care homes, or between rural areas and urban districts is recommended. Recruitment could be done by trained health care staff that have a trusting relationship with the respondents. Filial piety tools should be carefully examined

and selected, and undergo strict psychometric tests. These adjustments might help achieve more reliable findings in the relationships among the variables under study, and enhance the understanding of these associations at different time points.

Conclusion

Recognition and assessment of the importance of mutuality, filial attitude, and perceived social support are often neglected in nursing practice and in the research literature in mainland China. The findings of this cross-sectional study indicate that higher levels of mutuality, filial attitude, and perceived social support were all associated with better self-reported health in adult child caregivers. These factors can be viewed as caregiving resources for adult child caregivers. Therefore, nursing interventions and/or policies that might enhance mutuality, filial attitude, and perceived social support in adult child caregivers of parent stroke survivors in China are warranted.

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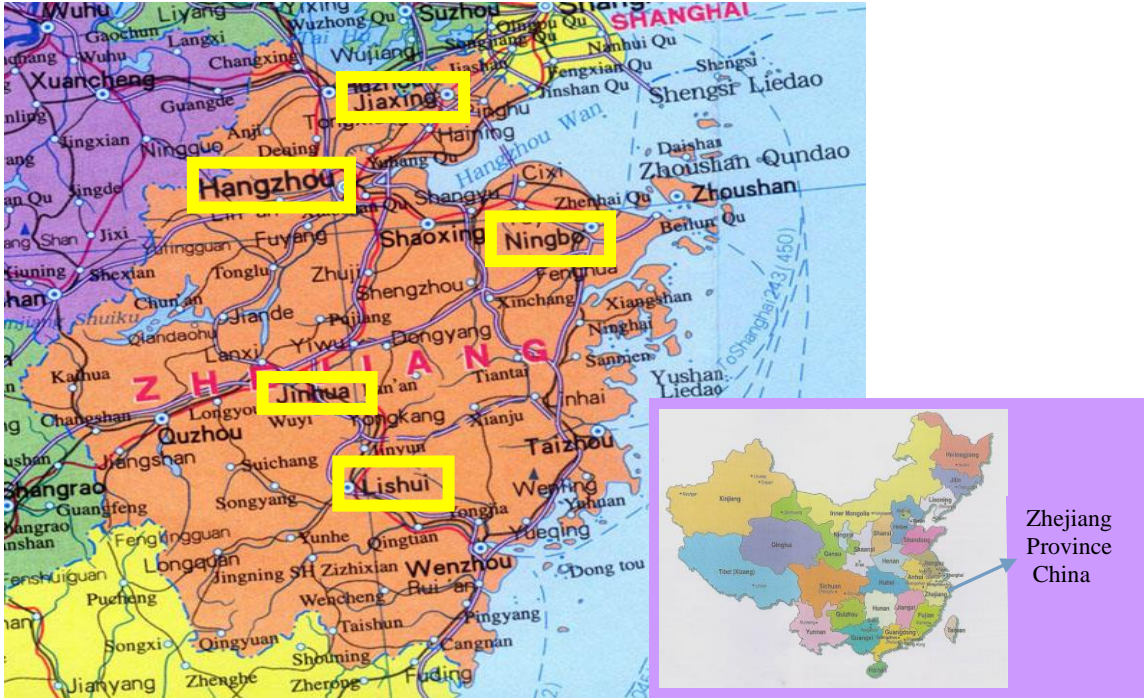
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APPENDIX A

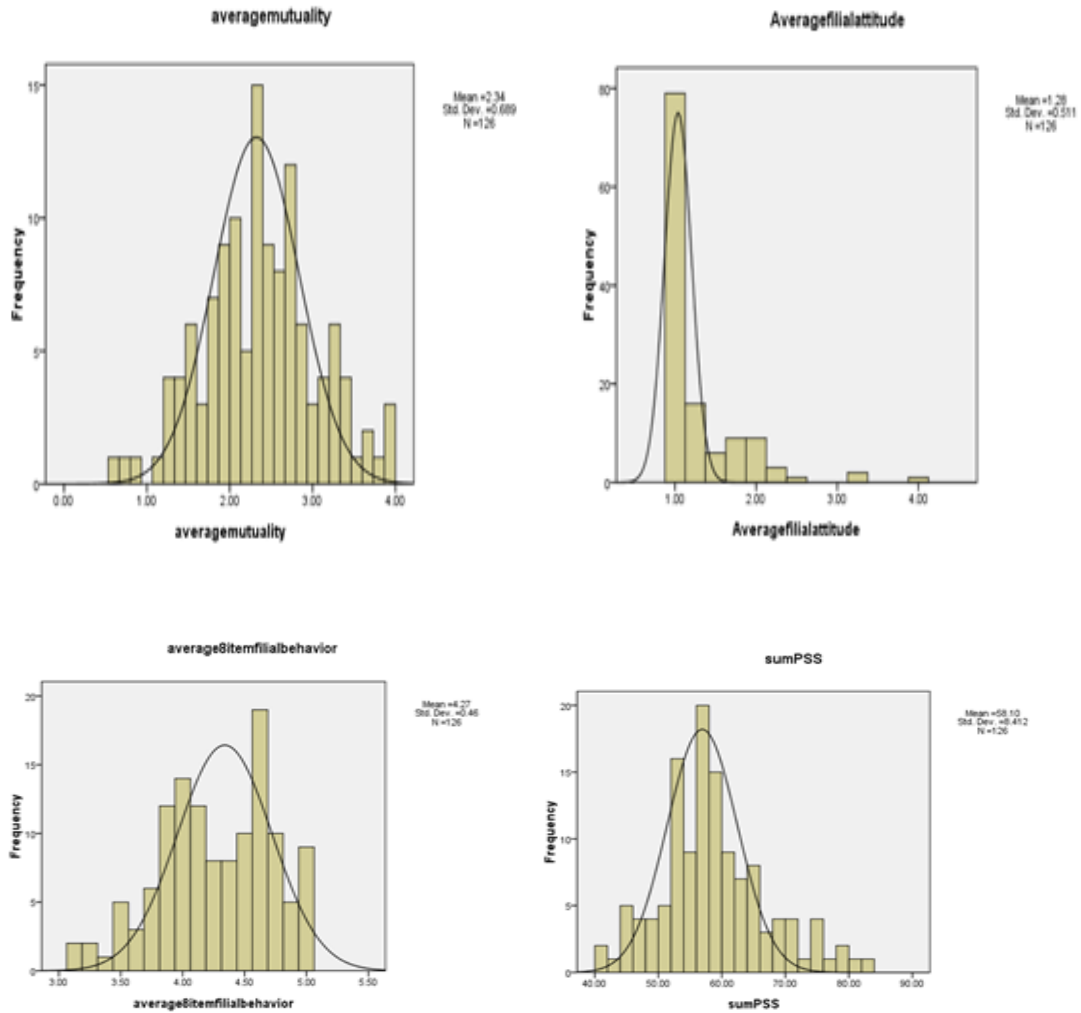
MAP OF DATA COLLECTION SITES

Map of data collection sites (cities of Jiaxing, Hangzhou, Ningbo, Jinhua, Lishui of Zhejiang Province, China).

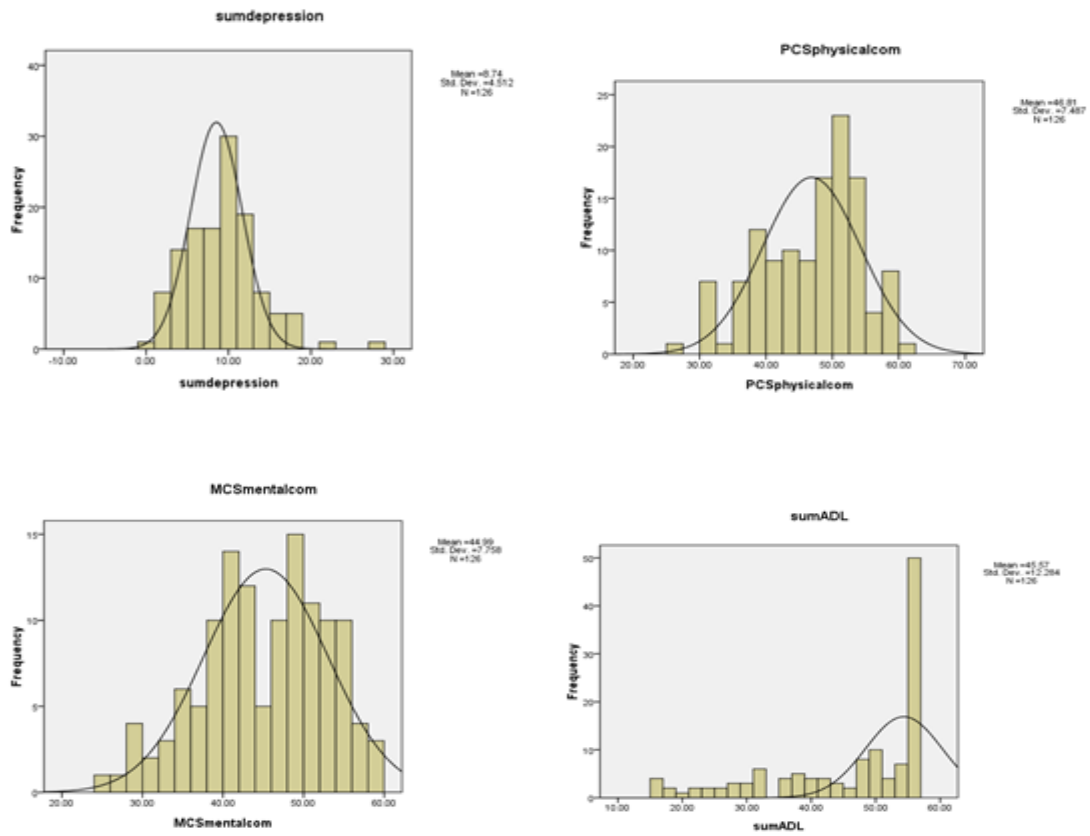


APPENDIX B

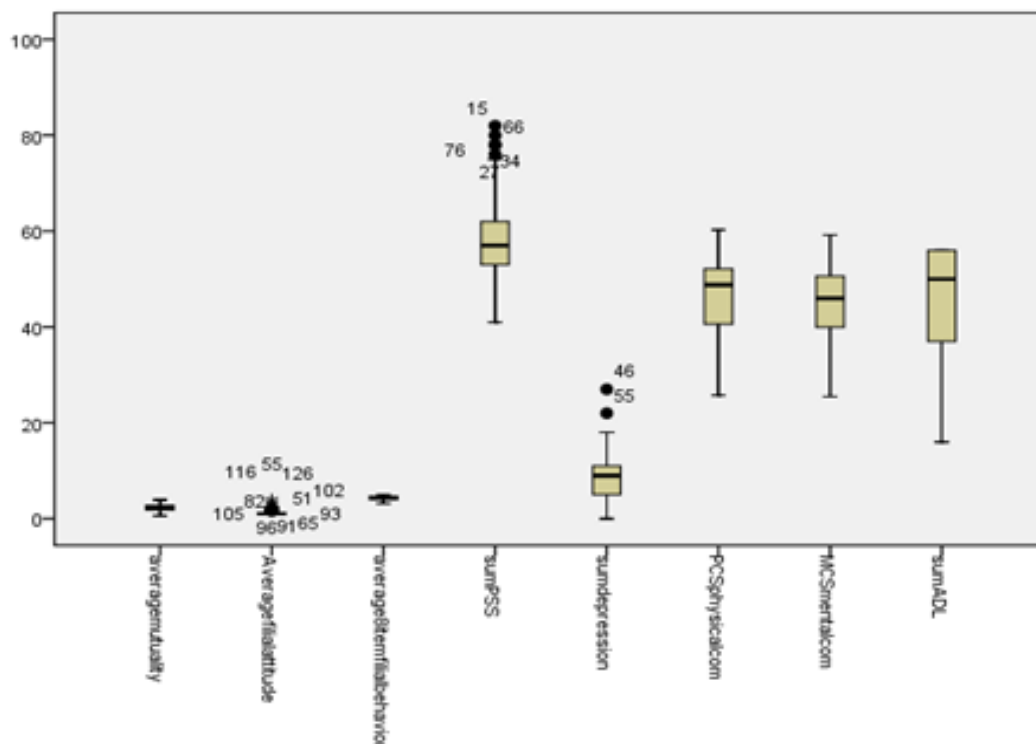
GRAPHS OF ANALYSIS



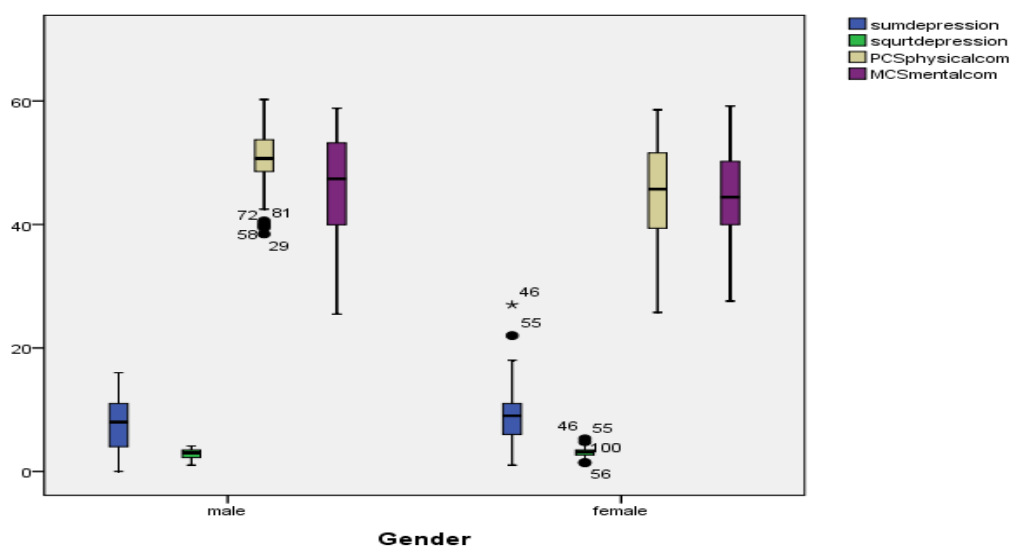
Graph 1. Histograms of Mutuality, Filial Attitude, Filial Behavior, Perceived Social Support, Depression, Physical Component Summary, Mental Component Summary, and Activities of Daily Living ($N = 126$)



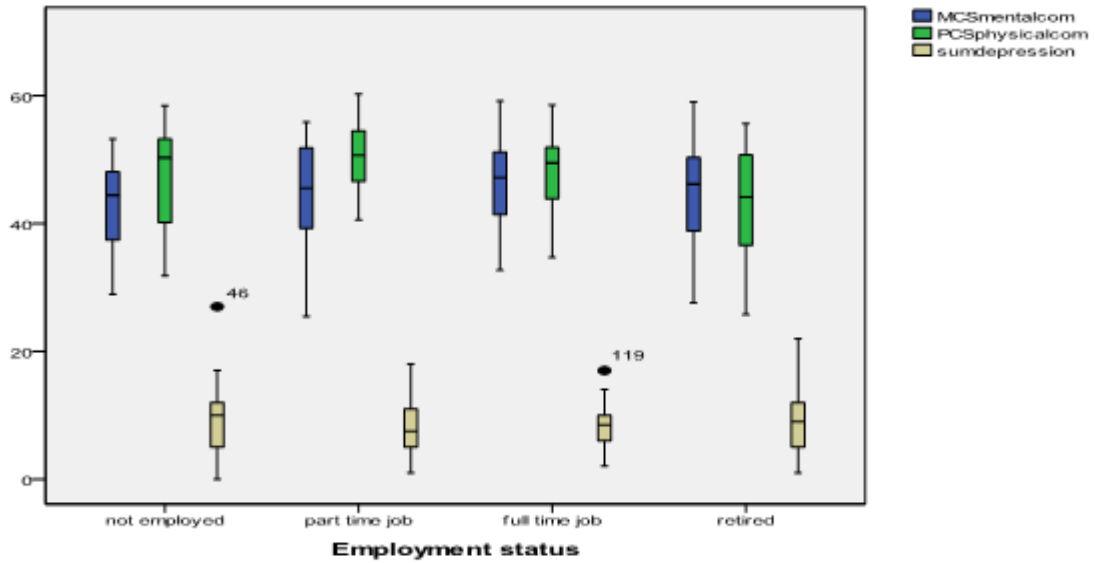
Graph 1. (continued). Histograms of Mutuality, Filial Attitude, Filial Behavior, Perceived Social Support, Depression, Physical Component Summary, Mental Component Summary, and Activities of Daily Living ($N = 126$)



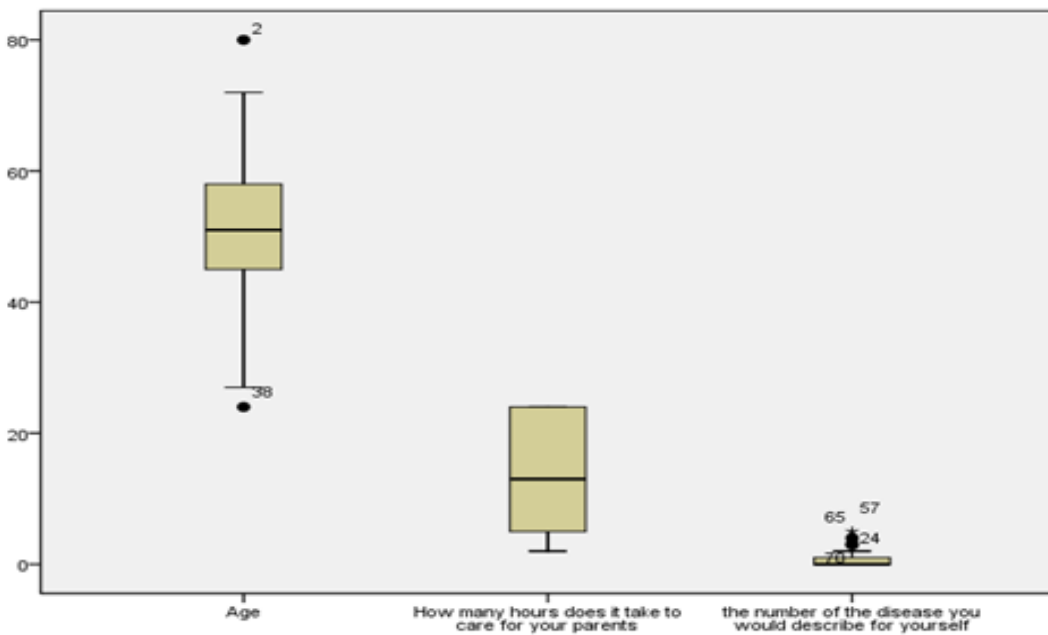
Graph 2. Box Plots of Mutuality, Filial Attitude, Filial Behavior, Perceived Social Support, Depression, Physical Component Summary, Mental Component Summary, and Activities of Daily Living ($N = 126$)



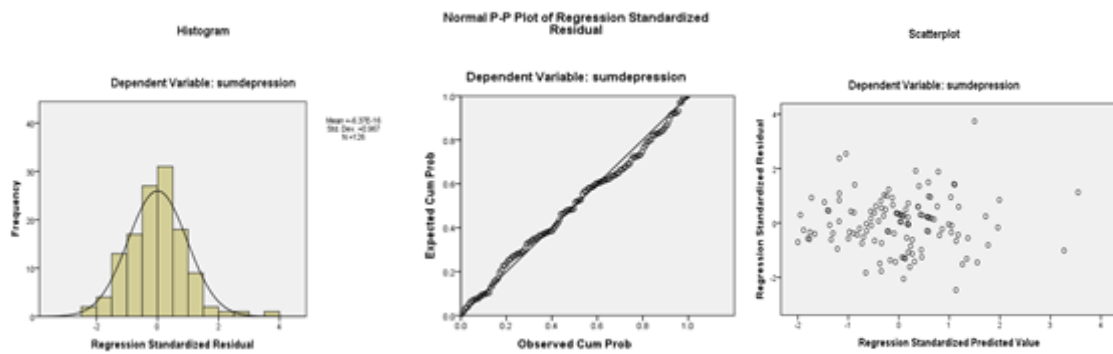
Graph 3. Box Plots of Depression, Physical Component Summary, Mental Component Summary of Both Male ($n = 38$) and Female ($n = 88$) Groups



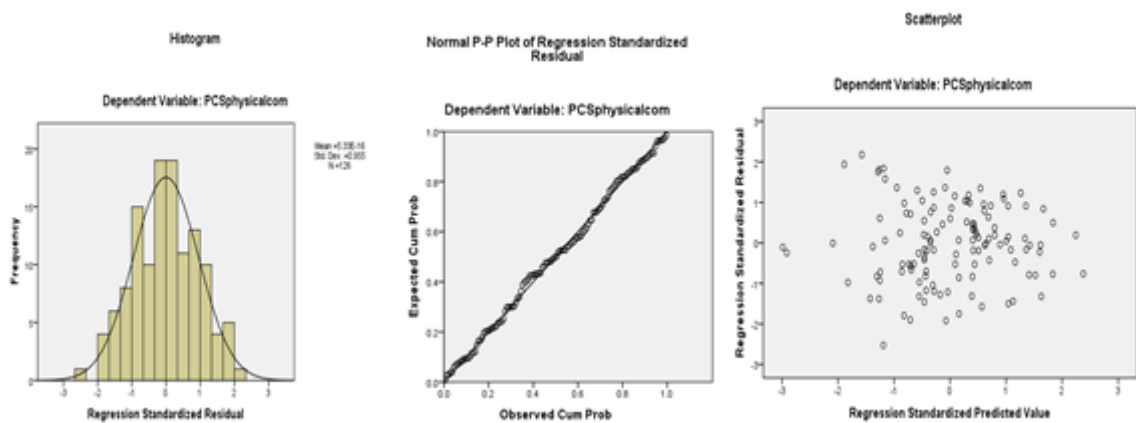
Graph 4. Box Plots of Depression, Physical Component Summary, and Mental Component Summary in the Employment Type Groups (Not Employed $n = 21$, Part Time Job $n = 24$, Full Time Job $n = 40$, Retired $n = 41$, Total $N = 126$)



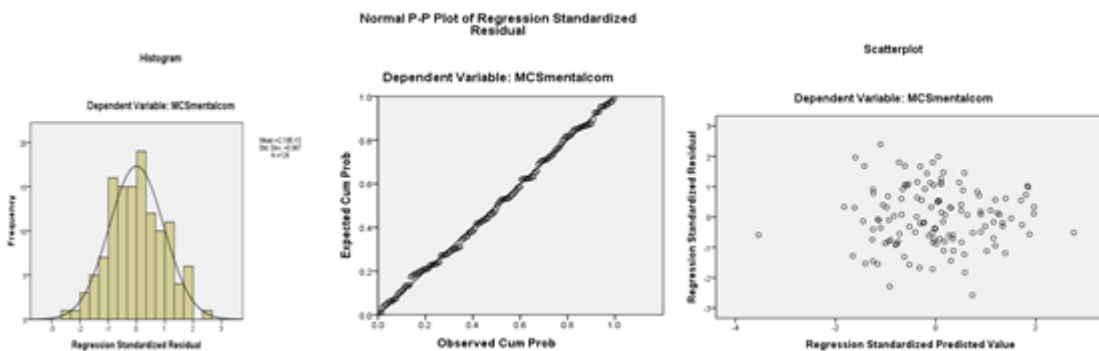
Graph 5. Box Plots of Age, Hours of Care Each Day, and Number of Diseases ($N = 126$)



Graph 6. The Regression Standardized Residual Histogram, Q - Q plot, and Scatterplot of Depression ($N = 126$)



Graph 7. The Regression Standardized Residual Histogram, Q - Q plot, and Scatterplot of Physical Component Summary ($N = 126$)



Graph 8. The Regression Standardized Residual Histogram, Q - Q plot, and Scatterplot of Mental Component Summary ($N = 126$)

APPENDIX C

DATA COLLECTION MEASURES

C1 Demographic Questions for Adult Child Caregiver and His/Her Parent

Demographic Questions for Adult Child Caregiver and His/Her Parent

Please circle the number that best describes you and your parent's condition, or write the number of word on the line.

1. You are: ① Male ② Female
2. What is your age? ____ years old.
3. Are you: ①Married ② Divorced ③Widowed ④Single
4. What is your highest level of formal education you have completed?
①None ② Elementary ③Middle school ④High school ⑤Associate degree
⑥Bachelor degree and above
5. What is your employment status?
① Not employed ② Part time job ③Full time job ④Retired
6. What is your average monthly income?
① < 2000 Yuan ② 2001- 4000 Yuan ③4001-6000 Yuan ④> 6001 Yuan
7. You are the care receiver's: ①Son ② Daughter ③Son-in-Law
④Daughter-in-Law.
8. Are you living with your parent whom you are taking care of? ① Yes ② No
9. Where is the care-receiver being cared for at the time of the interview with the caregiver? ①Home ② Hospital
10. How long have you been taking care for your parent? ____ years and ____ months.
11. How many hours does it take to care for your parent? ____ hours a day
or ____ hours a week.
12. How many people share your care-giving workload of your parent? ____ your other parent; _____ siblings and ____ helpers.

13. Are you rating yourself healthy? ①Yes ② No

If your answer is ② for this question, please state the number of the diseases ____ you would describe for yourself (already diagnosed).

14. Please help us fill out some information about your parent (the care-receiver) as the following:

a. His/her sex: ①Male ② Female

b. His/her age: ____ years old.

c. How many attacks of stroke he/she has had including this time? ____ times.

d. How long he has had the last attack of stroke? ____ years and months.

e. How long he has been discharged from hospital? ____ months.

f. Type of payment for his/her medical service:

①Do not need to pay by himself/herself.

②Paid partially himself/herself.

③Paid totally by himself/herself.

C2 Activities of Daily Living Scale (ADLs)

Activities of Daily Living Scale (ADLs)

Please circle the number that best describes your care receiver's condition on daily activities.

1= Performs without difficulty or help

2= Performs with difficulty

3= Performs with assistance

4= Unable to perform

Items	Levels			
	Performs without difficulty or help	Performs with difficulty	Performs with assistance	Unable to perform
1. Taking public transportation	1	2	3	4
2. Walking	1	2	3	4
3. Preparing meal	1	2	3	4
4. Housekeeping	1	2	3	4
5. Self-medication	1	2	3	4
6. Eating	1	2	3	4
7. Dressing	1	2	3	4
8. Grooming	1	2	3	4
9. Laundry	1	2	3	4
10. Bathing	1	2	3	4
11. Shopping	1	2	3	4
12. Toileting	1	2	3	4
13. Using telephone	1	2	3	4
14. Money management	1	2	3	4

C3 Mutuality Scale

Mutuality Scale

This is to survey the feelings of you and your family care receiver toward each other. Please answer the following questions which describe you the best.

You and your loved one					
	Not at all	A little	Some	Quite a bit	A great deal
1. To what extent do the two of you see eye to eye?	0	1	2	3	4
2. How close do you feel to him or her?	0	1	2	3	4
3. How much do you enjoy sharing past experiences with him or her?	0	1	2	3	4
4. How much does he or she express feelings of appreciation for you and the things you do?	0	1	2	3	4
5. How attached are you to him or her?	0	1	2	3	4
6. How much does he or she help you?	0	1	2	3	4
7. How much do you like to sit and talk with him or her?	0	1	2	3	4
8. How much love do you feel for him or her?	0	1	2	3	4
9. To what extent do the two of you share the same values?	0	1	2	3	4
10. When you really need it, how much does he or she comfort you?	0	1	2	3	4
11. How much do the two of you laugh together?	0	1	2	3	4
12. How much do you confide in him or her?	0	1	2	3	4
13. How much emotional support does he or she give you?	0	1	2	3	4
14. To what extent do you enjoy the time the two of you spend together?	0	1	2	3	4
15. How often does he or she express feelings of warmth toward you?	0	1	2	3	4

C4 Filial Behavior Scale and Filial Attitude Scale

Filial Behavior Scale and Filial Attitude Scale

The following is a list of the filial behaviors. Please answer each item by ticking a choice that applies to your situations.					
	Ne - ver	Rare -ly	Some- times	Of- ten	Al- most always
1. Maintaining contact	1	2	3	4	5
2. Giving practical assistance with daily routines (e.g., housework and other errands)	1	2	3	4	5
3. Providing financial assistance	1	2	3	4	5
4. Being obedient on important matters	1	2	3	4	5
5. Being accommodating on mundane matters	1	2	3	4	5
6. Showing respect (deference) before others	1	2	3	4	5
7. Taking the parent to the doctor when he or she is ill	1	2	3	4	5
8. Providing personal care when the parent is ill	1	2	3	4	5
9. Listening to your parent's problems (listening to other's thoughts and problems)	1	2	3	4	5
Please tick the number on the line to indicate what degree that you agree or disagree the following statements of filial beliefs.					
1. One should be appreciative of parents' loving-kindness	1 2 3 4 5 6 7				
	Strongly agree				Strongly disagree
2. One should treat his/her parents kindly regardless of how s/he has been treated	1 2 3 4 5 6 7				
	Strongly agree				Strongly disagree
3. One should provide his/her parents well	1 2 3 4 5 6 7				
	Strongly agree				Strongly disagree
4. One should honor his/her parents and make them proud	1 2 3 4 5 6 7				
	Strongly agree				Strongly disagree

C5 Multidimensional Scale of Perceived Social Support (MSPSS)

Multidimensional Scale of Perceived Social Support (MSPSS)

The following is a list of statements on your appraisal of social support. Please circle the number that best describes your situation.

Item	Strong -ly Dis- agree	Dis- agree	Slight- ly Dis- agree	Neither agree nor Dis- agree	Slight -ly Agree	Agree	Strong- ly Agree
1. There is a special person who is around when I am in need.	1	2	3	4	5	6	7
2. There is a special person with whom I can share my joys and sorrows	1	2	3	4	5	6	7
3. My family really tries to help me	1	2	3	4	5	6	7
4. I get the emotional help and support I need from my family.	1	2	3	4	5	6	7
5. I have a special person who is a real source of comfort to me.	1	2	3	4	5	6	7
6. My friends really try to help me.	1	2	3	4	5	6	7
7. I can count on my friends when things go wrong.	1	2	3	4	5	6	7
8. I can talk about my problems with my family.	1	2	3	4	5	6	7
9. I have friends with whom I can share my joys and sorrows	1	2	3	4	5	6	7
10. There is a special person in my life who cares about my feelings	1	2	3	4	5	6	7
11. My family is willing to help me make decisions	1	2	3	4	5	6	7
12. I can talk about my problems with my friends	1	2	3	4	5	6	7

C6 Center for Epidemiological Study Depression Scale (CES-D 10)

Center for Epidemiological Study Depression Scale (CES-D 10)






Please read the following items, which indicate individual's feelings and behaviors. Recall your experience in the past week, and tick the answer in the number that best reflects how often you had each of these symptoms.




Items	Rarely or none of the time	Some of the time	Much of the time	Most of the time or all of the time
1. I was bothered by things that usually don't bother me	0	1	2	3
2. I had trouble keeping my mind on what I was doing	0	1	2	3
3. I felt depressed.	0	1	2	3
4. I felt that everything I did was an effort	0	1	2	3
5. I felt hopeful about the future	0	1	2	3
6. I felt fearful.	0	1	2	3
7. My sleep was restless	0	1	2	3
8. I was happy	0	1	2	3
9. I felt lonely	0	1	2	3
10. I could not get going	0	1	2	3






C7 Standard SF-12 Health Survey Version 2.0 (SF-12v2)






Standard SF-12 Health Survey Version 2.0 (SF-12v2)

This survey asks for your views about your health. This information will help keep track of how you feel and how well you are able to do your usual activities. Answer every question by selecting the answer as indicated. If you are unsure about how to answer a question, please give the best answer you can.

1. In general, would you say your health is:				
Excellent	Very good	Good	Fair	Poor
				
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

2. The following questions are about activities you might do during a typical day. Does <u>your health now limit you</u> in these activities? If so, how much?			
	Yes, limited a lot	Yes, limited a little	No, not limited at all
a. Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf			
	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
b. Climbing several flights of stairs	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3

3. During the <u>past 4 weeks</u> , how much of the time have you had any of the following problems with your work or other regular daily activities as a result of your physical health?					
	All of the time	Most of the time	Some of the time	A little of the time	None of the time
					
a. <u>Accomplished less</u> than you would like	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
b. Were limited in the <u>kind</u> of work or other activities	<input type="checkbox"/> 1	<input type="checkbox"/> 2		<input type="checkbox"/> 4	<input type="checkbox"/> 5

4. During the <u>past 4 weeks</u> , how much of the time have you had any of the following problems with your work or other regular daily activities <u>as a result of any emotional problems</u> (such as feeling depressed or anxious)?					
	All of the time	Most of the time	Some of the time	A little of the time	None of the time
					
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<p>a. Accomplished less than you would like</p> <p>b. Did work or activities <u>less</u> carefully than usual</p>	<div style="display: flex; justify-content: space-around;"> <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 </div> <div style="display: flex; justify-content: space-around;"> <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 </div>															
<p>5. During the <u>past 4 weeks</u>, how much did <u>pain</u> interfere with your normal work (including both work outside the home and housework)?</p>																
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">Not at all</td> <td style="width: 20%;">A little bit</td> <td style="width: 20%;">Moderately</td> <td style="width: 20%;">Quite a bit</td> <td style="width: 20%;">Extremely</td> </tr> <tr> <td style="text-align: center;">▼</td> <td style="text-align: center;">▼</td> <td style="text-align: center;">▼</td> <td style="text-align: center;">▼</td> <td style="text-align: center;">▼</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/> 1</td> <td style="text-align: center;"><input type="checkbox"/> 2</td> <td style="text-align: center;"><input type="checkbox"/> 3</td> <td style="text-align: center;"><input type="checkbox"/> 4</td> <td style="text-align: center;"><input type="checkbox"/> 5</td> </tr> </table>		Not at all	A little bit	Moderately	Quite a bit	Extremely	▼	▼	▼	▼	▼	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
Not at all	A little bit	Moderately	Quite a bit	Extremely												
▼	▼	▼	▼	▼												
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5												
<p>6. These questions are about how you feel and how things have been with you <u>during the past 4 weeks</u>. For each question, please give the one answer that comes closest to the way you have been feeling. How much of the time during the past 4 weeks</p>																
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">All of the time</td> <td style="width: 20%;">Most of the time</td> <td style="width: 20%;">Some of the time</td> <td style="width: 20%;">A little of the time</td> <td style="width: 20%;">None of the time</td> </tr> <tr> <td style="text-align: center;">▼</td> <td style="text-align: center;">▼</td> <td style="text-align: center;">▼</td> <td style="text-align: center;">▼</td> <td style="text-align: center;">▼</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/> 1</td> <td style="text-align: center;"><input type="checkbox"/> 2</td> <td style="text-align: center;"><input type="checkbox"/> 3</td> <td style="text-align: center;"><input type="checkbox"/> 4</td> <td style="text-align: center;"><input type="checkbox"/> 5</td> </tr> </table>		All of the time	Most of the time	Some of the time	A little of the time	None of the time	▼	▼	▼	▼	▼	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
All of the time	Most of the time	Some of the time	A little of the time	None of the time												
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<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5												
<p>a. Have you felt calm and peaceful?</p> <p>b. Did you have a lot of energy?</p> <p>c. Have you felt down hearted and depressed?</p>	<div style="display: flex; justify-content: space-around;"> <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 </div> <div style="display: flex; justify-content: space-around;"> <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 </div> <div style="display: flex; justify-content: space-around;"> <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 </div>															
<p>7. During the <u>past 4 weeks</u>, how much of the time has your <u>physical health or emotional problems interfered with your social activities</u> (like visiting friends, relatives, etc.)?</p>																
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">All of the time</td> <td style="width: 20%;">Most of the time</td> <td style="width: 20%;">Some of the time</td> <td style="width: 20%;">A little of the time</td> <td style="width: 20%;">None of the time</td> </tr> <tr> <td style="text-align: center;">▼</td> <td style="text-align: center;">▼</td> <td style="text-align: center;">▼</td> <td style="text-align: center;">▼</td> <td style="text-align: center;">▼</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/> 1</td> <td style="text-align: center;"><input type="checkbox"/> 2</td> <td style="text-align: center;"><input type="checkbox"/> 3</td> <td style="text-align: center;"><input type="checkbox"/> 4</td> <td style="text-align: center;"><input type="checkbox"/> 5</td> </tr> </table>		All of the time	Most of the time	Some of the time	A little of the time	None of the time	▼	▼	▼	▼	▼	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
All of the time	Most of the time	Some of the time	A little of the time	None of the time												
▼	▼	▼	▼	▼												
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5												
<p>Thank you for completing these questions.</p>																

C8 成年子女照顾者和父母的一般情况调查表

成年子女照顾者和父母的一般情况调查表

请圈出最符合您和您的父母的情况的选项，或者在横线上填入相应的数字。

1. 您的性别：① 男 ② 女
2. 您的年龄？ _____ 周岁
3. 您的婚姻状况：① 已婚 ② 离婚 ③ 丧偶 ④ 单身
4. 您完成的最高学历：① 文盲 ② 小学 ③ 初中 ④ 高中 ⑤ 大专 ⑥ 本科及以上
5. 您的工作状态：① 无工作 ② 半职工作 ③ 全职工作 ④ 退休
6. 您的月平均收入？① 小于2000元 ② 2001- 4000元 ③ 4001-6000元 ④ 6001以上
7. 您是被照顾者的：① 儿子 ② 女儿 ③ 女婿 ④ 媳妇
8. 您和您的照顾者住一起吗？① 是 ② 不是
9. 受访时，您在哪里照顾您的被照顾者？① 在家 ② 在医院
10. 您照顾他/她有多长时间了？ _____ 年或 _____ 个月
11. 您化多少时间照顾他/她？ _____ 小时/天，或 _____ 小时/周
12. 你有几个人一起照顾他/她？ _____ 个父母； _____ 个兄弟姐妹； _____ 个保姆
13. 您认为你自己身体健康吗？ ① 是 ② 不是

如果您上一题的选项是 ②，请填上您已经确诊的疾病数量： _____ 种

14. 请帮助我们填写您的被照顾者的相关提问：
 - a. 他/她的性别：① 男 ② 女
 - b. 他/她的年龄： _____ 周岁
 - c. 包括这次，他/她一共有过几次中风？ _____ 次
 - d. 从最近这次中风到目前为止有多长时间了？ _____ 年或 _____ 个月
 - e. 这次中风出院有多长时间了？ _____ 个月
 - f. 他/她医疗费用支出的方式：
 - ① 他/她自己不需支付
 - ② 他/她需要部分自费
 - ③ 他/她需要全自费

C9 中文版日常生活能力量表

中文版日常生活能力量表

请圈出最符合您的被照顾者的生活能力情况：

1 = 自己完全可以做，无困难不需要帮助

2 = 有些困难

3 = 需要帮助

4 = 根本无法做

条 目	自己完全可以 做，无困难， 不需要帮助	有些困难	需要帮助	根本无法做
1. 使用公共车辆	1	2	3	4
2. 行走	1	2	3	4
3. 做饭菜	1	2	3	4
4. 做家务	1	2	3	4
5. 吃药	1	2	3	4
6. 吃饭	1	2	3	4
7. 穿衣	1	2	3	4
8. 梳头刷牙等	1	2	3	4
9. 洗衣	1	2	3	4
10. 洗澡	1	2	3	4
11. 购物	1	2	3	4
12. 定时上厕所	1	2	3	4
13. 打电话	1	2	3	4
14. 处理自己钱财	1	2	3	4

C10 中文版相依关系量表

中文版相依关系量表

以下是关于您和您的这位家人对彼此的感受，请选择一项最符合您的情况的选项并在后面数字上打勾。

您和您的家人					
	一点也没有	一点点	有一些	相当多	非常多
1. 您们对事情的看法有多一致？	0	1	2	3	4
2. 您觉得与他（她）有多亲近？	0	1	2	3	4
3. 您有多喜欢和他（她）分享过去的经验？	0	1	2	3	4
4. 他（她）有多少时候对您和您所做的事表达谢意？	0	1	2	3	4
5. 您在情感上有多依附他（她）？	0	1	2	3	4
6. 他（她）帮了您多少？	0	1	2	3	4
7. 您喜欢坐下来和他（她）谈话的程度有多少？	0	1	2	3	4
8. 您觉得您有多爱他（她）？	0	1	2	3	4
9. 您们俩人价值观相同的程度有多少？	0	1	2	3	4
10. 当您真正需要时，他（她）安慰您的程度有多少？	0	1	2	3	4
11. 您们多常笑在一起？	0	1	2	3	4
12. 您跟他（她）知心的程度如何（有些事只会告诉他（她），不会告诉别人）？	0	1	2	3	4
13. 他（她）给予您多少的情绪支持？	0	1	2	3	4
14. 您有多享受和他（她）在一起的时光？	0	1	2	3	4
15. 他（她）多常表达对您的体贴？	0	1	2	3	4

C11 孝行和行孝态度表

孝行和行孝态度表

<p>以下是一些描述你对父母所做的事，在后面选择一个最符合你的情况的选项并在相应的数字上打勾。</p>					
	从 不	很 少	有 时	经 常	总 是
1. 与父母保持联系	1	2	3	4	5
2. 照顾父母的饮食起居	1	2	3	4	5
3. 给父母零用钱或帮父母付帐单	1	2	3	4	5
4. 在有些重要的事情上听父母的	1	2	3	4	5
5. 在一般的事情上尽量迁就父母	1	2	3	4	5
6. 在他人面前表示对父母的尊重	1	2	3	4	5
7. 当父母身体不适时陪他（她）们去看医生	1	2	3	4	5
8. 当父母不适时照顾他（她）们	1	2	3	4	5
9. 倾听父母的烦恼（例如病痛或生活上不愉快的事情）	1	2	3	4	5
<p>以下是一些关于你对父母的态度，从1（强烈同意）依次变化至7（强烈反对），根据你对这些说法的同意程度，请在后面相应的数字上打勾。</p>					
1. 对父母的养育之恩心存感激	1 2 3 4 5 6 7				
	强烈同意			强烈反对	
2. 无论父母对您如何不好， 仍然善待他们	1 2 3 4 5 6 7				
	强烈同意			强烈反对	
3. 赡养父母使他们生活更为 舒适	1 2 3 4 5 6 7				
	强烈同意			强烈反对	
4. 子女应该做些让父母有光彩 的事	1 2 3 4 5 6 7				
	强烈同意			强烈反对	

C12 中文版领悟社会支持量表

中文版领悟社会支持量表

以下陈述是关于您对您的社会支持的评价，请你在每句后选项框内选择一个最符合您的想法的选项。

条 目	极 不 符 合	很 不 符 合	不 符 合	不 确 定	符 合	很 符 合	极 其 符 合
1. 总有人在我需要时提供帮助	1	2	3	4	5	6	7
2. 我有一个可以与我分享欢乐和痛苦的人	1	2	3	4	5	6	7
3. 我的家人真的十分愿意帮助我	1	2	3	4	5	6	7
4. 我从家庭中能得到感情上的帮助和支持	1	2	3	4	5	6	7
5. 我身边有一个能真正安慰我的人	1	2	3	4	5	6	7
6. 我的朋友们真正地尽力帮我	1	2	3	4	5	6	7
7. 如果有什么事发生，我可以指望我的朋友们	1	2	3	4	5	6	7
8. 我可以与家人诉说自己的问题	1	2	3	4	5	6	7
9. 我有一些朋友可以分享我的快乐和忧愁	1	2	3	4	5	6	7
10. 我的生活中总有个人会关心我的感受	1	2	3	4	5	6	7
11. 我的家人愿意帮我一起拿主意	1	2	3	4	5	6	7
12. 我可以和我的朋友们诉说自己的难题	1	2	3	4	5	6	7

C13 中文版10-条目流行病调查中心抑郁量表

中文版10-条目流行病调查中心抑郁量表

请阅读下列条目，这些条目代表人的感受和行为，请问你过去一周中有多常有那样的感受和行为，并在后面勾上最能反映你情况的选项。

条 目	很少或 没有	有时	很多时间	绝大多数 时间或所 有时间
1. 最近烦一些原来不烦心的事	0	1	2	3
2. 不能集中精力做事	0	1	2	3
3. 感到情绪低沉	0	1	2	3
4. 觉得做每件事都费力	0	1	2	3
5. 感到未来充满希望	0	1	2	3
6. 感到担心、害怕	0	1	2	3
7. 睡不安稳	0	1	2	3
8. 感到快乐	0	1	2	3
9. 觉得孤单、寂寞	0	1	2	3
10. 觉得提不起劲儿来做事	0	1	2	3

C14 中文版 12-条目生活质量量表（第二版）

中文版 12-条目生活质量量表（第二版）

该项调查询问关于您对您自己的健康状况的看法，您所提供的信息有助于了解您的自我感觉和从事日常生活的能力。感谢您回答这份问卷！回答下列每一问题时，请在最适当的答案框内上打叉，即(☒)。

1. 总的来说，您认为您的健康状况是：

极好	很好	好	一般	差
▼	▼	▼	▼	▼
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

2. 下列几个问题是关于您在一天的日常生活中可能进行的活动。您目前的健康状况是否会限制您从事这些活动？如果限制的话，限制到什么程度？

	有很大限制	有一点限制	没有任何限制
	▼	▼	▼
a. 中等强度的活动，比如搬桌子、使用吸尘器清洁地面、玩保龄球或打太极拳	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
b. 上几层楼梯	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3

3. 在过去的四个星期里，您在工作或其它日常活动中，有多少时间会因为身体健康的原因而遇到下列的问题？

	常常如此	大部分时间	有时	偶尔	从来没有
	▼	▼	▼	▼	▼
a. 实际做完的比想做的要少	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
b. 工作或其它活动的种类受到限制	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

4. 在过去的四个星期里，您在工作或其它日常活动中，有多少时间会因为情绪方面的原因（比如感到沮丧或焦虑）而遇到下列的问题？

	常常如此 ▼	大部分时间 ▼	有时 ▼	偶尔 ▼	从来没有 ▼
a. 实际做完的比想做的要少	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
b. 工作或从事其它活动时 不如往常细心了	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

5. 在过去的四个星期里，您身体上的疼痛对您的日常工作（包括上班和家务）有多大影响？

毫无影响 ▼	有很少影响 ▼	有一些影响 ▼	有较大影响 ▼	有极大影响 ▼
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

6. 下列几个问题是有关您在过去四个星期里的自我感觉和其它一些情况。回答每一个问题时，请选择一个最接近您的感觉的答案。在过去的四个星期里，有多少时间：

	常常如此 ▼	大部分时间 ▼	有时 ▼	偶尔 ▼	从来没有 ▼
a. 您感到心平气和？	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
b. 您感到精力充沛？	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
c. 您觉得心情不好，闷闷不乐？	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

7. 在过去的四个星期里，有多少时间您的身体健康或情绪问题妨碍了您的社交活动（比如探亲、访友等）

常常有妨碍 ▼	大部分时间有妨碍 ▼	有时有妨碍 ▼	偶尔有妨碍 ▼	从来没有妨碍 ▼
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

谢谢您回答完这些问题！

APPENDIX D

ITEM OR SUBSCALE MEANS AND SDs OF THE SCALES

D1 Item means and SDs of the Mutuality Scale

Item Means and SDs of the Mutuality Scale

Items of mutuality scale	<i>M</i>	<i>SD</i>
1. To what extent do the two of you see eye to eye	2.13	0.85
2. How close do you feel to him or her	3.16	0.74
3. How much do you enjoy sharing past experiences with him or her	2.38	0.93
4. How much does he or she express feelings of appreciation for you and the things you do	1.98	1.02
5. How attached are you to him or her	2.51	1.03
6. How much does he or she help you	1.97	1.20
7. How much do you like to sit and talk with him or her	2.30	0.87
8. How much love do you feel for him or her	3.25	0.76
9. To what extent do the two of you share the same values	2.05	0.82
10. When you really need it, how much does he or she comfort you	1.98	1.05
11. How much do the two of you laugh together	2.35	1.20
12. How much do you confide in him or her	2.21	2.01
13. How much emotional support does he or she give you	2.10	1.02
14. To what extent do you enjoy the time the two of you spend together	2.60	0.79
15. How often does he or she express feelings of warmth toward you	2.15	1.06

D2 Item means and SDs of the Filial Attitude Scale

Item Means and SDs of the Filial Attitude Scale

Items of filial attitude scale	<i>M</i>	<i>SD</i>
1. One should be appreciative of parents' loving kindness	1.21	0.57
2. One should treat his/her parents kindly regardless of how she has been treated	1.30	0.67
3. One should provide his/her parents well	1.24	0.54
4. One should honor his/her parents and make them proud	1.38	0.73

D3 Item means and SDs of the Filial Behavior Scale

Item Means and SDs of the Filial Behavior Scale

Items of filial behavior scale	<i>M</i>	<i>SD</i>
1. Maintaining contact	4.48	0.60
2. Providing practical assistance with daily routine	4.20	0.80
3. Providing financial assistance	3.20	1.16
4. Being accommodating on mundane matters	4.22	0.66
5. Showing respect before others	4.62	0.54
6. Taking the parent to doctor when he/she is ill	4.75	0.51
7. Providing personal care when the parent is ill	4.73	0.53
8. Listening to parent's problems	3.95	0.83

D4 Item means and SDs of the Multidimensional Scale of Perceived Social Support

Item Means and SDs of the Multidimensional Scale of Perceived Social Support

Items of multidimensional scale of perceived social support	<i>M</i>	<i>SD</i>
1. There is a special person who is around when I am in need	4.33	0.93
2. There is a special person with whom I can share my joys and sorrows	4.43	1.05
3. My family really tries to help me	5.82	0.88
4. I get the emotional help and support I need from my family	5.75	0.92
5. I have a special person who is a real source of comfort to me	4.52	1.06
6. My friends really try to help me	4.39	1.05
7. I can count on my friends when things go wrong	4.13	1.01
8. I can talk about my problems with my family	5.55	0.89
9. I have friends with whom I can share my joys and sorrows	4.53	1.05
10. There is a special person in my life who cares about my feelings	4.47	1.00
11. My family is willing to help me make decisions	5.68	0.89
12. I can talk about my problems with my friends	4.52	0.95

D5 Item means and SDs of the 10-item Center for Epidemiological Studies Depression Scale

Item Means and SDs of the 10-item Center for Epidemiological Studies Depression Scale

Items of center for epidemiological studies depression scale	<i>M</i>	<i>SD</i>
1. I was bothered by things that usually do not bother me	0.83	0.69
2. I had trouble keeping my mind on what I was doing	0.70	0.67
3. I felt depressed	0.75	0.63
4. I felt that everything I did was an effort	0.77	0.72
5. I felt hopeful about the future	1.27	0.83
6. I felt fearful	0.75	0.73
7. My sleep was restless	1.09	0.92
8. I was happy	1.48	0.77
9. felt lonely	0.49	0.63
10. I could not get going	0.61	0.67

D6 Subscale means and SDs of the Second Version of Standard 12-item Health Survey (SF-12v2)

Subscale means and SDs of the Second Version of Standard 12-item Health Survey (SF-12v2)

Subscales of the second version of standard 12-item health survey (SF-12v2)	<i>M</i>	<i>SD</i>
1. Physical fitness	80.75	23.70
2. Role physical	68.45	23.06
3. Body pain	65.28	25.29
4. General health	39.33	22.68
Physical component score (PCS)	46.81	7.49
5. Vitality	62.90	19.93
6. Social function	43.45	28.84
7. Role emotion	69.94	20.63
8. Mental health	66.67	14.83
Mental component score (MCS)	44.99	7.76

D7 Item means and SDs of Activities of Daily Living

Item Means and SDs of Activities of Daily Living

Items of activities of daily living	<i>M</i>	<i>SD</i>
1. Taking public transportation	3.60	0.78
2. Walking	3.12	1.05
3. Meal preparation	3.65	0.75
4. Housekeeping	3.63	0.84
5. Self-medication	2.84	1.20
6. Eating	2.77	1.24
7. Dressing	2.92	1.18
8. Grooming	2.79	1.28
9. Laundry	3.66	0.78
10. Bathing	3.46	0.94
11. Shopping	3.78	0.59
12. Toileting	2.95	1.23
13. Using telephone	3.23	1.13
14. Money management	3.17	1.21