

January 2013

Gender Differences In Adult Child Caregiving Patterns: Associations With Care-Recipients' Physical And Mental Health And Cognitive Status

Ying Liu

Yale University, tracyliu860131@gmail.com

Follow this and additional works at: <http://elischolar.library.yale.edu/ysphtdl>

Recommended Citation

Liu, Ying, "Gender Differences In Adult Child Caregiving Patterns: Associations With Care-Recipients' Physical And Mental Health And Cognitive Status" (2013). *Public Health Theses*. 1181.
<http://elischolar.library.yale.edu/ysphtdl/1181>

This Open Access Thesis is brought to you for free and open access by the School of Public Health at EliScholar – A Digital Platform for Scholarly Publishing at Yale. It has been accepted for inclusion in Public Health Theses by an authorized administrator of EliScholar – A Digital Platform for Scholarly Publishing at Yale. For more information, please contact elischolar@yale.edu.

Gender differences in adult child caregiving patterns: Associations with care-recipients' physical
and mental health and cognitive status

Ying Liu

Yale School of Public Health

Candidate for Degree of

Master of Public Health

Abstract

Purpose of the study: To examine differences related to gender of adult child primary caregivers, caregiving patterns, and the association with care-recipients' physical and mental health and cognitive status.

Design and Method: A secondary analysis of the most recent national cross-sectional survey (National Health and Aging Trends Study (NHATS)) was conducted on 5616 community dwelling older adults (65 years of age or older). The relationships between gender of their adult child caregivers and intensity and duration of care, type of care provided, care-recipients' physical and mental health (self-reported health status, number of chronic diseases, depression and anxiety) and cognitive status were analyzed by bivariate and multivariate procedures.

Results: No statistically significant gender differences were found with regard to the duration of care, care-recipients' physical and mental health or cognitive status; however, type of care provided by adult child primary caregivers was found to differ significantly between men and women. Women provided more care with activities of daily living than men did.

Implications: Our study provides evidence in support of there being gender differences in family caregiving patterns to older people in western industrial countries. Interventions may need to be tailored to the distinct needs of son and daughter caregivers.

Key words: adult child caregiver, gender differences, physical health, depression and anxiety, cognitive status

Acknowledgements: I would like to thank Dr. Joan Monin and Dr. Mayur Desai of Yale School of Public Health for their guidance in this project. I also want to acknowledge everyone involved in NHATS study for their work contributing to the data source in this project.

Table of Contents

Introduction.....	5
Method.....	8
Participants and Procedure.....	8
Measures.....	10
Results.....	12
Preliminary Analyses.....	12
Hypothesis Testing.....	13
Discussion.....	13
References.....	18
Appendix.....	22
Table 1. Description of All Caregivers and Primary Caregivers.....	22
Table 2. Description of care recipients who have a son or daughter as their primary caregiver	23
Table 3. Correlation matrix of study measures and covariates.....	24
Table 4. Gender differences in the duration of care.....	25
Table 5. Gender differences in the type of care.....	26
Table 6. Multiple linear regression of care recipients' self-reported health status.....	27
Table 7. Multiple linear regression of number of care recipients' chronic diseases.....	28
Table 8. Multiple linear regression of care recipients' depression and anxiety status.....	29
Table 9. Multiple linear regression of cognitive status.....	30

**Gender differences in adult child caregiving patterns: Associations with care-recipients'
physical and mental health and cognitive status**

Introduction

In industrialized countries, increases in life expectancy lead to greater levels of disability and worse health and cognitive status in older individuals and increase the demand for long-term care (Organization for Economic Cooperation and Development [OECD], 2005). Also in the United States, as the number of older Americans rises, so does the number of needed caregivers (Talley & Crews, 2007). In 2030, when all baby boomers will be at least 65 years old, the population of adults in this age group is expected to be 71 million (Administration on Aging, 2007). The increase in number of caregivers cannot be equal to, and is always smaller than the increase in number of care-recipients (Mack & Thompson, 2001). Family caregivers play a central role in caring for frail older adults. It is estimated that 36 million adults provide unpaid care to a family member who is age 65 or older (National Alliance for Caregiving, 2009). Nearly 80% of these family caregivers are spouses or adult children (Wolff & Kasper, 2006). The estimated economic value of the care provided by family caregivers is approximately \$450 billion a year, which exceeds total Medicaid spending and approaches 90% of the entire expenditure on Medicare (Feinberg, Reinhard, Houser, & Choula, 2011). As 76 million baby boomers gradually enter late life, most will eventually develop some form of functional limitations and rely on their spouses or adult children for care (Manton, Gu, & Lamb, 2006). Sustaining family caregivers' capacity to help maintain older adults' daily functioning, therefore, becomes an important policy issue. However, in order to best assist caregivers in their duties, it is necessary to understand their unique needs. The aim of this paper was to examine differences

between son and daughter caregivers in the types of care they provide and whether or not there are differences in their care recipient's physical and mental health and cognitive status.

Is caregiving for adults “women’s work?” How men’s care and women’s care are different?

A growing number of studies have focused on differences between men and women in their enactment of the caregiving role (Miller & Cafasso, 1992). In brief, these studies have consistently demonstrated three key findings. First, the majority of caregivers to elders are women (Finley, 1989). Factors that are usually cited to explain why daughters have dominated as primary caregivers include: their traditional assumptions of nurturing tasks, their stronger emotional ties to their family of orientation, and the fact that they have more flexible free time in their role as homemakers than do their male counterparts in their occupational roles (Horowitz, 1985). Men and women display different patterns of assistance that are consistent with a gender-based division of labor (Stoller, 1990). Research on gender differences in caregiving patterns finds inconsistent results. A study conducted in Spain reported that no statistically significant gender differences were found with regard to the intensity of care, duration of caregiving, or satisfaction; however, subjective burden was found to differ between men and women, and this difference was statistically significant (Rafael et al. 2012). In a systematic review and meta-analysis that integrated the results of 229 studies published from 1983 to June 2005, Pinquart and Sorensen (2006) found that women provided a greater amount of care than men in terms of specific areas of caregiving, whereas there were no gender differences in duration of caregiving with regard to the hours they spent on caregiving per week or per month.

Is physical, mental health and cognitive status of care-recipients similar for son and daughter caregivers?

Much of the work on the gender differences of caregiving has focused on negative effects of caregiving on caregivers' health or well-being, such as daughters' burden (Rafael, et al., 2012). Less attention has been paid to the health outcomes of care-recipients with regard to the gender of caregivers. It is important to understand if there are differences in the health of sons' and daughters' care-recipients. It may be that daughters are more burdened because they are taking care of sicker care-recipients than sons. It may also be the case that care recipients' health differs because of differences in the quality and type of support sons and daughters provide. To our knowledge, no studies have addressed this question. One exception is a study conducted in Japan that revealed that there may be a survival "penalty" for older Japanese women who are cared for by their daughters-in-law comparing to those who are cared for by their spouses (Nishi A, et al. 2010). Daughters-in-law played important roles in informal caregiving within East Asian traditional norms. However, Nishi and his group found that female elders receiving care from daughters-in-law were in highest risk of mortality compared to those who receiving spousal care, while male elders receiving care from daughters-in-law tended to live longer than spousal care counterparts. We investigate the relationship between the gender of adult child primary caregiver and the physical and mental health and cognitive status of care-recipients in order to fill this gap by analyzing data from National Health and Aging Trends Study (NHATS), a US sample.

Based on past research, we hypothesized that daughters are more likely to engage in primary caregiving than sons for their aging parents. Next, we hypothesize that male and female adult child caregivers provide different types of care. For example, female adult children provide most day-to-day and hands-on care, whereas male adult children engage more in intermittent assistance and support types such as transportation and financial support. On the other hand, we

hypothesize that the duration of care will be similar for both genders. Finally, we hypothesize that there will be no differences in physical and mental health and cognitive status of care-recipients because gender of caregiver is determined mainly based on social norms or convenience, rather than the state of the care recipient's health. However, because no existing research has addressed this question, it is somewhat exploratory.

Method

Participants and Procedure

This study analyzed national cross-sectional data collected from the National Health and Aging Trends Study (NHATS). The NHATS is a new resource for the scientific study of functioning in later life. The NHATS is being conducted by the Johns Hopkins University Bloomberg School of Public Health, with data collection by Westat, and support from the National Institute on Aging. The NHATS gathers information on a nationally representative sample of Medicare beneficiaries ages 65 and older. In-person interviews were used to collect detailed information on participants' physical and cognitive capacity. A series of activities performed by respondents provide complimentary measures of physical and cognitive capacity. Additionally, information on living arrangements, economic status and well-being, and aspects of early life is collected. The content and questions included in NHATS were developed by a multidisciplinary team of researchers from the fields of demography, geriatric medicine, epidemiology, health services research, economics, and gerontology.

Round 1 of NHATS used a stratified three-stage sample design: first stage is selecting primary sampling units (PSUs), which are individual counties or groups of counties; second stage is selection of 655 secondary sampling units (SSUs), which are ZIP codes or ZIP code fragments within sampled PSUs; and in the third stage, selection of beneficiaries within sampled

SSUs who were age 65 and older as of September 30, 2010, with oversamples by age and for Black non-Hispanic persons were conducted. The probabilities of selection at each of the three stages were designed to yield equal probability samples and targeted sample sizes by age group and race/ethnicity. The sample represents Medicare beneficiaries ages 65 and older living in the contiguous United States. Ninety-six percent of all persons living in the United States that are in this age group are Medicare beneficiaries (Kasper, Freedman. 2012). In-person sample person (SP) interview was conducted with SP sampled as discussed above. There is also a dataset of other person (OP), constructed from a roster that was generated from questions in the SP interview.

After sampling, for purposes of data collection, distinctions are made among persons living in: residential care settings that are nursing homes, residential care settings other than nursing homes, and all other community settings. Because our study is targeting adult child primary caregivers and care-recipients who are their parents, the present study is limited to the subgroup from community settings where adult children play a more crucial role in caregiving. After identifying the subgroup from community settings, we limited to analyzing those community SPs who have sons or daughters as their primary “helper”, or caregiver. The caregiver from OP data set is linked with SP by their ID used in survey. If the SP has only one caregiver, then this OP is regarded as primary helper. Otherwise, if the SP has multiple helpers we identify those who spend the most hours on helping care-recipients per month as the primary caregiver. We also limited to data without missing gender information for both caregivers and care-recipients for the purpose of analysis.

Measures

Care-recipient characteristics. Demographic information of the care-recipient was reported. Demographics include age category, gender, race/ethnicity, education, employment, marital status, and living arrangement. The age of sample person is categorized into 6 levels: 65-69, 70-74, 75-79, 80-84, 85-89, and 90+. Care recipients reported whether or not they have caregiver, and documented how many caregivers they have, if any.

Caregiver characteristics. Care-recipients reported the relationship between the primary caregiver and themselves. Basic information about gender, age, race, and education level of these caregivers were reported by the care-recipient.

Duration of care. The duration of care was assessed with amount of care provided, which was measured using the total length of duration the adult child primary caregiver provide care, and the units are hours of care per day, days of care per week and per month. We report the amount of care with total hours of care the adult child provided per month. Also care-recipients were asked whether the care they received has a regular schedule or is varied.

Type of care. The second factor assessed was the type of care provided, and this was recorded as either needing help with instrumental activities of daily living (IADLs) only or activities of daily living (ADLs) (Katz et al, 1963). For IADLs, the items are helping with laundry, shopping, food preparation, driving and managing finances. For ADLs, the items are helping with eating, bathing, toileting, dressing, getting around inside or outside the home and getting outside of the bed. We also calculated numbers of IADLs and ADLs with which the caregivers assisted their care-recipients. Further, they were asked if their caregivers helping with medicines in terms of keeping track of medicines, sitting in with them during doctor visit and

helping with insurance decisions. In addition, care-recipients were asked if they talk about important things with their caregivers.

Care-recipients' self-reported health status. Care-recipients self-reported their overall health status using a scale from 1 to 5 illustrating poor, fair, good, very good, and excellent, respectively.

Number of care-recipients' chronic diseases. The care-recipients were asked if they had the following chronic disease: heart attack, heart disease, high blood pressure, arthritis, osteoporosis, diabetes, lung disease, stroke, dementia or Alzheimer's disease or cancer. Additionally, they were asked if they had other serious diseases or illness we not listed. This measure was the summed number of reported chronic diseases.

Care-recipients' depression and anxiety. NHATS uses the PHQ-2 (Kroenke et al. 2003) and the GAD-2 (Kroenke et al. 2007), which are brief screening instruments for depression and anxiety, respectively. The questions are administered: "Over the last month, how often have you: a) had little interest or pleasure in doing things; b) felt down, depressed, or hopeless; c) felt nervous, anxious, or on edge; d) been unable to stop or control worrying?" Response categories are: not at all, several days, more than half the days, and nearly every day. Items "a" and "b" form the PHQ-2; items "c" and "d" form the GAD-2. Scores were calculated for a combined measure (Kroenke et al. 2009 and Lowe et al. 2009), based on summing scores for the items (1 = not at all; 2= several days; 3=more than half the days; 4=nearly every day).

Care-recipients' cognitive status. Several aspects of cognitive functioning were assessed, including memory (immediate and delayed 10 word recall), and executive function (clock drawing test), and retrieval of information (delayed 10 word recall). For immediate 10 item word recall, a list of 10 nouns is read to respondents as they appear on the computer screen during

interview. The person is asked to recall as many words as possible, in any order. The respondent is given up to 2 minutes. The score is from 0 to 10 corresponding to the number of words they could recall. Care recipients are randomly assigned to one of three lists that are fielded in the Health and Retirement Study (Ofstedal et al. 2005). For clock drawing, the respondent is given a sheet of paper and an erasable pen. They are asked to draw a clock on the piece of paper and the interviewer says, “Start by drawing a large circle. Put all of the numbers in the circle and set the hands to show 11:10 (10 past 11).” The respondent has 2 minutes to complete the activity. Scores are given by the interviewer in scale of 0-5 (0 not recognizable as a clock, 1 severely distorted depiction of a clock, 2 moderately distorted depiction of a clock, 3 mildly distorted depiction of a clock, 4 reasonably accurate depiction of a clock and 5 accurate depiction of a clock). The delayed word recall is administered after the Clock Drawing Test (David et al, 2010). Respondents are asked what words they recall from the list read to them earlier. The score is 0-10 the same with immediate word recall. The cognition score is the sum of the three scores described here.

Potential covariates. We tested the extent to which the following potential covariates were significantly related to gender of the primary caregiver and the health and cognitive status of the care recipients: demographics of care-recipients, such as age, education, marital status; and the presence of multiple caregivers.

Results

Preliminary Analyses

First, we summarized the gender distribution in acting as a caregiver and relationship of caregivers and primary caregivers with care-recipients (see Table 1). We also calculated the

descriptive statistics for care-recipients who having son or daughter as their primary caregivers (see Table 2). As shown in Table 3, we also examined correlations between all study variables.

Hypothesis Testing

As hypothesized, we found that more daughters than sons were caregivers (see Table 1). We conducted a series of bivariate analysis to examine gender differences in duration and types of care primary caregivers provided. Though no significant gender differences were found in duration of caregiving with regard to hours spent on caregiving per month, women gave more care with ADLs and IADLs than men did. Results are shown in Tables 4 and 5. Daughter caregivers assisted in higher amount of items in both ADLs and IADLs than son caregivers. Regarding gender within specific areas of ADLs care, statistically significant differences are found in bathing, toileting and dressing, which are all higher in daughter caregivers. On the other hand, daughter caregivers assist more in laundry and shopping, items in IADLs, than sons. Care-recipients are more likely to talk about important things with their daughter caregivers than with son caregivers ($p < 0.001$). Besides taking care of their parents, most caregivers also have children under 18 to take care of. The percentage of having children under 18 is higher in son caregivers ($p < 0.001$).

No significant differences were observed before and after controlling for covariates in a series of multiple regression analysis conducted to examine the association of gender of adult children primary caregivers and care-recipients' self-reported physical health status, number of chronic disease, depression and anxiety and cognitive status. (see Table 6-9).

Discussion

The results of our analyses revealed interesting differences in the nature of daughters' and sons' caregiving patterns that may have important implications for how we support

caregivers and tailor caregiving interventions. As hypothesized and consistent with past research, more daughters were caregivers than sons. Also as hypothesized women provided different types of care for care recipients than men caregivers did. However, care recipient health (self-reported health status, number of chronic disease, depression and anxiety and cognitive status) was not associated with the gender of adult children primary caregivers.

Findings from this study are consistent with previous research showing that women play predominant role in caregiving for aging parents. Research found that in a group of Organization for Economic Co-operation and Development (OECD) countries, care for older people is provided by the family and, more specifically, by women in the family (OECD, 2009). Although caregivers were most likely to be spouses, there was a higher percentage of daughters involved in caregiving compared to sons as we anticipated. We also found that daughters were more likely to take care of mothers, and sons were more likely to take care of fathers. Sons were also more likely to take care of a divorced or separated parent, to be one of multiple caregivers, and to have children under the age of 18. Our finding is inconsistent with Spillman and Pezzin's study showing that men were less likely to be caregivers if they had dependents under 15. A possible explanation of this distinction is that Spillman and Pezzin's research focused on both disabled parents and spouses while our study focuses solely on aging parents (Spillman & Pezzin, 2000). Having children may help connect sons and their aging parents, which might be an explanation of our findings. Also Grundy and Henretta's research supported the idea that if assistance is being provided to one generation it is more likely being provided to another generation too (Grundy & Henretta, 2006).

Next, we found no differences in duration of caregiving. However, supporting past research, women tended to be regular caregivers while men's caregiving schedule tended to be

more variable (Stoller, 1983). Also, importantly, sons and daughters provided different types of care. This finding is consistent with past research showing that most day-to-day, personal, and hands-on care is provided by women (Miller & Cafasso, 1992). Inconsistent with past research we did not find that men were more likely to engage in arrangements for services or care management (Chang & White-Means, 1991; Montgomery & Kamo, 1989), transportation (Young, Kahana, 1989), home repair and maintenance tasks (Coward, 1987). We did find though that care recipient were more likely to talk about important things with their daughters than their sons. These findings suggest that care-recipients may benefit more from having daughters as caregivers than sons in terms of having their emotional and personal needs addressed.

Most caregiving research has focused on gender differences in caregivers' subjective burden, and women tend to report higher burden and higher depressive symptoms (Rafael, et al, 2012; Lin, et al, 2012; Navaie-Waliser, et al, 2002). No research to our knowledge has examined whether there are differences in care-recipient health depending on the gender of the caregiver. In the present study, no differences were found in health outcomes of care-recipients. This may imply that men should be more involved in caregiving for their aging parents because they are equally effective in maintaining their parents' health. It may also mean that sons and daughters do not differentially choose to be caregivers based on the health of their parents. It is likely that societal norms dictate the choice to be a caregiver. Thus, any gender differences in caregiving burden are not due to severity of the care recipient's condition, but rather the perception of the caregiver.

Finally, although not hypothesized, contrary to our expectation, we found that having multiple caregivers was positively correlated with physical and mental health status. This may be because people who report having more caregivers may have more social connections, which is a

protective factor for health (Cohen, 2004). Our study had certain limitations that need to be considered. First, it employed a cross-sectional design, which prevented us from studying changes over time or establishing causal relationships. Therefore, prospective studies are needed to explore these relationships. Second, our target sample is a subgroup of a national study which might be subject to representativeness issue. Third, there is a large amount of unavailable data in duration of care and demographic data for caregivers in the first NHATS wave. Right now the NHATS is releasing data of the second wave and more information about other people in the respondent's life, especially about caregivers, is available to analyze. The NHATS study also includes a follow-up research concerning caregivers (the National Study of Caregiving [NSOC]) and the data has been released. We will continue work on with the newly-released data to explore and validate our finding.

Our study supports the notion that there are gender-based differences in family caregiving to older people in western industrial countries. Our results suggest that caregiving daughters are more involved in care and may meet more emotional and functional assistance needs of their parents than caregiving sons. Sons are more likely to have other caregivers helping them to meet the needs of their parents. However, parents of caregiving sons and daughters do not differ in terms of physical and mental health and cognitive status. Therefore, sons and daughters can be equally effective caregivers. Furthermore, findings from studies provide some evidence that suggests that gender differences in caregiver burden may be more affected by caregiver perceptions rather than the severity of the care recipients' conditions. The take home message is that both sons and daughters should be encouraged to take care of their parents, especially given that men and women have more equal presence in the workforce; however, they may need different types of support in doing so. Women tend to take on more responsibility themselves.

They may need to be encouraged to seek support from others. Men may need more help with connecting emotionally with their parents to help meet those needs.

References

- Administration on Aging. A profile of older Americans: 2005. (2007). Washington, DC, Department of Health and Human Services.
- Cohen, S. (2004). Social relationship Social relationships and health. *American Psychologist*, 59, 676–684.
- Chang, C, & White-Means, S. (1991). The men who care: An analysis of male primary caregivers who care for frail elderly at home. *The Journal of Applied Gerontology*, 10,343-358.
- Coward, R. T. (1987). Factors associated with the configuration of the helping networks of noninstitutionalized elders. *Gerontological Social Work*, 10,113-132.
- David JS, Marc T, Godfrey DP. Calibrated neuropsychological normative system. Psychological Assessment Resources, Inc. Copyright 2010.
- Feinberg L, Reinhard SC, Houser A, Choula R. Valuing the invaluable: 2011 update, the growing contributions and costs of family caregiving. AARP Public Policy Institute; Washington, DC: 2011. Retrieved from <http://www.aarp.org/relationships/caregiving/info-07-2011/valuing-the-invaluable.html>.
- Finley, N. J. (1989). Theories of family labor as applied to gender differences in caregiving for elderly parents. *Journal of Marriage and the Family*, 51, 79-86.
- Grundy, E., & Henretta, J. (2006). Between elderly parents and adult children: a new look at the intergenerational care provided by the "sandwich generation." *Ageing & Society*, 26, 707-722.

- Horowitz, A. (1985). Sons and daughters as caregivers to older parents: Differences in role performance and consequences. *The Gerontologist*, 25,612-617.
- Johnson RW, Wiener JM. A profile of frail older Americans and their caregivers. The Urban Institute; Washington, DC: 2006. Retrieved from http://www.urban.org/UploadedPDF/311284_older_americans.pdf.
- Kasper, Judith D. and Freedman, Vicki A. (2012). National Health and Aging Trends Study Round 1 User Guide: Final Release. Baltimore: Johns Hopkins University School of Public Health. www.NHATS.org
- Katz, S., Ford, A.B., Moskowitz, R.W., Jackson, B.A., & Jaffe, M.W. (1963). Studies of illness in the aged. The index of ADL: A standardized measure of biological and psychosocial function. *JAMA*, 185(12), 914-919.
- Kroenke K, Spitzer RL, Williams JBW. (2003) The Patient Health Questionnaire-2: validity of a two-item depression screener. *Medical Care*, 41, 1284-1292.
- Kroenke K, Spitzer RL, Williams JB, et al. (2007) A brief measure for assessing generalized anxiety disorder: the GAD-7. *Archives of Internal Medicine*, 146, 317-325.
- Kroenke K, Spitzer RL, Williams JBW, et al. (2009) An ultra-brief screening scale for anxiety and depression: the PHQ-4. *Psychosomatics*, 50, 613-621.
- Lin IF, Fee HR, Wu HS. (2012). Negative and positive caregiving experiences: A closer look at the intersection of gender and relationships. *Family Relations*, 61(2): 343–358.
- Lowe B, Wahl I, Rose M, et al. (2009) A 4-item measure of depression and anxiety: validation and standardization of the patient health question-4 (PHQ-4) in the general population. *Journal of Affective Disorders*, 122(1-2): 86-95.
- Mack, K. & Thompon, L. Data profiles, family caregivers of older persons: Adult children. (2001). Georgetown University, the Center on an Aging Society.

Manton KG, Gu X, Lamb VL. Change in chronic disability from 1982 to 2004/2005 as measured by long-term changes in function and health in the U.S. elderly population. *Proceedings of the National Academy of Sciences*. 2006;103:18374–18379.

Miller, B., & Cafasso, L. (1992). Gender differences in caregiving: Fact or artifact? *The Gerontologist*, 32,498-507.

Montgomery, R., & Kamo, Y. (1989). Parent care by sons and daughters. In J. A. Mancini (Ed.), *Aging parents and adult children* (pp. 213-230). Lexington, MA: Lexington Books.

National Alliance for Caregiving Caregiving in the U.S.: A focused look at those caring for the 50+ 2009 Retrieved from http://assets.aarp.org/rgcenter/il/caregiving_09.pdf.

Navaie-Waliser M, Spriggs A, Feldman PH. (2002). Informal caregiving: differential experiences by gender. *Medical Care*, 40(12):1249-59.

Nishi A, Tamiya N, Kashiwaqi M, et al. (2010). Mothers and daughters-in-law: a prospective study of informal care-giving arrangements and survival in Japan. *BMC Geriatrics*, 29, 10: 61.

Ofstedal MB, Fisher GG, Herzog AR. (2005) HRS/AHEAD documentation report: documentation of cognitive functioning measures in the health and retirement study No. DR-006.

Organization for Economic Cooperation and Development (2005). Long-term care for older people. Paris. Retrieved from <http://www.oecd.org/els/health-systems/long-termcareforolderpeopleoecdstudy2001-2004.htm>.

Organization for Economic Cooperation and Development (2009). The long-term care workforce: Overview and Strategies to adapt supply to a growing demand. Paris. OECD health working papers, No. 44.

- Pinquart, M., & Sorensen, S. (2006). Gender differences in caregiver stressors, social resources, and health: An updated meta-analysis. *Journals of Gerontology; Series B: Psychological Science and Social Science*, **61**(1), 33–45.
- Rafael del-Pino-Casado, Antonio Frías-Osuna, Pedro A. Palomino-Moral, et al. (2012). Gender differences regarding informal caregivers of older people. *Journal of Nursing Scholarship*, *44*, 349-357.
- Spillman, B.C., & Pezzin, L.E. (2000). Potential and active family caregivers: changing networks and the ‘sandwich generation.’ *The Milbank Quarterly*, *78*(3), 347-374.
- Stoller, E. P. (1983). Parental caregiving by adult children. *Journal of Marriage and the Family*, *45*, 851-858.
- Stoller, E. P. (1990). Males as helpers: The role of sons, relatives, and friends. *The Gerontologist*, *30*, 228-235
- Talley, R.C. & Crews J.E. (2007). Framing the public health of caregiving. *American Journal of Public health*, *97* (3): 393.
- Wolff JL, Kasper JD. Caregivers of frail elders: Updating a national profile. *The Gerontologist*.2006; *46*: 344–356.
- Young, R. F., & Kahana, E. (1989). Specifying caregiver outcomes: Gender and relationship aspects of caregiving strain. *The Gerontologist*, *29*, 660-666.

Appendix

Table 1. Description of All Caregivers and Primary Caregivers

Characteristic	All caregiver N=9877 (%)	Primary caregiver N=5616 (%)
Sex		
Male	3526 (35.7)	1875 (33.4)
Female	6351 (64.3)	3741 (66.6)
Relationship with care-recipient		
Wife	2054 (20.8)	1852 (33.0)
Husband	1232 (12.5)	1012 (18.0)
Daughter	2438 (24.7)	1115 (19.9)
Son	1386 (14.0)	562 (10.0)
Other relatives	1859 (18.8)	698 (12.4)
Nonrelatives	908 (9.2)	377 (6.7)

Table 2. Description of care recipients who have a son or daughter as their primary caregiver

Characteristic	Relationship of primary CG to CR		<i>p</i>
	Daughter (N=1115) (%)	Son (N=562) (%)	
Age			.087
65-69 years	97 (8.7)	67 (11.9)	
70-74 years	183 (16.4)	78 (13.9)	
75-79 years	191 (17.1)	108 (19.2)	
80-84 years	274 (24.6)	139 (24.7)	
85-89 years	203 (18.2)	105 (18.7)	
90 years and older	167 (15.0)	65 (11.6)	
Sex			.009
Male	218 (19.6)	141 (25.1)	
Female	897 (80.4)	421 (74.9)	
Race/ethnicity			.003
Non-Hispanic white	636 (57.8)	360 (64.5)	
Non-Hispanic black	330 (30.0)	136 (24.4)	
Hispanic	109 (9.9)	39 (7.0)	
Other, non-Hispanic	26 (2.4)	23 (4.1)	
Education			.096
Less than high school	461 (41.9)	208 (37.5)	
High school graduate	304 (27.6)	148 (26.7)	
Vocational, technical, business, or trade school certificate or diploma	81 (7.4)	40 (7.2)	
At least some college	255 (23.2)	159 (28.7)	
Employment			.441
Yes	57 (5.2)	35 (6.3)	
No	459 (41.8)	217 (39.1)	
Retired/Don't work anymore	583 (53.1)	303 (54.6)	
Marital status			.007
Married or living with a partner	226 (20.3)	105 (18.7)	
Divorced or Separated	145 (13.0)	109 (19.4)	
Widowed	721 (64.7)	337 (60.1)	
Never married	23 (2.1)	10 (1.8)	
Living arrangement			.454
Lives alone	402 (36.1)	224 (39.9)	
Lives with spouse/partner only	124 (11.1)	55 (9.8)	
Lives with spouse/partner and with others	101 (9.1)	46 (8.2)	
Lives with others only	488 (43.8)	237 (42.2)	
Number of caregivers			.028
1	420 (37.7)	181 (32.2)	
> 1	695 (62.3)	381 (67.8)	

Note: Percentages may not sum to 100% due to rounding. Numbers may not sum to total due to missing data. CR: care-recipients; CG: caregivers.

Table 3. Correlation matrix of study measures and covariates

	1	2	3	4	5	6	7	8	9
1. CR gender	-----	-.0637**	-.0163	-.0535*	.0305	-.0469	-.0750**	-.0721**	-.0406
N		1677	1677	1677	1656	1676	1652	1647	1423
(0 = Female, 1 = Male)									
2. CG gender	-----	-----	.0382	.0538*	-.0569*	-.0185	.0294	.0000	-.0151
N			1677	1677	1656	1676	1652	1647	1423
(0 = Male, 1 = Female)									
3. CR age category	-----	-----	-----	-.0351	-.0898***	.0317	.0444	-.0383	-.3588***
N (Range: 1 - 6)				1677	1656	1676	1652	1647	1423
4. Single CG vs. Multiple CG	-----	-----	-----	-----	.0168	.1266***	-.1224***	-.1012***	.0334
N					1656	1676	1652	1647	1423
(0 = Multiple CG, 1 = Single CG)									
5. CR education	-----	-----	-----	-----	-----	.2326***	-.0934***	-.1433***	.3140***
N (Range: 1 - 4)						1655	1631	1628	1413
6. CR self-reported health	-----	-----	-----	-----	-----	-----	-.4252***	-.3915***	.1621***
N (Range: 1 - 5)							1651	1647	1422
7. CR number of chronic disease	-----	-----	-----	-----	-----	-----	-----	.2777***	-.0212
N (Range: 1 - 11)								1624	1402
8. CR depression and anxiety	-----	-----	-----	-----	-----	-----	-----	-----	-.0794**
N (Range: 4 - 16)									1404
9. CR cognitive status	-----	-----	-----	-----	-----	-----	-----	-----	-----
N (Range: 0 - 25)									

Note. $p < .001$ ***, $p < .01$ ** , $p < .05$ *. CR depression and anxiety: Not at all coded as 1, several days coded as 2, more than half the days coded as 3 and nearly every day coded as 4; the frequency were coded and four question in total giving the range of 4 to 16; CR cognitive status: sum scores of immediate word recall (0 to 10), clock drawing (0 to 5) and delayed word recall (0 to 10), and the summed score range from 0 to 25.

Table 4. Gender differences in the duration of care

Characteristic	Relationship of primary CG to CR		<i>p</i>
	Daughter (N=1115) (%)	Son (N=562) (%)	
Amount of care (per month)			.205
Unknown	562 (50.4)	274 (48.8)	
< 30 hr	223 (20.0)	129 (23.0)	
30 – 59 hr	74 (6.6)	27 (4.8)	
60 – 119 hr	81 (7.3)	31 (5.5)	
120 – 179 hr	42 (3.8)	28 (5.0)	
180 – 744 hr (24/7)	133 (11.9)	73 (13.0)	
Help is regularly scheduled			.025
Unknown	36 (3.2)	18 (3.2)	
Regular	371 (33.3)	150 (26.7)	
Varied	708 (63.5)	394 (70.1)	

Note: Percentages may not sum to 100% due to rounding. CR: care-recipients; CG: caregivers.

Table 5. Gender differences in the type of care

Type of care	Relationship of primary CG to CR		<i>p</i>
	Daughter (%)	Son (%)	
IADLs assisting	N = 697	N = 388	
Laundry	139 (19.9)	58 (14.9)	.041
Shopping	334 (47.9)	153 (39.4)	.007
Food preparation	246 (35.3)	117 (30.2)	.086
Driving	484 (69.4)	270 (70.6)	.960
Managing finances	171 (24.5)	90 (23.2)	.621
Number of IADLs assisted (<i>Mean ± SD</i>)	1.9713 ± 1.1418	1.7732 ± 1.0903	.006
ADLs assisting	N = 344	N = 138	
Eating	94 (27.3)	38 (27.5)	.963
Bathing	142 (41.3)	31 (22.5)	<.001
Toileting	69 (20.1)	17 (12.3)	.045
Dressing	188 (54.7)	45 (32.6)	<.001
Getting around inside the home	146 (42.4)	61 (44.2)	.724
Getting outside of the home	237 (68.9)	98 (71.0)	.648
Getting outside of the bed	93 (27.0)	36 (26.1)	.832
Number of ADLs assisted (<i>Mean ± SD</i>)	2.8169 ± 1.8979	2.3623 ± 1.8677	.017
Helping with medicines	N = 561	N = 153	
Keeping track of medicines	244 (43.5)	74 (48.4)	.282
Sitting in with CR during doctor visit	505 (90.0)	130 (85.0)	.078
Helping with insurance decisions	27 (4.8)	9 (5.9)	.592

Note: CR: care-recipients; CG: caregivers.

Table 6. Multiple linear regression of care recipients' self-reported health status

Characteristic	Unadjusted Model (N=1676)*		Adjusted Model (N=1648)	
	Beta (SE)	<i>p</i>	Beta (SE)	<i>p</i>
Gender of adult child primary caregiver				
Male	-0.041 (0.057)	.473	-0.033 (0.055)	.556
Female	Reference	---	Reference	---
Age (years)				
65-69	Reference	---	Reference	---
70-74	0.009 (0.109)	.927	0.035 (0.105)	.738
75-79	-0.114 (0.106)	.285	-0.052 (0.103)	.613
80-84	-0.073 (0.101)	.472	-0.044 (0.099)	.659
85-89	-0.068 (0.106)	.520	-0.016 (0.104)	.880
90 +	0.157 (0.112)	.159	0.190 (0.113)	.092
Gender of care recipient				
Male	Reference	---	Reference	---
Female	-0.116 (0.065)	.075	-0.154 (0.065)	.018
Race/ethnicity				
Non-Hispanic white	Reference	---	Reference	---
Non-Hispanic black	-0.393 (0.060)	<.001	-0.299 (0.062)	<.001
Hispanic	-0.653 (0.095)	<.001	-0.472 (0.096)	<.001
Other, non-Hispanic	-0.167 (0.157)	.287	-0.088 (0.153)	.566
Educational level				
Less than high school	Reference	---	Reference	---
High school graduate	0.254 (0.065)	<.001	0.151 (0.066)	.022
Vocational, technical, business, or trade school certificate or diploma	0.323 (0.106)	.002	0.197 (0.105)	.062
At least some college	0.632 (0.067)	<.001	0.537 (0.068)	<.001
Marital status				
Married or living with a partner	Reference	---	Reference	---
Divorced or Separated	0.024 (0.092)	.795	-0.073 (0.091)	.422
Widowed	0.023 (0.069)	.736	-0.064 (0.073)	.380
Never married	-0.273 (0.200)	.173	-0.099 (0.197)	.615
Number of caregivers				
Single CG	Reference	---	Reference	---
Multiple CG	0.303 (0.055)	<.001	0.296 (0.055)	<.001

Note: Gender of adult child primary caregiver, gender of care recipient, and number of caregivers were coded as 1/0 variable when "Reference" was coded as 1.

* Sample size of unadjusted model was determined by simple linear regression of self-reported health status by gender of adult child primary caregiver

Table 7. Multiple linear regression of number of care recipients' chronic diseases

Characteristic	Unadjusted Model (N=1652) *		Adjusted Model (N=1625)	
	Beta (SE)	<i>p</i>	Beta (SE)	<i>p</i>
Gender of adult child primary caregiver				
Male	0.095 (0.090)	.291	0.099 (0.091)	.275
Female	Reference	---	Reference	---
Age (years)				
65-69	Reference	---	Reference	---
70-74	0.286 (0.173)	.098	0.345 (0.172)	.045
75-79	0.186 (0.168)	.268	0.129 (0.169)	.445
80-84	0.353 (0.160)	.027	0.271 (0.162)	.094
85-89	0.441 (0.168)	.009	0.330 (0.171)	.054
90 +	0.281 (0.177)	.112	0.104 (0.184)	.572
Gender of care recipient				
Male	Reference	---	Reference	---
Female	-0.325 (0.103)	.002	-0.253 (0.106)	.018
Race/ethnicity				
Non-Hispanic white	Reference	---	Reference	---
Non-Hispanic black	0.022 (0.097)	.822	-0.098 (0.102)	.337
Hispanic	-0.032 (0.152)	.833	-0.176 (0.156)	.261
Other, non-Hispanic	-0.650 (0.255)	.011	-0.625 (0.252)	.013
Educational level				
Less than high school	Reference	---	Reference	---
High school graduate	-0.177 (0.105)	.092	-0.201 (0.107)	.061
Vocational, technical, business, or trade school certificate or diploma	-0.302 (0.173)	.081	-0.308 (0.173)	.076
At least some college	-0.425 (0.108)	<.001	-0.398 (0.112)	<.001
Marital status				
Married or living with a partner	Reference	---	Reference	---
Divorced or Separated	0.198 (0.145)	.172	0.359 (0.150)	.017
Widowed	0.353 (0.109)	.001	0.390 (0.119)	.001
Never married	0.500 (0.314)	.112	0.538 (0.320)	.093
Number of caregivers				
Single CG	Reference	---	Reference	---
Multiple CG	-0.448 (0.088)	<.001	-0.543 (0.090)	<.001

Note: Gender of adult child primary caregiver, gender of care recipient, and number of caregivers were coded as 1/0 variable when "Reference" was coded as 1.

* Sample size of unadjusted model was determined by simple linear regression of number of chronic diseases by gender of adult child primary caregiver

Table 8. Multiple linear regression of care recipients' depression and anxiety status

Characteristic	Unadjusted Model (N=1627) *		Adjusted Model (N=1622)	
	Beta (SE)	<i>p</i>	Beta (SE)	<i>p</i>
Gender of adult child primary caregiver				
Male	0.015 (0.144)	.919	-0.029 (0.143)	.839
Female	Reference	---	Reference	---
Age (years)				
65-69	Reference	---	Reference	---
70-74	-0.512 (0.275)	.063	-0.568 (0.271)	.036
75-79	-0.292 (0.268)	.275	-0.447 (0.264)	.091
80-84	-0.414 (0.254)	.104	-0.525 (0.254)	.039
85-89	-0.037 (0.267)	.891	-0.178 (0.268)	.508
90 +	-0.722 (0.282)	.011	-0.824 (0.290)	.005
Gender of care recipient				
Male	Reference	---	Reference	---
Female	-0.469 (0.166)	.005	-0.574 (0.168)	<.001
Race/ethnicity				
Non-Hispanic white	Reference	---	Reference	---
Non-Hispanic black	0.382 (0.154)	.013	0.222 (0.160)	.165
Hispanic	1.283 (0.240)	<.001	0.990 (0.247)	<.001
Other, non-Hispanic	0.567 (0.401)	.158	0.431 (0.396)	.277
Educational level				
Less than high school	Reference	---	Reference	---
High school graduate	-0.496 (0.166)	.003	0.351 (0.169)	.038
Vocational, technical, business, or trade school certificate or diploma	-0.815 (0.271)	.003	-0.612 (0.272)	.025
At least some college	-1.079 (0.171)	<.001	-0.928 (0.176)	<.001
Marital status				
Married or living with a partner	Reference	---	Reference	---
Divorced or Separated	-0.247 (0.231)	.285	-0.194 (0.235)	.410
Widowed	-0.227 (0.175)	.194	-0.189 (0.187)	.312
Never married	-0.185 (0.502)	.713	-0.529 (0.504)	.294
Number of caregivers				
Single CG	Reference	---	Reference	---
Multiple CG	-0.575 (0.141)	<.001	-0.495 (0.142)	<.001

Note: Gender of adult child primary caregiver, gender of care recipient, and number of caregivers were coded as 1/0 variable when "Reference" was coded as 1.

* Sample size of unadjusted model was determined by simple linear regression of depression and anxiety status by gender of adult child primary caregiver

Table 9. Multiple linear regression of cognitive status

Characteristic	Unadjusted Model (N=1423) *		Adjusted Model (N=1409)	
	Beta (SE)	<i>p</i>	Beta (SE)	<i>p</i>
Gender of adult child primary caregiver				
Male	-0.103 (0.222)	.641	0.142 (0.193)	.462
Female	Reference	---	Reference	---
Age (years)				
65-69	Reference	---	Reference	---
70-74	-0.829 (0.381)	.030	-0.816 (0.355)	.022
75-79	-2.276 (0.375)	<.001	-2.103 (0.350)	<.001
80-84	-2.694 (0.355)	<.001	-2.745 (0.337)	<.001
85-89	-3.661 (0.378)	<.001	-3.645 (0.359)	<.001
90 +	-4.977 (0.409)	<.001	-5.162 (0.398)	<.001
Gender of care recipient				
Male	Reference	---	Reference	---
Female	-0.372 (0.251)	.139	-0.634 (0.224)	.005
Race/ethnicity				
Non-Hispanic white	Reference	---	Reference	---
Non-Hispanic black	-1.562 (0.237)	<.001	-1.788 (0.220)	<.001
Hispanic	-2.061 (0.376)	<.001	-1.500 (0.347)	<.001
Other, non-Hispanic	-1.756 (0.752)	.020	-2.425 (0.661)	<.001
Educational level				
Less than high school	Reference	---	Reference	---
High school graduate	1.938 (0.250)	<.001	1.467 (0.234)	<.001
Vocational, technical, business, or trade school certificate or diploma	2.262 (0.394)	<.001	1.668 (0.363)	<.001
At least some college	3.038 (0.249)	<.001	2.333 (0.236)	<.001
Marital status				
Married or living with a partner	Reference	---	Reference	---
Divorced or Separated	-0.313 (0.347)	.367	-0.547 (0.315)	.083
Widowed	-1.319 (0.263)	<.001	-0.547 (0.250)	.029
Never married	-1.940 (0.862)	.025	-0.931 (0.768)	.226
Number of caregivers				
Single CG	Reference	---	Reference	---
Multiple CG	0.278 (0.215)	.197	0.251 (0.192)	.191

Note: Gender of adult child primary caregiver, gender of care recipient, and number of caregivers were coded as 1/0 variable when "Reference" was coded as 1.

* Sample size of unadjusted model was determined by simple linear regression of cognitive status by gender of adult child primary caregiver