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著者	Imaiso Junko
著者別名	今磯, 純子
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Running head: HOME-BASED CAREGIVING APPRAISAL IN RURAL AND URBAN JAPAN

Authors: Junko Imaiso, MSN, PHN, RN (Graduate Student in Doctoral Course)

Address:

Graduate Course of Nursing Science, Division of Health Sciences,

Graduate School of Medical Science, Kanazawa University,

5-11-80 Kodatsuno, Kanazawa-shi, Ishikawa-Pref. 920-0942, Japan

E-mail: junkoi_ima@yahoo.co.jp

Keiko Tsukasaki, DSN, PHN, RN (Professor)

Address:

Department of Nursing Science, Faculty of Health Sciences, College of

Medical, Pharmaceutical and Health Science, Kanazawa University,

5-11-80 Kodatsuno, Kanazawa-shi, Ishikawa-Pref. 920-0942, Japan

Fuki Okoshi, MSW, PHN, RN (Graduate Student in Doctoral Course)

Same address as the first author

This quantitative study aimed to determine the differences between rural and urban residencies related to home-based appraisal (including care burden and positive appraisal) for Japanese primary family caregivers of the elderly with extensive care needs. The study examined a sample of 196 caregivers (106 rural, 90 urban), and stepwise multiple regression analysis was performed.

Resident location was significantly associated with care burden, and each factor associated with the appraisal, especially care burden, differed between rural and urban areas. The social and physical environment is thus a necessary consideration to support family caregivers and the elderly requiring home-based care.

Background

The percentage of the 65 years and over population in Japan is the highest in the world, 22.7% in 2009, and is estimated to further rise in the future (Health and Welfare Statistics Association, 2010).

An increase in health care needs is expected to accompany this increase in the elderly population.

The long-term care insurance system was introduced in 2000 to enable elderly citizens to live at home rather than in a facility. Support from the community is even more important for elderly patients in order to maintain their home-based life, particularly for those with extensive care needs whose family caregivers are engaged in providing care almost all day long (Cabinet Office, 2011).

Elderly patients with high care needs are more dependent on their family caregivers; therefore, we believe it is important that the caregivers are physically and mentally fit, which can be quantified with a caregiving appraisal.

Previous studies on home-based caregiving appraisal have mainly focused on the negative aspects such as care burden, care fatigue and care stress (Zarit, Reever, & Bach-Peterson, 1980; Faison, Faria, & Frank, 1999; Tsukasaki, Makimoto, & Kido, 2008). Focus has gradually shifted to the positive aspects such as caregiving satisfaction, caregiving mastery, enjoyment or pleasure for caregiving (Worcester & Quayhagen, 1983; Cohen, Gold, Shulman, & Zuccherro, 1994; Saito, Kunisaki, & Kanagawa, 2001). A comprehensive study by Hunt suggested that both aspects should be considered by nurses when supporting family caregivers (Hunt, 2003). We believe that support to reduce the negative aspects and raise the positive aspects should be considered, and that the factors associated with both aspects need to be examined so family caregivers providing the most intense levels of care are able to maintain a healthy state of physical and mental well-being.

A previous study suggested that the residential community (rural vs. urban) should be a focus when considering support for caregivers of the elderly (Glasgow, 2000). In urban communities compared to rural, geographical conditions for accessing social supports are more convenient, and while the quantity and quality of social supports are higher, the population size is greater, the population density is higher, and relationships within the community tend to be weaker (Glasgow,

2000; Japanese Ministry of Health, Labor, and Welfare, 2005). On the other hand, human relationships tend to be more intimate and informal supports from relatives or neighbors more prevalent in rural communities compared to urban areas (Bushy, 2000; Glasgow, 2000). However, in rural communities, formal social supports tend to be weaker, geographical conditions are less convenient, and resistance against outside help and formal supports is more widespread (Bushy, 2000). Furthermore, the rate of population reduction is higher, with larger proportions of elderly residents and declining birth rates with significant out-migration of younger adults (Bushy, 2000; Glasgow, 2000). Therefore, we hypothesized that, because of these differences between residential communities, the home-based caregiving appraisal of family caregivers from urban and rural areas would differ, as well as the factors associated with the appraisal.

Of the previous studies that focused on the differences between residential communities and their effects on family caregivers for the elderly with care needs, one analyzed the regional difference in a negative caregiving appraisal (Kurasawa, Yoshimasu, Washio, Miyai, Miyashita, & Arai, 2007), and the other analyzed the location difference in a caregiving appraisal including both negative and positive aspects (Lee, Yoo, & Jung, 2010). Kurasawa et al. (Kurasawa, Yoshimasu, Washio, Miyai, Miyashita, & Arai, 2007) reported that a regional difference in the care burden of Japanese family caregivers was recognized, but that the definition of an urban community was not clear; therefore, a study with a stronger definition of urban communities would be necessary. Lee

et al. (Lee, Yoo, & Jung, 2010) reported that a location difference in the care stress of Korean family caregivers was recognized, but that the location difference for positive caregiving was not analyzed. Accordingly, a study using a different scale that can measure negative and positive aspects would prove valuable and also provide a home-based caregiving appraisal with knowledge about the difference of residential communities that can be compared with other global studies.

In order to minimize the negative impact of caregiving, Bedard et al. suggested that caregiver characteristics, care-recipient characteristics and external variables caregivers themselves cannot control must be understood (Bedard, Koivuranta, & Stuckey, 2004). Several studies found an association between home-based caregiving appraisal and caregiver characteristics or care-recipient characteristics. In the association between caregiving appraisal and caregiver characteristics, age (Worcester & Quayhagen, 1983; Kurasawa, Yoshimasu, Washio, Miyai, Miyashita, & Arai, 2007), gender (Dwyer, & Miller, 1990; Faison, Faria, & Frank, 1999), relationship (Peters-Davis, Moss, & Pruchno, 1999), health state (Lawton, Moss, Kleban, Glicksman, & Rovine, 1991; Cohen, Gold, Shulman, & Zuccherro, 1994; Faison, Faria, & Frank, 1999; Tsukasaki, Makimoto, & Kido, 2008) and caregiving-related situations (Dwyer, & Miller, 1990; Lawton, Moss, Kleban, Glicksman, & Rovine, 1991; Faison, Faria, & Frank, 1999; Saito, Kunisaki, & Kanagawa, 2001; Tsukasaki, Makimoto, & Kido, 2008; Lee, Yoo, & Jung, 2010) were found to be significant. In the association between caregiving appraisal and care-recipient characteristics, age (Worcester & Quayhagen, 1983; Lee, Yoo,

& Jung, 2010), gender (Cohen, Gold, Shulman, & Zuccherro, 1994) and state of care needs (Worcester & Quayhagen, 1983; Dwyer, & Miller, 1990; Lawton, Moss, Kleban, Glicksman, & Rovine, 1991; Faison, Faria, & Frank, 1999) were found to be significant. We would agree with Bedard et al. (Bedard, Koivuranta, & Stuckey, 2004) in that caregiver characteristics, care-recipient characteristics and external variables including residential communities must be spelled out in order to identify factors associated with home-based caregiving appraisals.

The purpose of this study was to discover any differences in the negative and positive aspects of the home-based caregiving appraisal and in factors associated with the appraisal due to the residential communities, rural vs. urban, where family caregivers and the elderly with high care needs live.

Materials and Methods

Research Design

This latitudinal study is quantitative and was designed to examine correlations.

Definitions of the Terms

Rural Community

Based on the Act on Special Measures for Promotion for Independence for Underpopulated Areas (Ministry of Internal Affairs and Communications, 2000), a rural community is defined as an area that meets any of the following conditions as a result of the Japan national census: depopulation rate for 35 years (from 1960 to 1995) of 0.3 or more, depopulation rate for 35 years of 0.25 or more and the elderly population (65 years old and over) in 1995 of 0.24 or more, depopulation rate for 35 years of 0.25 or more and the population comprising those 15 through 29 years old in 1995 of 0.15 or less, depopulation rate for 25 years (from 1970 to 1995) of 0.19 or more, or areas are recognized by merging of municipalities as an exception. This definition applies to 730 municipalities in 45 prefectures of Japan, as of April 1, 2009.

Urban Community

Based on the Local Autonomy Act (Ministry of Internal Affairs and Communications, 1947), an urban community is defined as a major city designated by government ordinance in Japan where the metropolis has a population of 500,000 and greater. This definition applies to 18 cities and 23 specified districts in Tokyo Metropolis in 15 prefectures of Japan, as of April 1, 2009.

Home-based Caregiving Appraisal

Home-based caregiving appraisal covers both care burden and positive caregiving appraisal. For

care burden, the Japanese version of the Zarit Scale (J-ZBI) with 22 items was used. The score ranged from 0 to 88, with a higher score indicating greater care burden (Zarit, Reever, & Bach-Peterson, 1980; Arai, Kudo, Hosokawa, Washio, Miura, & Hisamachi, 1997; Arai, 2002). For positive caregiving appraisal, the positive appraisal scale with 14 items was used (Sakurai, 1999), which was based on the caregiving satisfaction scale (Lawton, Kleban, Moss, Rovine, & Glicksman, 1989) and the self-gain scale (Skaff, & Pearlin, 1992). The score ranged from 1 to 56, with a higher score indicating more positive caregiving.

Participants

The participants were primary family caregivers who use home-visit nursing services and live in rural or urban areas with an elderly recipient (65 years and over) who necessitates care above level three. “Care above level three” refers to levels of caregiving determined by the long-term insurance system in Japan, with levels three to five being the highest. Level three care involves caregiving either for 70 minutes or for longer than 70 minutes but less than 90 minutes, level four care is that given for 90 minutes or longer than 90 minutes but less than 110 minutes, and level five care is that given for 110 minutes or longer (Health and Welfare Statistics Association, 2010).

Data Collection

The professional home care facilities such as home-visit nursing stations were selected by using Welfare and Service Network System (WAM Net) in Japan. And, the research protocol and participant selection process were initially proposed to 767 professional home care facilities such as home-visit nursing stations (355 rural facilities in 45 prefectures, and 412 urban facilities in 15 prefectures) by mail. Of the 398 facilities (rural 177, urban 221) that responded to the proposal, 91 facilities (22.9%) were approved for the study, including 46 rural facilities (approval rate 26.0% of 177 rural facilities) in 21 of 45 prefectures, and 45 urban facilities (approval rate 20.4% of 221 urban facilities) in 14 of 15 prefectures.

Survey questionnaires and written explanations of this study were sent to the approved facilities. Questionnaires were given to family caregivers recruited by the facilities, and completed questionnaires were sent directly from the family caregivers to the researcher by mail. The total number of questionnaires sent to the facilities was 365 (196 rural, 169 urban). There were 219 respondents to the study (60.0%), of which 123 (62.8%) were in rural and 96 (56.8%) in urban communities. Caregivers who responded inappropriately to a question were excluded. The final total of respondents was 196 (89.5%), of which 106 (86.2%) were in rural and 90 (93.8%) in urban communities. Data were collected from April 2010 to February 2011.

Survey Contents

The survey was conducted with a confidential and self-administrated questionnaire. The survey items were based on the three determinants suggested by Bedard et al. (Bedard, Koivuranta, & Stuckey, 2004): caregiver characteristics, care-recipient characteristics and external variables which caregivers themselves cannot control. After a pre-test was conducted and the questionnaire revised, the survey was completed and ready for participants. Participants took about 30 minutes to complete the survey, which consisted of the following four categories: caregiver characteristics (attributes: 10 items, health state: 2 items, situation related with caregiving: 14 items), care-recipient characteristics (4 items), external variables (residential communities: 1 item, support situation for caregiving: 5 items), and home-based caregiving appraisal (care burden, positive appraisal).

To evaluate depression as one of the healthy state measures for caregiver characteristics, the Center for Epidemiologic Studies Depression Scale (CES-D) was used with 20 questions; results range from 0 to 60, with a higher score indicating greater depression (Okamoto, 1995/1998; McDowell, & Newell, 1996).

Analysis

To analyze differences between rural and urban communities in caregiver characteristics, care-recipient characteristics and external variables, univariate analysis was performed using t-tests and χ^2 -tests. Furthermore, Mann-Whitney U test was performed to analyze differences between

rural and urban communities in home-based caregiving appraisal. Analysis of the correlation between care burden and positive appraisal by all participants, rural only and urban only was performed using Spearman rank correlation.

To analyze differences between communities in the factors associated with the home-based caregiving appraisal, multivariate analysis was performed. First, 19 survey items (Table 1) were selected as independent variables based on confirmed correlations from all survey items and results from the univariate analysis. Stepwise multiple regression analysis was then performed using the independent variables and the total score of care burden and positive appraisal as dependent variables to calculate for all participants, participants in only rural communities, and participants in only urban communities; the independent variable for residential communities was removed in calculations for participants in only rural or urban communities.

Statistical analysis of the data was conducted using SPSS 17.0 for Windows ver. Japanese. P-values less than 0.05 were deemed statistically significant.

Ethical Considerations

The study protocol was approved by the Medical Ethics Committee of Kanazawa University in Japan (January 27, 2010/No. 246). Participant involvement with this study was voluntary.

Results

Outline of Participants (Table 2)

Table 2 outlines participant characteristics. Significant statistical differences were found between rural and urban participants for relationship and education with caregiver characteristics and family supporters of the primary caregivers with external variables. Caregivers in rural communities were more likely to not be children of the elderly recipient (spouse, daughter-in-law, others), less likely to be college or postgraduate school graduates and more likely to have supporters of their own than urban caregivers.

Home-based Caregiving Appraisal (Table 3)

Table 3 illustrates home-based caregiving appraisal. The mean \pm SD of the care burden score was 33.3 ± 18.2 for all participants, 31.8 ± 16.5 for rural and 35.1 ± 20.0 for urban. The difference between rural and urban results was not significant.

The mean \pm SD of the positive appraisal score was 39.0 ± 9.1 for all participants, 39.7 ± 9.0 for rural, and 38.3 ± 9.1 for urban. The difference between rural and urban results was not significant.

Analysis of the correlation between care burden and positive appraisal showed significant negative correlation recognized by all three groups: all participants, rural only and urban only. It

was found that the higher the care burden, the lower the positive appraisal, and the lower the care burden, the higher the positive appraisal.

Factors Associated with Home-based Caregiving Appraisal

Care Burden (Table 4)

Table 4 shows data related to factors associated with care burden. For statistically significant results for all participants, relationship ($\beta=0.202$) and residential community ($\beta=0.134$) were positive, and *sekentei* (social pressure) ($\beta=-0.226$), obligation ($\beta=-0.164$), night care ($\beta=-0.190$), care level ($\beta=-0.169$) and former caregiving experience ($\beta=-0.128$) were negative (model explanation: 19.3%).

The care burden was higher among those who were not children of their care-recipients, lived in urban communities, considered *sekentei* (social pressure) as a factor when deciding whether or not to accept formal or informal caregiving supports, had an obligation to provide care, provided care at night, cared for elderly recipients at level three care and had former caregiving experience.

For statistically significant care burden results with participants in only rural communities, *sekentei* ($\beta=-0.262$), night care ($\beta=-0.224$) and education ($\beta=-0.203$) were negative (model explanation: 15.4%). The care burden was higher with rural participants who considered *sekentei* (social pressure) as an important factor, provided care at night and were neither college nor postgraduate school graduates. For significant factors associated with care burden participants in

only urban communities, relationship ($\beta=0.285$) and gender of caregivers ($\beta=0.222$) were positive (model explanation: 12.6%). The care burden was higher with female urban participants who were not children of their care-recipients.

Residential community was found to be one of the significant factors associated with care burden; in addition, all the significant factors associated with care burden were found to differ between rural and urban participants.

Positive Appraisal (Table 5)

Table 5 shows data related to factors associated with positive appraisal. For statistically significant results with all participants, obligation ($\beta=0.392$) was positive, and gender of the care-recipients ($\beta=-0.203$) and relationship ($\beta=-0.169$) were negative (model explanation: 19.5%). Positive appraisal was lower for participants who had an obligation for caregiving, cared for female recipients and were not children of the recipients. Residential community was not recognized as a significant associated factor.

For statistically significant positive appraisal results with participants in only rural communities, obligation ($\beta=0.421$) was positive, and gender of the care-recipients ($\beta=-0.374$) and relationship ($\beta=-0.235$) were negative (model explanation: 32.1%). Positive appraisal was lower with rural participants who had an obligation for caregiving, cared for female recipients, and were not children

of the recipients. For significant factors associated with positive appraisal participants in only urban communities, obligation ($\beta=0.356$) and age of care-recipients ($\beta=0.206$) were positive (model explanation: 13.8%). Positive appraisal was lower with urban participants who had an obligation for caregiving and cared for younger elderly recipients.

Although residential community was not found to be one of the significant factors associated with positive appraisal, obligation was found as a common factor with both rural and urban participants; in addition, the other significant factors associated with positive appraisal were found to differ between rural and urban participants.

Discussion

Community Differences of Home-based Caregiving Appraisal

Family caregivers of elderly recipients with high care needs are greatly affected by this role and must juggle their own obligations with caregiving in their daily life. We speculate that family caregivers may have mixed feelings due to the negative and the positive aspects of their caregiving. Therefore, we believe it is important for nurses to understand the full spectrum of caregiver feelings in order to support them. Between the rural and urban residential communities, many different variables such as population construction, geographical conditions, adequate levels of social support,

relationships within the community and social norms may exist. It is important to determine caregiving appraisal between different residential communities so that nurses will be able to present the appropriate support.

A few previous studies analyzed the differences with caregiving appraisal between rural and urban residential communities for family caregivers of elderly patients (Kurasawa, Yoshimasu, Washio, Miyai, Miyashita, & Arai, 2007; Lee, Yoo, & Jung, 2010). Kurasawa et al. (Kurasawa, Yoshimasu, Washio, Miyai, Miyashita, & Arai, 2007) reported that the care burden in urban communities was significantly higher among 167 primary family caregivers (57 rural, 110 urban) of the dependent elderly (65 years old and over) based on a survey using the Japanese version of the Zarit Scale (J-ZBI). Lee et al. (Lee, Yoo, & Jung, 2010) reported that care stress in urban communities was higher among 242 Korean family caregivers (97 rural, 145 urban) of older stroke patients over 60 years old from a survey using the Korean version of the Revised Caregiving Appraisal Scale (K-RCAS) with 27 items including both negative and positive appraisal, but the residential community difference for the positive appraisal was not analyzed. These results seem to indicate that negative caregiving aspects tend to be higher for caregivers in urban communities than in rural. Family caregivers for the elderly with high care needs would have a particularly harder time since the time and effort of their caregiving tend to be greater than that for other caregivers. Therefore, we believe that caregiving appraisal of family caregivers for elderly recipients with high

care needs must be explored.

For this current study, the caregiving appraisal with both negative and positive aspects and differences between associated factors were observed by selecting family caregivers of the elderly (65 years old and over) with high care needs who lived in rural and urban communities across Japan. We found no statistically significant difference between rural and urban caregiving, although the care burden tended to be higher and the positive appraisal lower in urban communities than in rural. One reason for the lack of a significant difference may be related to the fact that the quality of relationships with the care-recipients may be equally positive in both rural and urban communities and because caregivers recruited at facilities that assist with home-care, such as home-visit nursing stations, may be more than typically enthusiastic for caregiving.

Residential Community Difference in Factors Associated with Home-based Caregiving

Appraisal

Care Burden

The current study showed that residential community was significantly associated with care burden. Bien et al. (Bien, Wojszel, & Sikorska-Simmons, 2007) reported that rural-urban location was significantly associated with a negative impact on caregiving for 253 informal Polish caregivers, including family caregivers (126 rural, 127 urban) of the elderly (75 years old and over) from a

survey using a modified version of the Carers of Older People in Europe Index (COPE), including both negative and positive appraisals. However, Kurasawa et al. (Kurasawa, Yoshimasu, Washio, Miyai, Miyashita, & Arai, 2007) reported that region (rural vs. urban) was not significantly associated with care burden, having analyzed the association with 167 primary Japanese family caregivers (57 rural, 110 urban) of the dependent elderly (65 years old and over) ranging from the minimum required support level to long-term level five care using home-visit nursing services. We believe the results of this study differ from those of Kurasawa et al. (Kurasawa, Yoshimasu, Washio, Miyai, Miyashita, & Arai, 2007) possibly because this study focused only on participants caring for elderly recipients with high care needs using home-visit nursing services.

The current study also suggested that factors associated with care burden differed between rural and urban caregivers. For this study, *sekentei* (social pressure), night care and education were recognized as significant for rural participants while relationship and gender of the caregivers were recognized for urban participants.

A previous study suggested that, among rural residents, having more education was significantly related to better home care (Mitchell, Strain, & Blandford, 2007). Caregivers in rural communities have also tended to feel self-reliant in that they must perform caregiving duties by themselves rather than accept formal support; they experience some social pressure to care for family without outside help (Bushy, 2000; Imaiso, & Sasaki, 2010). We believe that family

caregivers in rural communities have these factors linked to their care burden because they do not seek out formal social support related to night care due to lack of education and *sekentei*.

Regarding the factors associated with care burden in urban communities, Dwyer et al. (Dwyer, & Miller, 1990) reported that relationships (adult child or not) were not associated with caregiver stress and caregiver burden from a survey of 569 primary caregivers of the elderly with various care needs in the United States. We believe that our results differ from those of Dwyer et al. (Dwyer, & Miller, 1990) because this study focused more narrowly on caregivers of the elderly with high care needs. Still, Dwyer et al. (Dwyer, & Miller, 1990) reported an association where care burden of women caregivers was higher than that of men, a result that coincided with the current study.

We believe that the significant difference in factors associated with care burden between rural and urban caregivers may have been influenced by classic differences between rural and urban environments, including social norms, strength of relationships within the community and prevalence of social support.

Positive Appraisal

The current study identified no association between positive appraisal and residential community. Bien et al. (Bien, Wojszel, & Sikorska-Simmons, 2007) reported the same result, supporting the notion that no differences exist in positive appraisal among residential communities.

Obligation was recognized as a significant factor associated with positive appraisal among all family caregivers, and the same result was found with both rural and urban participants separately. Lee et al. (Lee, Yoo, & Jung, 2010) also found obligation as a positive factor associated with care stress among Korean family caregivers, but the association between positive appraisal and obligation was not analyzed, making this current study the first to quantitatively associate positive appraisal with obligation. The social norm for caregiving in Asian nations is that it is a way for family members to show respect and filial piety to their elders (Chow, 2004). We believe that caregiving with the consciousness of obligation in Japan, where it is natural for family members to care for the elderly, may lead to care stress and a lower positive appraisal.

For this study of the different factors associated with positive appraisal between rural and urban area, gender of the care-recipients and relationship were recognized as significant for rural participants, and age of the care-recipients was recognized for urban participants.

In the current study, the association between positive appraisal and relationship in rural communities was found for the first time. Worcester et al. (Worcester & Quayhagen, 1983) reported that no significant association between caregiving satisfaction and gender of care-recipients was found in a survey of 48 rural family caregivers for the elderly (60 years old and over) with various care levels. We believe this study differs from Worcester et al. (Worcester & Quayhagen, 1983) because it focused only on family caregivers of the elderly with high care needs.

No previous studies have analyzed the factors associated with positive appraisal in urban communities. Lee et al. (Lee, Yoo, & Jung, 2010) found age of the care-recipients to be a significant positive factor associated with care stress, but the association between positive appraisal and age of the care-recipients was not analyzed by community. The present study characterized the association between positive appraisal and age of the care-recipients in urban communities for the first time.

Support by Community Health Nurses

We believe home care support tailored for different residential communities is needed based on the results of the current study that shows how factors associated with home-based caregiving appraisal by family caregivers differ for rural and urban communities. As previously mentioned, if rural family caregivers can be persuaded to accept support services for night care without having *sekentei*, their care burden could be reduced. Support to improve positive appraisal for caregivers of elderly women who are not their parents may also be needed in rural communities. On the other hand, the care burden of women caregivers for elderly recipients who are not their parents is reduced in urban communities, but more support to improve positive appraisal of caregivers who care for younger elderly recipients may be needed instead.

In addition, the results suggest that regardless of the residential communities, support which can

relieve family caregivers of the conscious obligation for caregiving may lead to higher positive appraisal.

Limitations

Regarding the participants in the current study, there is a possibility of bias in selecting caregivers who have a good relationship with home-visit nurses or home-care facilities. The residential communities where participants for this study lived were 21 prefectures (46.7%) in 45 prefectures with rural communities and 14 prefectures in 15 prefectures with urban communities (93.3%). Participants were not recruited from all possible prefectures with rural or urban communities in Japan; therefore, the results may be limited in generalizing communities, particularly rural communities.

Conclusions

The current study surveyed 196 primary family caregivers (106 rural, 90 urban) of the elderly at level three care and above who lived in rural and urban communities in Japan about the realities of home-based caregiving, both the negative and positive aspects, and the associated factors were

analyzed. We identified factors associated with the care burden of family caregivers including residential communities, relationships, *sekentei*, obligation, night care, care level and former caregiving experience. Factors associated with both care burden and positive appraisal differed between rural and urban participants, suggesting that community health nurses may need to consider the differences of rural vs. urban residential communities in order to best support family caregivers of the elderly with high care needs.

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Captions

Table 1. Independent Variables for Multivariate Analysis with Home-based Caregiving Appraisal
as the Dependent Variable

Table 2. Outline of Participants

Table 3. Home-based Caregiving Appraisal

Table 4. Factors Associated with Care Burden

Table 5. Factors Associated with Positive Appraisal

Table 1. Independent Variables for Multivariate Analysis with Home-based Caregiving Appraisal as the Dependent Variable

Variables	Method of Scoring
Caregiver Characteristics	
Age	Years Old
Gender	0=Male, 1=Female
Relationship	0=Child, 1=Not Child (Spouse, Daughter-in-Law, Others)
Education	0=Neither University nor Postgraduate School, 1=University or Postgraduate School
Job	0=Yes, 1=No
Household	0=Yes, 1=No
Former Caregiving Experience	0=Yes, 1=No
Duration of Caregiving	Years
Night Care	0=Yes, 1=No
Obligation for Caregiving	0=Yes, 1=No
Care-recipient Characteristics	
Age	Years Old
Gender	0=Male, 1=Female
Care Level ¹⁾	Level 3=3, Level 4=4, Level 5=5
Cognitive Disabilities	0=Yes, 1=No
External Variables	
Residential Communities *	0=Rural, 1=Urban
Assistant Caregivers ²⁾	0=Yes, 1=No
Quantity of Formal Home Care Services ³⁾	Number
Support by Neighborhood	0=Yes, 1=No
<i>Sekentei</i> or Social Pressure ⁴⁾	0=Pay Attention, 1=Pay No Attention

Note: * Analyzed Variable only in All Participants

¹⁾ Refers to an increase in care time with increasing care level.

²⁾ Refers to supporters for the primary caregivers in the families.

³⁾ Refers to the number of six possible formal home care services used: home-visit caregiving, home-visit rehabilitation, day service, day care, home-visit bath or short stay.

⁴⁾ Refers to whether caregivers pay attention to outside social pressure in deciding whether to accept the formal or informal caregiving support.

Table 2. Outline of Participants

Attribute		Total	Residential Communities		χ^2 / t value	p-value
		N=196(%)	Rural N=106(%)	Urban N=90(%)		
Primary Family Caregiver Characteristics						
Attribute						
Age (Mean±SD: years old)		65.6±10.2	65.3±10.8	66.0±9.5	t=-0.508	0.612
Gender	Male	46(23.5)	23(21.7)	23(25.6)	$\chi^2=0.403$	0.320
	Female	150(76.5)	83(78.3)	67(74.4)		
Relationship	Child	69(35.2)	31(29.2)	38(42.2)	$\chi^2=3.593$	0.040*
	Not Child (Spouse, Daughter-in-Law, Others)	127(64.8)	75(70.8)	52(57.8)		
Education	Neither University nor Postgraduate School	163(83.2)	94(88.7)	69(76.7)	$\chi^2=5.016$	0.025*
	University or Postgraduate School	33(16.8)	12(11.3)	21(23.3)		
Job	Yes	49(25.0)	30(28.3)	19(21.1)	$\chi^2=1.342$	0.160
	No	147(75.0)	76(71.7)	71(78.9)		
Household	Yes	189(96.4)	102(96.2)	87(96.7)	$\chi^2=0.027$	0.590
	No	7(3.6)	4(3.8)	3(3.3)		
Health State						
Physical Health Problem		n=195	n=105	n=90	$\chi^2=1.382$	0.151
	Yes	106(54.4)	53(50.5)	53(58.9)		
	No	89(45.6)	52(49.5)	37(41.1)		
Depression (Mean±SD) ¹⁾		n=193	n=104	n=89	t=-1.165	0.246
		12.2±8.7	11.6±8.5	13.0±8.9		
Situation Related with Caregiving						
Former Caregiving Experience	Yes	80(40.8)	43(40.6)	37(41.1)	$\chi^2=0.006$	0.527
	No	116(59.2)	63(59.4)	53(58.9)		
Duration of Caregiving (Mean±SD: years)		6.8±5.9	6.6±5.2	7.0±6.6	t=-0.501	0.617
Night Care	Yes	136(69.4)	75(70.8)	61(67.8)	$\chi^2=0.203$	0.383
	No	60(30.6)	31(29.2)	29(32.2)		
Obligation for Caregiving	Yes	89(45.4)	45(42.5)	44(48.9)	$\chi^2=0.813$	0.224
	No	107(54.6)	61(57.5)	46(51.1)		
Care-recipient Characteristics						
Age (Mean±SD: years old)		82.1±10.5	81.6±10.5	82.7±10.4	t=0.508	0.477
Gender	Male	74(37.8)	40(37.7)	34(37.8)	$\chi^2=0.000$	0.556
	Female	122(62.2)	66(62.3)	56(62.2)		
Care Level	Level 3	29(14.8)	19(17.9)	10(11.1)	$\chi^2=1.950$	0.377
	Level 4	58(29.6)	29(27.4)	29(32.2)		
	Level 5	109(55.6)	58(54.7)	51(56.7)		
Cognitive Disability	Yes	107(54.6)	58(54.7)	49(54.4)	$\chi^2=0.001$	0.542
	No	89(45.4)	48(45.3)	41(45.6)		
External Variables						
Assistant Caregivers	Yes	123(62.8)	73(68.9)	50(55.6)	$\chi^2=3.691$	0.038*
	No	73(37.2)	33(31.1)	40(44.4)		
Quantity of Formal Home Care Services (Mean±SD)		2.2±1.0	2.1±1.0	2.3±1.1	t=-1.556	0.121
Support by Neighborhood	Yes	38(19.4)	25(23.6)	13(14.4)	$\chi^2=2.602$	0.075
	No	158(80.6)	81(76.4)	77(85.6)		
<i>Sekentei</i> or Social Pressure	Pay Attention	34(17.3)	20(18.9)	14(15.6)	$\chi^2=0.372$	0.338
	Pay No Attention	162(82.7)	86(81.1)	76(84.4)		

Note: *p<.05

¹⁾ CES-D score is 0-60 points, with a high score indicating a high depression state.

Table 3. Home-based Caregiving Appraisal

	Care Burden			Positive Appraisal			Correlation between Care Burden and Positive Appraisal p-value (Spearman Rank Correlation Coefficient)
	Mean±SD	p-value ¹⁾	Median (Min-Max)	Mean±SD	p-value ¹⁾	Median (Min-Max)	
Total N=196	33.3±18.2	N/A	30.0 (1-81)	39.0±9.1	N/A	39.0 (14-56)	0.001** (-0.238)
Rural N=106	31.8±16.5	0.407	29.0 (1-74)	39.7±9.0	0.358	40.0 (14-56)	0.020* (-0.225)
Urban N=90	35.1±20.0		30.5 (5-81)	38.3±9.1		39.0 (14-56)	0.025* (-0.235)

Note: * p<.05, ** p<.01, N/A: No Answer

¹⁾ Comparison between Rural and Urban: Mann-Whitney U test

Table 4. Factors Associated with Care Burden

	Variables	β	p-value	VIF	R	Adjusted R ²	Durbin-Watson Test
Total N=196	Relationship	0.202	0.003**	1.064			
	<i>Sekentei</i> or Social Pressure	-0.226	0.001**	1.052			
	Obligation for Caregiving	-0.164	0.012*	1.015			
	Night Care	-0.190	0.004**	1.031	0.471	0.193	2.161
	Care Level	-0.169	0.011*	1.041			
	Residential Community	0.134	0.042*	1.030			
	Former Caregiving Experience	-0.128	0.048*	1.005			
Rural N=106	<i>Sekentei</i> or Social Pressure	-0.262	0.005**	1.011			
	Night Care	-0.224	0.014*	1.003	0.422	0.154	2.120
	Education	-0.203	0.027*	1.010			
Urban N=90	Relationship	0.285	0.005**	1.014			
	Gender of Caregivers	0.222	0.028*	1.014	0.382	0.126	2.254

Note: β =Standardized Partial Regression Coefficient; VIF=Variance Inflation Factors; R=Multiple Correlation Coefficient; Adjusted R²=Adjusted Coefficient of Determination;

Relationship (Child=0, Not Child=1); *Sekentei* or Social Pressure (Pay Attention=0, Pay No Attention=1);

Obligation for Caregiving (Yes=0, No=1); Night Care (Yes=0, No=1); Care Level (Level 3=3, Level 4=4, Level 5=5);

Residential Community (Rural=0, Urban=1); Former Caregiving Experience (Yes=0, No=1);

Education (Neither University nor Postgraduate School=0, University or Postgraduate School=1); Gender of Caregivers (Male=0, Female=1)

* p<.05, ** p<.01

Table 5. Factors Associated with Positive Appraisal

	Variables	β	p-value	VIF	R	Adjusted R ²	Durbin-Watson Test
Total N=196	Obligation for Caregiving	0.392	0.000 ^{***}	1.004	0.455	0.195	2.119
	Gender of Care Recipients	-0.203	0.004 ^{**}	1.144			
	Relationship	-0.169	0.015 [*]	1.147			
Rural N=106	Obligation for Caregiving	0.421	0.000 ^{***}	1.020	0.584	0.321	2.126
	Gender of Care Recipients	-0.374	0.000 ^{***}	1.124			
	Relationship	-0.235	0.007 ^{**}	1.144			
Urban N=90	Obligation for Caregiving	0.356	0.001 ^{**}	1.007	0.396	0.138	2.169
	Age of Care Recipients	0.206	0.040 [*]	1.007			

Note: β =Standardized Partial Regression Coefficient; VIF=Variance Inflation Factors; R=Multiple Correlation Coefficient; Adjusted R²=Adjusted Coefficient of Determination;

Obligation for Caregiving (Yes=0, No=1); Gender of Care Recipients (Male=0, Female=1); Relationship (Child=0, Not Child=1)

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