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Influence of living arrangements on the management and control of hypertension: A mixed-methods study of Korean American elderly

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Abstract

Elders living alone may experience worse health outcomes than do those living with spouse and/or children. Using baseline data from a randomized trial to promote high blood pressure (HBP) control in Korean elders (N=440), we examined the relationship between living arrangements and HBP control. We also interviewed a sub-sample to better understand the patterns of social interactions associated with different types of living arrangements. One in five reported living alone; this group tended to be older and female, and resided in senior group housing. Those living alone were twice as likely as those living with a spouse to have controlled BP (OR=2.08; 95% CI 1.09–3.97), even after controlling for study covariates. Those in senior group housing had frequent social interactions that involved conversations around health, encouragement concerning medication taking, and health information sharing. In conclusion, Korean elders living independently are neither socially-isolated nor at increased risk for poor BP control.

Keywords

living arrangements; elderly; hypertension

Introduction

In the US, 7.4% of the population is 65 years of age or older; 30.1% of people aged 65 or over live on their own: 38.8% of all men, and 18.7% of all women [1]. A substantial body of studies has identified older people living alone as being at risk of not having their health problems recognized; living alone in later life is seen as a potential health risk [2–6]. However, counterexamples exist to indicate that living alone is not necessarily harmful to health. In fact, some reports in the literature have suggested that those living alone are as robust as those living with others [7–9]. Furthermore, recent studies suggest the health status of elders living with children is worse than those living without them [10, 11]. Nevertheless,

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the perception persists that living alone is problematic, and clinicians and researchers can be encouraged to use lone status as a trigger for further attention and assessment.

Expectations of filial obligation may have a strong influence on individuals' preferences for living arrangements, particularly among recent immigrant elders such as Asians, who originally came from a culture in which more traditional living arrangements (i.e., co-residence with children) are preferred. For example, research on current living arrangements of older immigrants in the U.S. indicates that older Asian and Hispanic immigrants are more likely to live with family than are non-Hispanic Caucasian immigrants [12]. These patterns of co-residence are often attributed to the norms of filial piety or obligation that are prevalent in Asian culture. However, previous research on variations in expectations of filial obligation among older adults has yielded mixed results. For example, in a sample of Hispanic immigrants in the U.S., Kao and Travis [13] found that being older, female, and less acculturated was related to increased expectations of filial obligation. In contrast, a study of Asian Indian immigrants found no correlations between filial obligation expectations and education or length of residence in the US [14].

Living in a new Western society may lead to different expectations of filial obligation among both the adult children and the older immigrants themselves. Longer length of stay in the U.S. is more likely to be associated with changes in cultural values, including expectations related to filial obligation [15]. However, despite indications from recent studies that elders living alone may experience worse health outcomes than do those living with spouse and/or children, none of these studies specifically looked at such potential associations in Asian minority elders, particularly in relation to chronic disease outcomes.

High blood pressure (HBP) is one of the most common chronic diseases in the US, affecting more than one in four adults [16]. The prevalence of HBP tends to increase when a group of immigrants migrates to a more developed country; this increase may be associated with the stress related to acculturation, diet, and lifestyle changes [17]. Several studies have revealed a high prevalence of HBP among recent Asian immigrants, and particularly among Korean American (KA) seniors, whose overall prevalence of HBP (71%) was found to be 10 to 20% higher than those reported for other ethnic groups of equivalent age [18–21].

Today's KAs, who represent more than 10% (ranked fourth largest) of the total Asian Americans, are one of the fastest-growing Asian sub-groups in the US [22]. They are predominantly first-generation immigrants who still maintain their language and culture [23]. In order to address inadequate HBP control in KA elderly, we designed and conducted a community-based clinical trial for HBP management that targeted KA elderly (65+) with HBP. This trial was conducted over a 5-year period in the Baltimore-Washington metropolitan Korean community, an area with one of the highest Korean populations in the country. This study has provided a unique opportunity to examine living arrangements in relation to a variety of chronic disease management behaviors and outcomes in this understudied population. The current analysis made use of baseline data from this 5-year study of KA elderly with HBP to test the hypothesis that living alone at an older age (60 years or over) increases the risk of poor chronic disease management behavior and outcomes when compared with to KA peers living with spouse and/or children.

Methods

Study design and sample

The Self-Help Intervention Program for HBP (SHIP-HBP) trial was a community-based cluster-randomized trial that was designed to promote HBP control among KA elderly. Based on previous epidemiological studies that revealed a high prevalence of regular

attendance at ethnic churches among the target population (> 85%) [19, 24], the ethnic church was used as the unit of random assignment. Eligibility for study participation was based on the following inclusion criteria: 1) self-identified as Korean American; 2) aged 60 or older; 3) systolic BP >=140 mm Hg and/or diastolic BP >=90 mmHg or being on antihypertensive medication; 4) no cognitive impairment, based on the Korean version of Mini-Mental State Exam [25]; and 5) written consent to participate in the study. The study design involved two parallel arms (experimental vs. control groups) with a delayed intervention. The experimental group was exposed to a multifaceted behavioral intervention that consisted of 6 weeks of in-class group education (2 hours per week), home BP monitoring, and individual telephone counseling by a trained bilingual counselor for 12 months. The control group received the intervention after the final data collection was completed. A total of 440 KA seniors completed the baseline assessment and were included in this analysis.

Procedures

After approval from the Institutional Review Board, data collection began. In order to complete the study questionnaires, trained bilingual research staff conducted face-to-face interviews with eligible KA elderly who agreed to participate. Body weight, height, and BP were also measured. In addition, for the purposes of this study, we conducted individual interviews with a sub-sample of the study participants (n=12) via phone. The goal of the individual interviews was two-fold: 1) to better understand the pattern of social interactions among the study participants based on the type of residence; and 2) to explore how the pattern of social interactions might influence individual health behaviors. Each telephone interview took about 10–15 minutes. Participants received $20 as compensation for their time and effort.

Measures

Baseline data, including participants' sociodemographic data, health care utilization, and relevant medical history, were collected using a structured questionnaire developed for this study. In particular, the types of living arrangements were divided into the following response categories: living alone, living with spouse, and living with child(ren), with or without spouse. Health care utilization was assessed using three items for which the responses were coded yes or no: “Do you have a primary care provider for your HBP care?” “Do you visit your doctor regularly?” and “Are you currently taking HBP medication?” Health care utilization scores were calculated by counting yes responses to each of the three items (possible range=0–3). For the individual phone interview, we developed a semi-structured interview guide that included questions about the effects of residence type (e.g., single-family home, townhouse, group housing) on social interactions, as well as on their health: “Does your residence type have a positive/negative effect on your social interaction? If so, how?” “Do you think social interactions positively/negatively influence your health behavior(s)? If so, how?” The study questionnaire also included a number of psychosocial variables, such as social support, depression, HBP knowledge, medication adherence, and quality of life.

BP was assessed using an A&D UA-767 (A&D Company, Ltd, Tokyo, Japan), a fully automatic validated device against a mercury sphygmomanometer. Following published guidelines [26], participants were seated quietly for at least 5 minutes in a chair and trained research staff measured BP three times. Baseline BP was calculated by averaging the second and third readings.

Social support was assessed by the Personal Resource Questionnaire (PRQ) 85-Part 2 [27]. The PRQ 85-Part 2 is a 25-item instrument that measures perceived level of social support.

Each item is scored on a seven-point (1–7) Likert-type scale. Total scores can range from 25 to 175, with higher scores indicating higher levels of social support. The Korean version of the PRQ was validated with the original developer [28]. The Cronbach's alpha was 0.91 in this Korean sample.

Depression was measured by the Patient Health Questionnaire (PHQ-9), a nine-item instrument to evaluate the presence of depressive symptoms during the past 2 weeks [29]. The item is scored from 0 (not at all) to 3 (nearly every day). Total scores range from 0 to 27. The PHQ-9 has cut-off points of 5, 10, 15, and 20, representing the threshold for mild, moderate, moderately severe, and severe depression, respectively. In this study, a total score of 5 or greater was used as a cut-off for determining the presence of depressive symptoms. The validity and reliability of the PHQ-9 have been reported in primary care and obstetrical and gynecological patients [29]. The alpha coefficient was 0.83 in our study.

HBP knowledge was evaluated using the Hypertension Knowledge Test (HKT). The HKT consists of 12 items developed by the National HBP Education Program of the National Heart, Lung, and Blood Institute (*Check Your High Blood Pressure IQ*) [30] and 14 items generated by the investigative team based on a literature review. The 26-item knowledge test has been used in our previous studies of KAs [31–33]. HBP knowledge scores are calculated by counting the number of items with correct responses, with total scores ranging from 0 to 26. The HKT has been validated in community samples of KAs with HBP using item response theory analysis [34]. The reliability coefficient was 0.62 in our sample of KA elderly.

We used the medication subscale of the Hill-Bone Adherence to HBP Therapy Scale to measure medication adherence. The medication subscale consists of nine items (e.g., “How often do you forget to take your HBP medicine?” or “How often do you skip your HBP medicine before you go to the doctor?”) on a four-point Likert-type scale (1=none of time to 4=all the time) [35]. Total scores range from 9 to 36, with higher scores reflecting poorer adherence to antihypertensive drug therapy. The Hill-Bone Adherence Scale has demonstrated adequate reliability, construct validity, and predictive validity in several independent populations [35]. The reliability coefficient alpha was 0.71 in this study.

Quality of life was measured by the psychological well-being subscale of the HBP Battery of Scales-Reduced Version [36]. The subscale consists of seven items on a four-point Likert type scale. Total scores can range from 7 to 40, with higher scores indicating greater quality of life. The scale was back-translated into Korean for this study. The alpha coefficient of the scale was 0.84 in the KA elderly.

Data Analysis

We used χ^2 tests and analyses of variance to compare study variables according to different types of living arrangements (i.e., living alone, living with spouse, living with children). In addition, multiple hierarchical logistic regression was performed to examine the relationship between the study variables and BP control. BP control was defined as BP <140/90 mm Hg [26]. For the purpose of this regression analysis, we divided the sample into high and low groups of HBP knowledge and social support based on quartile scores; those in the upper quartile (75 percentile) were categorized as high HBP knowledge and social support groups. Sociodemographic (age, gender, education, length of stay in the US, type of residence, insurance, and health care utilization) and disease-related characteristics (comorbidity, years of HBP) were entered in the first block. In block two, living arrangement was entered along with other psychosocial variables, such as HBP knowledge, social support, depression, medication adherence, and quality of life. Results were considered statistically significant at $p \leq 0.05$ (two-sided). Finally, we used descriptive statistics such as frequency, mean, and

standard deviation to summarize the characteristics of the subsample who participated in the semi-structured individual telephone interview. Qualitative data regarding the effects of residence type (e.g., single-family home, townhouse, group housing) on their social interactions as well as on their health-related behaviors were analyzed using content analysis. Quotes were selected to support the findings from the semi-structured interviews.

Results

Sample characteristics by living arrangements

Table 1 presents the sample characteristics according to living arrangements. Overall, the KA in this sample were predominantly females (69.5%) in their early 70s (mean±SD = 70.9±5.5 years), with an average of 11.1 (±4.3) years of education and 24.2 (±11.3) years of residence in the US. More than half (58.1%) were living in either a single-family home or a townhouse. About four-fifths (80.2%) were insured by Medicare and/or Medicaid; 19.8% of the sample reported no health insurance coverage. The mean years of HBP was 9.6 (±8.9), with an average of less than one co-morbid condition (mean±SD = 0.69±0.7). The majority (83.9%) had a primary care physician for their HBP, reported regular doctor visits (86.1%), and were on HBP medication (86.1%), but only slightly more than one-third (37.5%) had achieved BP control.

The most frequent type of living arrangement was living with spouse (51.6%), followed by living with child (ren) (28.4%) and living alone (20%). Living arrangement was significantly associated with a number of demographic and disease-related factors. Specifically, those who reported living alone were more likely to be female and older, had lower levels of education, had lived in the US longer, tended to reside in senior group housing, and were more likely to have Medicaid ($p< 0.01$ for all tests). In addition, they had higher levels of health care utilization and better BP control ($p\leq 0.01$ for both tests). However, living arrangement was not associated with any of the psychosocial variables in the study.

Multiple logistic regression analysis of BP control

Table 2 shows the odds ratio (OR) and 95% confidence interval (CI) for each candidate predictor of BP control. In model 1, a shorter length of stay in the US (OR=0.97; 95% CI 0.94–0.99), fewer years of having HBP (OR=1.00; 95% CI 0.99–1.00), and health care utilization (OR=1.84; 95% CI 1.04–3.27) were significantly associated with BP control. In the second block (model 2), the OR for those living alone was statistically significant (OR=2.08; 95% CI 1.09–3.97), after adjusting for sociodemographic and disease-related characteristics. Those who were living alone were at last two times more likely to have BP control than were those living with a spouse, after controlling for other variables.

Perceived effects of type of residence on social interaction and health

Given that living arrangements, as the strongest predictor of BP control in the KA elderly with HBP, was significantly associated with type of residence (i.e., single/townhome, apartment, and senior group housing), we further explored the nature and contexts in which the type of residence might play a role as it related to social interactions and health, analyzing a subsample of participants via individual phone interviews. In order to ensure that this subsample was representative of the overall sampling scheme in terms of type of residence, we selected four participants in senior group housing, two in an apartment or condominium, and six in a single-family home or townhouse, paralleling the proportions of residence type in the original study sample. The subsample characteristics and the findings of the interviews are presented in Table 3.

The subsample (N=12) tended to be slightly younger than the original sample (mean±SD = 68.2±4.3 years) and included equal numbers of males and females. Those in senior group housing were either living alone or with a spouse, while those in an apartment were living with their child(ren). The group living in a single-family home or townhouse included equal numbers of elderly who were living with a spouse and/or child(ren). Almost all (91.6%) responded that they had had social interactions at least a few times per week. In particular, every participant who resided in senior group housing or an apartment/condominium had frequent social interactions (more than once per day). The social interactions were most frequently with friends, followed by contacts with family members and relatives, either in-person via phone calls. Health issues were mentioned as a casual conversation topic, particularly among the interview participants who resided in senior housing (75%).

All of four KA elders who resided in senior housing responded that their residence type facilitated social interactions in a positive way, particularly with friends and neighbors. They felt ongoing interactions with neighbors in the same building as one of the biggest advantages of their residence: “Because of close proximity of living space in this housing, we can meet so often,” “It's so convenient to meet people here,” “Since I live in this senior housing, we can help and depend on each other.” On the other hand, KA seniors who lived in a single-family home, townhouse, or apartment were generally isolated and had limited social interactions with their peer groups. They were often engaged in activities supporting their grown-up children or grandchildren, so their social and health needs were given a lower priority. Regardless of the type of residence, however, the majority of the interview participants (75%) indicated that social interaction itself positively affected their health, although this sentiment was more prevalent among those in senior group housing: “It [interactions with friends and neighbors] makes me laugh and relieve my stress,” “We can exchange information about medication or foods and share so many other stuffs.”

Discussion

To our knowledge, this study is among the first to exclusively focus on the association between living arrangements and health outcomes such as BP in Asian minority elders, particularly in the context of chronic disease management and control. The sample consisted of relatively well-educated, Korean immigrant elders with HBP. The demographic characteristics of the sample were representative of today's KA elders in terms of educational level and insurance status but had a slight overrepresentation of women. For example, census data indicate that 59% of today's KA elders aged 60 and older are female (as compared to 73% in our study sample), and 55% have a high school or greater level of education; more than 73% have a health insurance [22]. In addition, our BP inclusion criteria encompass more than two-thirds of all KA elders [19]. Therefore, the study findings should be applicable to a substantial portion of the KA elderly population in the U.S., whose numbers are rapidly increasing [23].

Consistent with cultural expectations of family support in the Korean community [15], the rate of KA elders living alone (20%) was lower than that in the general US population aged 65 years or over, of whom slightly more than 30% live on their own [1]. This difference may be a reflection of the current study sample, which included a younger age group (60 to <65 yrs; about 14% of the study sample) than did the general U.S. sample. KA elders who reported living alone were at least twice more likely than their counterparts to have achieved BP control. Thus, the hypothesis that KA elderly who live alone would have worse HBP control when compared with those living with a spouse and/or children was not supported in our study.

While the evidence from the literature regarding the association between living arrangements and health outcomes has been mixed, the result of our study is consistent with some previous studies in which elders, particularly women, who had lived alone tended to have better health outcomes (e.g., psychological functioning, functional status, cognitive functioning) [7–9]. The studies, however, included predominantly white female samples, and none examined the influence of living arrangements on health in the context of chronic disease management and control. Hence, there is a need for additional research, particularly using more diverse samples with various health conditions.

The mechanisms by which living arrangements influence BP outcomes in the elderly are currently unknown. One possible explanation for our study findings is that the Korean elders who had lived alone might have developed social networks outside the household that positively influenced their HBP management. Social networks channel the diffusion of health information and health practices. In their discussions with us, the subsample of Korean elders who participated in individual telephone interviews, particularly those in senior group housing, reported frequent social interactions (more than once a day) that often involved casual conversations around health topics and positive encouragement about HBP medication-taking and health information sharing. In contrast, KA seniors in alternate living arrangements tended to have only limited social interactions with friends or neighbors. Limited social interactions outside the household, along with language barriers [23], make Korean elders in alternate living arrangements a socially isolated group. These contextual factors may offer additional explanation for an interesting finding from our quantitative analysis: that KA elders living in senior group housing were more likely to have adequate BP control than were their counterparts in other types of residence.

While most previous studies have examined the effects of living alone on health outcomes [2–9], Chan et al. [37] have noted that social networks within (living arrangements) and outside the household need to be differentiated and examined as such. In their national sample study of older adults (≥60 years) in Singapore [37], the authors found that both living alone and having weak social networks outside the household were associated with higher depressive symptom scores and that the effect of living alone on depressive symptoms was modified by the strength of social networks. Taken together, these results point to the need for further research to investigate the potential moderating effect of the strength of social networks outside the household on the relationship between living arrangements and HBP outcomes in the elderly.

This current study is potentially limited by the fact that we did not measure the strength of the participants' social networks. Rather, our findings were derived from individual interviews with a subsample of the study, using residence type as a proxy. Some of the instruments used to measure psychosocial variables (HBP knowledge) had a relatively low reliability coefficient which might have resulted in lack of significant findings. In addition, the average length of stay in the U.S. reported in the study sample (24 years) was somewhat longer than that reported in a random sample survey of Korean elders (16 years). Hence, our sample may have included those who were more acculturated than the general KA elderly residing in a community, though longer years of residence in the U.S. is not always associated with higher levels of acculturation in elders [15, 38]. Finally, because of the sample inclusion criteria and sampling scheme, the study included hypertensive Korean elders who were otherwise generally healthy and mobile and who resided in suburban areas (including those living in group housing). Elders living in inner-city high-rise housing developments are often low-income and may be at a disadvantage for developing supportive social networks. Future research needs to expand to involve sicker elders in diverse residence settings with more detailed neighborhood characteristics (e.g. density, access to

fresh foods or walking routes) that may have an impact on social processes and general health.

In conclusion, we found that Korean elders living alone were neither socially isolated nor at increased risk for poor BP control when compared with those in other living arrangements. Our study findings point to the need for additional research to broaden our knowledge and understanding of the benefits of a social support-based system approach to better improve chronic disease management and care in community-residing minority elders. Programs promoting social integration of elders and strengthening non-familial social networks, particularly for those elders living alone, may have a positive impact on HBP management and appears to be a fruitful avenue for promoting BP control.

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Table 1

Sample characteristics by type of living arrangements (N=440)

Variables	Total	Living arrangements			p-value
		alone (n=88)	with spouse (n=227)	with child(ren) (n=125)	
Female, n (%)	306 (69.5)	81 (92.0)	130 (57.3)	95 (76.0)	0.000
Age (yrs), mean (±SD)	70.9 (±5.5)	73.2 (±6.0)	70.2 (±5.0)	70.3 (±5.6)	0.000
Education (yrs), mean (±SD)	11.1 (±4.3)	9.8 (±4.3)	11.6 (±4.4)	11.0 (±4.2)	0.002
Length of stay in the US (yrs), mean (±SD)	24.2 (±11.3)	26.2 (±8.5)	25.8 (±10.0)	20.0 (±11.3)	0.000
Type of residence, n (%)					0.000
Single-family home/townhouse	255 (58.1)	19 (21.6)	123 (54.2)	113 (91.1)	
Apartment	95 (21.6)	27 (30.7)	57 (25.1)	11 (8.9)	
Senior group housing	89 (20.3)	42 (47.7)	47 (20.7)	0	
Insurance, n (%)					0.000
Medicare	246 (55.9)	45 (51.1)	148 (65.2)	53 (42.4)	
Medicaid	107 (24.3)	36 (40.9)	52 (22.9)	19 (15.2)	
Uninsured	87 (19.8)	7 (8.0)	27 (11.9)	53 (42.4)	
Years of HBP, mean (±SD)	9.6 (±8.9)	9.6 (±7.9)	9.7 (±8.9)	9.6 (±9.6)	0.982
Co-morbidity, mean (±SD)	0.6 (±0.7)	0.5 (±0.7)	0.6 (±0.8)	0.5 (±0.6)	0.101
Health care utilization, mean (±SD)	2.7 (±0.7)	2.7 (±0.7)	2.7 (±0.6)	2.5 (±0.8)	0.006
BP control, n (%)	165 (37.5)	44 (50.0)	84 (37.0)	37 (29.6)	0.010
SBP (mmHg), mean (±SD)	141.0 (±18.7)	137.7 (±17.6)	140.9 (±18.3)	143.6 (±20.0)	0.080
DBP (mmHg), mean (±SD)	79.5 (±11.2)	77.3 (±10.7)	79.5 (±10.5)	81.0 (±12.6)	0.050
HBP knowledge					0.165
High, n (%)	325 (73.9)	58 (65.9)	172 (75.8)	95 (76.0)	
Low, n (%)	115 (26.1)	30 (34.1)	55 (24.2)	30 (24.0)	
Social support					0.681
High, n (%)	227 (51.6)	49 (55.7)	114 (50.2)	64 (51.2)	
Low, n (%)	213 (48.4)	39 (44.3)	113 (49.8)	61 (48.8)	
Depression					0.010
Depressed, n (%)	91 (20.7)	28 (31.8)	37 (16.3)	26 (20.8)	
Not depressed, n (%)	349 (79.3)	60 (68.2)	190 (83.7)	99 (79.2)	
HBP medication adherence, mean (±SD)	10.7 (±2.5)	10.6 (±2.0)	10.7 (±2.7)	10.7 (±2.5)	0.877

Variables	Total	Living arrangements			p-value
		alone (n=88)	with spouse (n=227)	with child(ren) (n=125)	
Quality of life, mean (±SD)	30.7 (±4.7)	30.2 (±5.1)	30.9 (±4.5)	30.7 (±4.7)	0.506

Table 2

Odds ratios for BP control among Korean elders with HBP

Factors	Model 1			Model 2		
	OR	95% CI	P-value	OR	95% CI	P-value
Gender						
Male: reference						
Female	1.360	0.803–2.304	0.252	1.135	0.626–2.058	0.677
Age	1.000	0.955–1.046	0.983	0.997	0.949–1.048	0.909
Years of education	1.039	0.982–1.101	0.185	1.031	0.970–1.096	0.329
Length of stay in the US	0.971	0.945–0.997	0.031	0.968	0.941–0.994	0.018
Type of residence						
Group housing: reference						
Single-family or townhouse	0.799	0.443–1.440	0.455	1.293	0.658–2.540	0.455
Apartment	0.695	0.353–1.371	0.294	0.769	0.384–1.540	0.459
Years of HBP	0.997	0.994–0.999	0.003	0.997	0.994–0.999	0.004
Co-morbidity	0.799	0.580–1.101	0.170	0.835	0.600–1.164	0.288
Health care utilization	1.840	1.035–3.271	0.038	1.807	0.995–3.282	0.052
Insurance						
Medicare: reference						
Medicaid	1.030	0.418–2.537	0.948	1.165	0.456–2.972	0.750
Uninsured	0.622	0.281–1.378	0.242	0.743	0.321–1.721	0.488
HBP knowledge				1.031	0.950–1.119	0.467
Social support				1.031	0.802–1.325	0.811
Depression				0.958	0.877–1.045	0.334
Medication adherence				0.964	0.863–1.076	0.511
Quality of life				0.987	0.953–1.022	0.463
Living arrangements						
Living with spouse: reference						
Living alone				2.078	1.089–3.965	0.027
Living with child(ren)				0.596	0.324–1.096	0.096

Table 3

Characteristics of the subsample and perceived effects of type of residence (N=12)

Variables	Total	Senior group housing (n=4)	Apartment (n=2)	Single home or townhouse (n=6)
Age (yrs), mean ± SD	68.2 ± 4.3	68.8 ± 4.3	69.0 ± 1.4	67.5 ± 5.2
Female, n (%)	6 (50.0)	2 (50.0)	2 (100)	2 (33.3)
Living arrangements, n (%)				
Live alone	2 (16.7)	2 (50.0)		
Live with spouse	5 (41.7)	2 (50.0)		3 (50.0)
Live with child(ren)	5 (41.7)		2 (100)	3 (50.0)
Frequency of social interaction, n (%)				
More than once per day	7 (58.3)	4 (100)	2 (100)	1 (16.7)
2–3 times per week	4 (33.3)			4 (66.7)
Once a week	1 (8.3)			1 (16.7)
2–3 times per month	0			
Target of social interaction, n (%) *				
Family members	6 (50.0)	3 (75.0)	1 (50.0)	2 (33.3)
Relatives	2 (16.7)		2 (100)	1 (16.7)
Friends	10 (83.3)	4 (100)		4 (66.7)
Interaction methods, n (%) *				
In-person	10 (83.3)	4 (100)	1 (50.0)	5 (83.3)
Telephone	8 (66.7)	4 (100)	2 (100)	2 (33.3)
Internet (email, chatting)	1 (8.3)		1 (50.0)	
Health as a casual conversation topic, n (%)	6 (50.0)	3 (75.0)	1 (50.0)	2 (33.3)
Perceived positive effect of residence type on social interaction, n (%)	6 (50.0)	4 (100)	1 (50.0)	1 (16.7)
Perceived positive effect of social interaction on health, n (%)	9 (75.0)	3 (75.0)	1 (50.0)	5 (83.3)

* Participants were instructed to answer whenever applicable for each response category.