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Factors Associated with Health Discussion Network Size and Composition Among Elderly Recipients of Long Term Services and Supports

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Abstract

Social networks play an important role in helping older adults monitor symptoms and manage chronic conditions. People use verbal discussions to make sense of symptoms, determine their seriousness, and decide whether to seek medical care. In this study, problem-specific social networks called health discussion networks (HDNs) are examined over time among older adults receiving long-term services and supports (LTSS). Data were gathered from older adults who had recently moved into a nursing home (NH) or assisted-living facility (ALF) or who had started to receive home and community-based services (H&CBS). LTSS recipients identified people with whom they discussed symptoms or disease information, talked over what their physician said, and considered consulting other health-care providers. Data were analyzed for 216 adults with Mini Mental State Examination (MMSE) baseline scores of 20 or higher, and these individuals were interviewed quarterly over a 12-month period. Generalized Estimated Equations (GEE) were used to model repeated measures of HDN size and composition as a function of baseline age, gender, race, ethnicity, marital status, education, quality of life, setting, number of adult children, and cognitive status. GEE modeling demonstrated that HDN size decreased over time ($p=.01$) and that the probability of mentioning formal care providers as part of that network increased over time ($p=.003$). Multivariate predictors of increased HDN size were lower ratings of quality of life ($p=.001$), having more adult children ($p=.04$), and higher MMSE scores ($p<.0001$) after controlling for covariates. Older adults new to receiving LTSS had relatively small HDNs that were mixed networks including family, friends, and formal care providers. This suggests an opportunity for interventions aimed at maintaining and enhancing the HDNs of older adults beyond family members.

Chronic illness or disability can dramatically affect social interactions and limit a person's ability to maintain social ties. Changes in social interactions are also affected by advancing age, and for some individuals, they are further disrupted by changes in living location as they move from the community to residential long-term services and supports (LTSS), such as a nursing home (NH) or assisted-living facility (ALF) (Field, Walker, & Orrell, 2002; van Willigen & Chadha, 2003). The transition to receiving LTSS can make it harder for older adults to maintain existing social ties with the people with whom they usually discuss their health. When an older adult transitions to LTSS, new relationships are formed both with formal care providers and other LTSS residents who may be experiencing similar chronic conditions.

Discussions about health are frequent topics of conversation among chronically ill older adults, who are typically managing multiple co-existing conditions (Thorpe & Howard, 2006). It is through these conversations that people's perceptions of their illnesses are formed, treatment options are explored, and the pressure to seek or not seek formal medical care exerted (Pescosolido et al., 1998). Individuals do not experience illness in a vacuum, but within the contextual framework of a network of people with whom they discuss their health (Freidson, 1970). Decisions about managing chronic diseases are often made in conjunction with others through verbal exchange (Ajrouch, Antonucci, & Janevic, 2001). The people with whom we discuss our health concerns constitute our health discussion network (HDN), which is typically a smaller subset of a person's larger social network. Perry & Pescosolido (2010) explain the mechanism by which HDNs influence health:

[H]ealth discussion networks work through social regulation, or the normative influence applied by social networks in order to shape a member's decisions, behaviors, or attitudes toward health. These in turn, affect morbidity and mortality through healthy or unhealthy behaviors, as well as patterns of health care utilization. (Perry & Pescosolido, 2010, p. 356).

Freidson (1970) utilizes a symbolic interactionist perspective to explain how individuals use lay health discussants (people who are not medical professionals) to make sense of symptoms, determine their seriousness, make self-care decisions, seek medical care, and comply with medical regimes. Typically, health discussants are family members but non-family members who have more expertise, such as formal care providers, can also be involved. Usually, chronic conditions have a slow, subtle onset (and can also be asymptomatic e.g. hypertension) making it difficult to determine when medical care is needed. Therefore, the appraisal and monitoring support from lay health discussants is an important partnership in recognizing the need for medical attention. Once conditions are diagnosed, lay HDN members can be instrumental in managing the illness and in encouraging (or discouraging) medication compliance and lifestyle changes such as diet and exercise.

Most studies of social networks have collected information that is not specific to health discussions. One common way data on personal social networks is collected is to ask such name-generating questions as, With whom do you discuss important matters? The number of individuals mentioned in response has been found to be predictive of many important outcomes, including health, finding jobs, accessing information, and obtaining social

support (Granovetter, 1995; Smith & Christakis, 2008). However, little is known about the size and composition of HDNs among older adults who have recently started to receive LTSS and how their HDNs change over time in relation to changes in health outcomes. This is an important area of study because multiple co-occurring illnesses are often the reason that older adults require LTSS. The health status of these individuals can change daily or even by the hour. Yet LTSS recipients may no longer have access to the physicians who have provided care to them for many years because of the need to see physicians associated with the LTSS organization. Moreover, the start of LTSS services is often a time filled with disruptions as an array of new providers need to perform medical assessments and at the same time establish relationships and obtain health histories from LTSS recipients. And even if LTSS recipients are able to continue seeing their community physicians, obtaining transportation for an office visit may prove challenging.

In addition, seeking information about health conditions can be difficult for this older adult population because LTSS recipients may have difficulties accessing their HDN. Environmental barriers such as having a phone in their NH or AL room that make confidential conversations possible or access to sources of information such as computers or libraries to acquire information about their conditions may be nonexistent. Additionally physical and functional impairments, such as hearing loss and cognitive impairment may limit conversations with HDN members (Cruice, Worrall, & Hickson, 2005). How older adults navigate these transitions and continue to seek out (or fail to seek out) conversations with network members about their health is unknown. Seeking to understand how these transitions affect the HDNs of older adults is consistent with the current emphasis on “person-centered care” (health care responsive to an individual's wants, needs, and preferences) (Institute of Medicine, 2001). Clearly, LTSS recipients are at great risk of not having a voice in decisions about their health and health care. Therefore, achieving person-centered care will be even more challenging if LTSS recipients have no one to discuss their health with, are unable to keep in touch with trusted members of their HDNs due to a relocation to a nursing home or assisted-living facility, or have no way to access desired health information.

The way individuals communicate and interact socially changes throughout the life course. Life-span developmental approaches focus on understanding how communication changes as individual's age. Understanding the process of change and its relation to aging is of particular interest (Nussbaum, Pecchioni, Robinson & Thompson, 2000). One theory of how people change their patterns of interactions in relation to the aging process includes Carstensen's socioemotional selectivity theory, which proposes that older adults purposively limit social interactions to those that are the most emotionally rewarding (Carstensen, 1991; Carstensen, 1995). This theory acknowledges the costs of social interactions in terms of energy expenditure required to interact and reciprocate, as well as the potential to have negative experiences. Over the life course, older adults respond by focusing their energy on maintaining relationships that are rewarding while allowing unrewarding relationships to fade.

While the size of a social network is typically one focus of social network studies, the type of relationships between network members (e.g., family, friends, neighbors, co-workers) has

also been found to be connected to subjective well-being and the type of support received. This is an additional unexplored area for older adults receiving LTSS. Generally, older community-dwelling adults with ties to a broad range of people report greater well-being (Litwin & Shiovitz-Ezra, 2011). In addition, older adults do not tend to rely on the same people for all types of support, but instead target specific individuals for specific conversations and support (Cutrona and Russell, 1990; Penning, 1990; Simons, 1983/1984; Wellman and Wortley, 1990; Weiss, 1974). Research into this area, described as functional specificity (Perry & Pescosolido, 2010) and role-topic dependency (Bearman & Parigi, 2004), suggests that focused questions are required to explore specific outcomes of interest, such as asking about HDNs when examining health outcomes. Despite enormous population growth and expansion of LTSS (Jones, Dwyer, Bercovitz & Straham, 2009), social network research with older adults in LTSS is sparse, and HDNs have not yet been specifically explored.

Because the HDNs of older adults new to LTSS have not been studied and neither the size nor the composition of these networks is known, there remains a knowledge gap in an area where it is possible to intervene to better support these older adults during a time of declining health and increased vulnerability. The reliance on formal care providers instead of family and friends has significant implications for the training needs of those providing health discussions and perhaps for the use of technology to help keep family members engaged when they are no longer living with or near the LTSS recipient. In an effort to establish a foundation of knowledge from which to design studies of LTSS and health outcomes, we examined in a population of older adults who have recently started to receive LTSS their reports of family, friends, and formal care providers who are relied upon for health discussions.

The aims of this study are: 1) to describe the size and composition of the HDNs of 216 older adults new to receiving LTSS; 2) to examine changes in HDN size and composition over one year from the start of receiving LTSS; and 3) to explore predictors of the size and composition of HDNs.

Method

Study Design and Procedure

This study of health discussion networks is part of a longitudinal investigation of changes in multiple domains of health-related quality of life (HRQoL) among older adults new to receiving long-term services and supports (R01-AG025524, PI Dr. Mary Naylor). Data for this study were generated during quarterly (at baseline, 3, 6, 9, and 12 months) interviews conducted with enrolled older adults within 60 days of their move to the major providers of long-term care, including Nursing Homes (NH), Assisted Living Facilities (ALF), and the more common forms of Home and Community Based Services (H&CBS). The University of Pennsylvania and the Visiting Nurse Service of New York Institutional Review Boards reviewed and approved this study for their respective sites.

The study was conducted in the Philadelphia and New York City metropolitan service areas. Eligible subjects were age 60 or older, could communicate in either English or Spanish, had

a Mini Mental State Examination (MMSE; Folstein, Folstein, & McHugh, 1975) score of 12 or higher, and had begun to receive LTSS within the preceding 60 days. Staff members of each participating site identified potential subjects new to their organization and referred them to one of the HRQoL study team members. Trained research assistants then approached the potential participant in person, explained the study, and administered the MMSE. LTSS recipients scoring 23 or higher on the MMSE were eligible, and informed consent was obtained from those willing to participate. For LTSS recipients who scored between 12 and 22 on the MMSE and who agreed to participate, a legally authorized representative for the elder was contacted, the study explained, and written consent for the LTSS recipients to participate was obtained.

Data reported in this study come from the interviews with the first 216 older adults enrolled into the HRQoL study who had baseline and 12-month data and at least two of the three other interviews (3, 6, or 9 month) with a baseline MMSE score of 20 or higher. LTSS recipients with MMSE scores of less than 20 ($n = 26$) were not included because of concerns about the accuracy of recall for the name-generating questions used to elicit data in this study. Elders with mild cognitive impairment (MMSE score 20-23) are included in this analyses for two reasons. First, this group, as a whole, had fewer years of education, and the MMSE score is sensitive to educational attainment (i.e., fewer years of education are associated with lower MMSE scores) (Crum, Bassett, & Folstein, 1993). Second, other researchers have found that elders with MMSE scores in this range are able to identify a health-care proxy to make medical decisions on their behalf and were consistent in identifying the same person (95% consistency, 15-30 day interval) (Mezey, Teresi, Ramsey, Mitty, & Bobrowitz, 2000).

Measures

Basic demographic information was collected from each older adult, including race (white vs. other), ethnicity (Hispanic vs. not Hispanic), gender (male vs. female), age (continuous), education (continuous), marital status (married vs. not married), household income (less than \$20,000 vs. \$20,000 or more), and number of adult children (count). Respondents were also classified by the type of services they were receiving (NH, ALF, or H&CBS), which was further collapsed into a “moved” variable for those who experienced a physical move either to an ALF or NH versus those who had not moved (H&CBS).

In addition, repeated measure predictor variables include the MMSE (Folstein, Folstein, & McHugh, 1975), which is used to measure cognitive function, is widely used to measure orientation to time and place, recall ability, short-term memory, and arithmetic ability in elderly patients. The MMSE total score ranges from 0 to 30 and reflects the number of correct responses. Using standard MMSE cut points for cognitive impairment, LTSS recipients scoring higher than 23 are considered cognitively intact, those with scores of 20-23 are deemed to be mildly impaired (Kim, Karlawish & Caine, 2002).

The Geriatric Depression Scale Short Form (GDS-SF) (Brink, Yesavage, Lum, Heersema, Adey, et al., 1982), which assesses the presence and severity of depression. This instrument has demonstrated validity and reliability for measuring depression among older adults who are institutionalized (Burke, Nitcher, Roccaforte, & Wengel, 1992) or cognitively impaired

(Katz & Parmalee, 1997; Yesavage, Brink, Rose, Lum, Huang, Adey, & Leirer, 1983). It requires just 5-7 minutes to administer, with all items answered in a “yes” or “no” format for ease of comprehension by elders with cognitive impairment.

Finally, health-related quality of life was measured using the Medical Outcomes Study SF-12v.2, a subset of items from the SF-36. The SF-12 accurately reproduces the two summary component scores (Physical Component Summary Score [PCS] and Mental Health Component Summary Score [MCS]). Higher scores indicate better overall quality of life (Ware, Kosinski, & Keller, 1996; Ware, 2002).

Network Characteristics

Members of health discussion networks were assessed by means of a series of name-generating questions related to health, which had been modified from studies by Stoller and Wisniewski (2003), and from studies by Abbott, Stoller, and Rose (2007) in community living older adults and frail elderly veterans. Three name-generating questions were included:

1. Whom do you talk to when you want some information about a particular disease or symptom, what might be causing it, or how you might treat it?
2. Whom do you talk to about what the doctor has told you? and
3. Whom do you ask for advice about consulting a health practitioner (either advice in finding a good doctor or about consulting another type of practitioner)?

LTSS recipients reported the first name and last initial of each person they mentioned in response to the name-generating questions. Initials of the last name for each person mentioned were sought in order to keep people with the same first name separate. Names were recorded on a network roster, which was used to match the person mentioned to the specific question(s) that elicited the name. The respondent was then asked a series of questions about each person, including relationship to respondent, age, sex, and number of years the respondent had known the individual. Relationships that were less than one year in duration were coded as one year.

The information elicited by the questions listed above was then used to examine the size and composition of each individual's health discussion network. *Network size* is a count of unique members of the health discussion network, including all family, friends, and formal care providers mentioned in response to the name-generating questions. For the purposes of this study, *network composition* was determined in three steps: a) health discussion network members were categorized by the relationship to the elder, b) the number of people in each category was counted, and c) older adults were then assigned to one of two composition categories. Exploratory analyses of the relationships revealed that many different types of relationships existed, and, in order to analyze these descriptively, two composition categories were created: *family and friend only* networks (a traditional lay health discussion network) and *mixed networks* (including family, friends, and formal care providers) and was dummy coded as 0 = family and friends only; 1 = mixed. For analysis Network size and network composition became the dependent outcome measures.

Statistical Analyses

Data collected in quarterly interviews over one year (baseline, 3, 6, 9, and 12 months) were used in this analysis. Baseline and 12-month data and at least two of the other data points were present for all 216 older adults. Outcomes were initially examined for bivariate associations with control variables (see “Measures” section and Table 1) using simple Poisson and logit generalized estimating equation (GEE) models for total network size and composition (Long, 1997). An autoregressive covariance matrix AR(1) accounted for correlations between observations for the same person. Covariates emerging significant at the 0.10 level were included in subsequent multivariate modeling. Preliminary modeling included an assessment of differences over time between subgroups defined within control variables; these models included a single control variable, time (baseline, 3, 6, 9, and 12 months). The final multivariate models included the entire sample with the exception of the four people who were missing data on the SF12.

Results

Sample Characteristics

Overall, respondents were 81 years old, on average (standard deviation [SD] 8.5, range 60-97), and the majority of elders in this sample were white females with an average of 12 years of education (SD 5.1, range 0-26). Thirty percent of respondents were Hispanic, and the majority of older adults were no longer married with an overall average of three adult children, including stepchildren (SD 2.5, range 0-13). Fifty-four percent of elders had experienced a permanent move to a NH or ALF, while 46% had not moved, but had begun receiving LTSS in their home (See Table 1).

Overall, few older adults (4%) reported having no one to discuss their health with, but 14% mentioned just one person who constituted their health discussion network. The majority of older adults mentioned two (31%) or three (31%) members of their HDNs. Finally, 20% of elders mentioned having four or more HDN members at baseline (Mean 2.5; SD 1.2). The majority (58%) of older adults receiving LTSS reported having mixed health discussion networks consisting of family, friends, and formal care providers -- such as doctors and nurses -- while 42% mentioned only family and friends at baseline.

Health Discussion Network Size

Bivariate analysis—GEE modeling with repeated measures was used to assess predictors of the size of the health discussion networks. The results show that network size decreases over time ($p = 0.009$; see Table 2). GEE with repeated measures was also used to assess bivariate associations between health discussion network size and the following covariates: age, gender, race, ethnicity, marital status, income, geographic move, education, number of adult children, quality of life, depression, and cognitive status. Results indicate that older adults who did not move to receive LTSS (i.e., those who receive H&CBS) have larger health discussion networks ($p < .0001$). Other bivariate predictors of a larger health discussion network include higher MMSE score ($p < 0.0001$), lower quality of life related to physical health (SF12 PCS; $p < 0.0001$), and having more adult children ($p = 0.013$).

Multivariate analysis—Multivariate GEE modeling indicates that independent predictors of larger health discussion networks among LTSS recipients include having a lower rating of quality of life related to physical health (SF12 PCS; $p = 0.0007$), having more adult children ($p = 0.04$), and having higher MMSE scores ($p < 0.0001$). Not experiencing a geographic move and receiving H&CBS became marginally non-significant after inclusion of covariates ($p = 0.06$; see Table 2). No other variables were significant predictors of the size of health discussion networks.

Health Discussion Network Composition

Bivariate analysis—GEE modeling of repeated measures was used to assess predictors of the composition of health discussion networks. The results show that the probability of having a mixed network increases over time ($p = 0.003$; see Table 3). Bivariate associations of characteristics of HDNs with each covariate show that non-Hispanics ($p = 0.002$) and unmarried older adults ($p = 0.01$) are associated with having mixed networks ($p = 0.01$). Finally, greater number of years of education was associated with having a mixed network ($p = 0.006$; see Table 3).

Multivariate analysis—Multivariate GEE for binary data modeling repeated measurement of HDN composition over time shows that the probability of having a mixed network increases over time ($p = 0.003$) and that older adults who are not married report having more formal providers in their networks ($p = .02$; see Table 3). No other variables were significant predictors of the composition of health discussion networks.

Discussion

Overall, this study highlights three major findings related to HDN size, composition, and predictors of both outcome variables. First, the HDNs of older adults new to receiving LTSS are relatively small and made up mostly of mixed networks, including family, friends, and formal care providers. Generally, larger networks are associated with better health outcomes; however, very little research has focused on chronically ill older adults receiving LTSS with access to a variety of health-care providers on a regular, often daily, basis. Perhaps having only a few very involved and knowledgeable individuals is all that is needed and wanted by older adults receiving LTSS. Carstensen's socioemotional selectivity theory supports that notion (Carstensen, 1991; Carstensen, 1995). Older adults receiving LTSS may want -- or be physically and cognitively able to handle -- only a few key individuals in their HDNs. Because most of the health issues they face are chronic in nature, older adults may not need very many people to provide information and opinions about their health and health-care options. For instance, someone who has had congestive heart failure for 15 years prior to receiving LTSS may have most of the information needed about the condition. Additional information about new or alternative therapies that might come from a more expansive network may not be needed or wanted. Future studies need to account for the frequency of HDN interactions in order to determine which explanation may be more plausible.

Alternatively, having a small HDN may be a function of not being able to maintain relationships because of a geographic move, death of age-matched network members, or

declining physical or cognitive health. In such cases, older adults “make do” with whomever they have; in other words, they get by with fewer individuals than may be beneficial. This would not be the best of situations and certainly would not help with fostering person-centered care. Finally, chronically ill older adults may fear that talking about their health concerns could threaten their already fragile autonomy and lead to increased dependency. Combined with the added unadjusted finding that overall HDN size decreases over time, additional studies are needed to understand the relationship of HDN size to health outcomes and to seek possible ways to increase discussions for those individuals who would like to have more. While the HDN is a subset of an older adult's overall social network, we do not know whether the decline in HDN size represents a general decline in the entire social network. While a move to a nursing home or assisted living facility has been found to increase socialization and provide opportunities to add network members, we did not find support of the move leading to increases in numbers of confidants with whom older adults wish to discuss their health. The unadjusted finding that those who did not experience a geographic move (those receiving H&CBS) had larger HDNs supports the importance of “aging in place” to maintaining social relationships. Prior studies have highlighted the importance of older adults remaining in the community to maintain the integrity of their social networks (Lee, Woo, & Mackenzie, 2002). Surprisingly, age and gender were not predictive of HDN size even though women have been found to have larger networks (McLaughlin, Vagenas, Pachana, Begum, & Dobson, 2010) and networks have been found to decrease with advancing age (Carstensen, 1991). This may be a function of the questions we asked or because the older adults in this study are in advanced age and the size of their HDN may have changed prior to the need for LTSS and the start of this study.

The second major finding was that people rely more on mixed networks over time. Older adults may be more likely to turn to formal care providers for health discussions over time as their relationships evolve, trust is developed, and rapport established. In fact, older adults may find formal care providers to be more helpful because they are more knowledgeable than family or friends. HDN members or other LTSS residents may encourage older adults to rely more on formal care providers because complex health discussions are more common when managing multiple co-occurring illnesses. While we presume this would be beneficial, formal care providers may not be privy to contextual information about the way the older adult has lived his or her life and so may not recommend all possible options or alternative therapies, because the formal care provider does not know the history of the LTSS recipient. This is where a family member or friend might be able to help frame discussions that need to take account of how an individual has lived his or her life. Future studies should explore the nature of the shift in network composition in terms of the proportion of family, friends, and formal care providers making up the HDN.

Finally, the third major finding included identifying multivariate predictors of HDN size and composition. Quality of life, number of adult children, and MMSE score were significant predictors for the size of HDNs, while only marital status was predictive of the composition of HDNs. Older adults with lower quality of life ratings (SF12PCS) reported larger HDNs. The SF-12 physical health summary score measures quality of life in relation to difficulties with physical functions. Individuals who rated their quality of life lower may have more serious health concerns and tend to report more HDN members because of the need for more

specialized knowledge. Having more adult children increases the availability of close family members with whom to discuss health concerns. Moreover, multiple studies have found adult children to be centrally involved in the care of a parent.

Even though we did not include individuals with moderate or severe cognitive impairment, higher MMSE scores still predicted a larger HDN. Clearly, this relates to the cognitive ability needed to recall the names of people with whom one discusses health and speaks to the need to develop complementary ways of obtaining information for individuals with cognitive impairment. Proxy data regarding health discussions from family members and LTSS staff need to be explored in order to have a more accurate picture of health discussions that are taking place. Health discussions may be occurring between formal care providers and family members that the LTSS recipient is not aware of or has forgotten. Exploring the impact of health discussions on health for individuals with cognitive impairment is an important next step.

The only multivariate predictor of having a mixed network was marital status. Married persons have a trusted confidant with whom to discuss health concerns and may not feel the need or want to discuss concerns with others, including formal care providers. Being widowed, separated/divorced, or never married was predictive of reporting a mixed network. This is a particularly encouraging finding that indicates unmarried older adults are making connections with formal care providers in a way that married individuals are not. Formal care providers should be especially attentive to the health discussion needs of unmarried older adults and consult with them about their preferences for discussion.

Limitations

Although the data about health discussion networks were elicited for the purpose of this paper, the project still retains the limitations of secondary data analysis. The questions about health discussion networks were not central to the original aims of the study. Thus, to minimize the burden on respondents, it was necessary to limit the number of questions about health discussion networks that could be added to the study. The name-generating questions used in this study focused on the needs thought to be relevant to older adults who recently started to receive LTSS services. If additional name-generating questions had been asked in other problem focused areas, such as assistance with emotional or instrumental support, a larger network may have been identified.

While we did include data from elders with mild cognitive impairment, we did not include 26 older adults with moderate to severe cognitive impairment ($\text{MMSE} < 20$) due to the method of eliciting network members using name-generating questions. There is a substantial need for the development of enhanced measures to include populations with cognitive impairment, such as using proxy data from LTSS staff, from other LTSS residents, and from family members. Analyses were limited to the sample that had completed baseline, 12-month, and two of the three intervening interviews. Individuals who missed multiple interviews due to hospitalizations or who died during the course of the year were not included in this analysis. Future research linking health discussion networks to health outcomes over time and having older adults rate their satisfaction with the health discussions they have with staff, family, and friends is needed.

Conclusion

This is the first study to have examined the HDNs of older adults receiving LTSS and to explore the changes in those networks over time. The small size of the HDNs and their decrease over time are likely to be disadvantages to older adults living with multiple chronic illnesses. This is especially troubling since the instability in the HDN occurs during a time of increased vulnerability and need. Formal care providers need to be particularly attentive to unmarried individuals' need for discussions. This work helps to establish a foundation for advancing the science of HDNs in older adults and sets the stage for intervention studies within the LTSS infrastructure designed to improve the social connectedness of older adults to their HDN members, both informal and formal.

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References

- Abbott KH, Stoller EP, Rose JH. The structure and function of frail male Veterans' informal networks. *Journal of Aging and Health*. 2007; 19:757–777. [PubMed: 17609414]
- Ajrouch KH, Antonucci TC, Janevic MR. Social networks among blacks and whites: The interaction between race and age. *Journal of Gerontology: Social Sciences*. 2001; 56:112–118.
- Bearman P, Parigi P. Cloning headless frogs and other important matters: Conversation topics and network structure. *Social Forces*. 2004; 83:535–557.
- Brink TL, Yesavage JA, Lum O, Heersema PH, Adey M, Rose TL. Screening tests for geriatric depression. *Clinical Gerontologist*. 1982; 1:37–44.
- Burke WJ, Nitcher RL, Roccaforte WH, Wengel SP. A prospective evaluation of the Geriatric Depression Scale in an outpatient geriatric assessment center. *Journal of the American Geriatrics Society*. 1992; 40:1227–1230. [PubMed: 1447439]
- Carstensen LL. Socioemotional and selectivity theory: Social activity in life-span context. *Annual Review of Gerontology and Geriatrics*. 1991; 11:195–217.
- Carstensen LL. Evidence for a life-span theory of socioemotional selectivity. *Current Directions in Psychological Science*. 1995; 4:151–156.
- Cruise M, Worrall L, Hickson L. Personal factors, communication and vision predict social participation in older adults. *Advances in Speech-Language Pathology*. 2005; 7:220–232.
- Crum RM, Anthony JC, Bassett SS, Folstein MF. Population-based norms for the Mini-Mental State Examination by age and education level. *Journal of the American Medical Association*. 1993; 269:2389.
- Cutrona, CE.; Russell, D. Type of social support and specific stress: Toward a theory of optimal matching. In: Sarason, I.; Sarason, B.; Pierce, G., editors. *Social support: An interactional view*. New York, NY: Wiley and Sons; 1990. p. 319–366.
- Field EM, Walker MH, Orrell MW. Social networks and health of older people living in sheltered housing. *Aging and Mental Health*. 2002; 6:372–386. [PubMed: 12425771]
- Folstein MF, Folstein SE, McHugh PR. Mini-mental state: A practical method for grading the cognitive state of patients for the clinician. *Journal of Psychiatric Research*. 1975; 12(3):189–198. [PubMed: 1202204]
- Freidson, P. *Professional dominance: The social structure of medical care*. Atherton, NY: Atherton Press; 1970.

- Granovetter, M. *Getting a job: A study of contacts and careers*. Chicago, IL: University of Chicago Press; 1995.
- Institute of Medicine. *Crossing the quality chasm: A new health system for the 21st century*. Washington, DC: National Academy Press; 2001.
- Jones AL, Dwyer LL, Bercovitz AR, Straham GW. The national nursing home survey: 2004 overview. *Vital and Health Statistics Series 13, Data from the National Health Survey*. 2009; 167:1–155.
- Katz, I.; Parmalee, P. Assessment of depression in patients with dementia. In: Lawton, MP.; Holmes, D.; Ory, M., editors. *Measurement in elderly chronic care populations*. New York, NY: Springer; 1997. p. 90-103.
- Kim SYH, Karlawish JHT, Caine ED. Current state of research on decision-making competence of cognitively impaired elderly persons. *American Journal of Geriatric Psychiatry*. 2002; 10:151–165. [PubMed: 11925276]
- Lee D, Woo J, Mackenzie AE. A review of older people's experiences with residential care placement. *Journal of Advanced Nursing*. 2002; 37(1):19–27. [PubMed: 11784394]
- Litwin H, Shiovitz-Ezra S. Social network type and subjective well-being in a national sample of older adults. *The Gerontologist*. 2011; 51:379–388. [PubMed: 21097553]
- Long, JS. *Regression models for categorical and limited dependent variables*. Thousand Oaks, CA: Sage Publications; 1997.
- McLaughlin D, Vagenas D, Pachana NA, Begum N, Dobson A. Gender differences in social network size and satisfaction in adults in their 70s. *Journal of Health Psychology*. 2010; 15(5):671–679. [PubMed: 20603290]
- Mezey M, Teresi J, Ramsey G, Mitty E, Bobrowitz T. Decision-making capacity to execute a health care proxy: Development and testing of guidelines. *Journal of the American Geriatrics Society*. 2000; 48:179–187. [PubMed: 10682947]
- Nussbaum, JF.; Pecchioni, LL.; Robinson, JD.; Thompson, TL. *Communication and aging*. 2nd. Mahwah, NJ: Lawrence Erlbaum Associates; 2000.
- Penning MJ. Receipt of assistance by elderly people: Hierarchical selection and task specificity. *The Gerontologist*. 1990; 30:220–227. [PubMed: 2347504]
- Perry BL, Pescosolido BA. Functional specificity in discussion networks: The influence of general and problem-specific networks on health outcomes. *Social Networks*. 2010; 32:345–357.
- Simons RL. Specificity and substitution in the social networks of the elderly. *International Journal of Aging and Human Development*. 1983; 18:121–139. [PubMed: 6668076]
- Smith KP, Christakis NA. Social networks and health. *Annual Review of Sociology*. 2008; 34:405–429.
- Stoller EP, Wisniewski A. The structure of lay discussion networks: Managing illness in community settings. *Journal of Aging and Health*. 2003; 15:482–507. [PubMed: 12914017]
- Thorpe KE, Howard DH. The rise in spending among Medicare beneficiaries: The role of chronic disease prevalence and changes in treatment intensity. *Health Affairs*. 2006; 25(5):w378–w388. [PubMed: 16926180]
- van Willigen J, Chadha NK. Social networks of old people in India. *Journal of Aging and Social Policy*. 2003; 15:109–124. [PubMed: 14696692]
- Ware JE, Kosinski M, Keller SD. A 12-item short-form health survey: Construction of scales and preliminary tests of reliability and validity. *Medical Care*. 1996; 34:220–233. [PubMed: 8628042]
- Ware, JE. *How to score version 2 of the SF-12 health survey*. Health Assessment Lab; 2002.
- Weiss, RS. The provisions of social relationships. In: Rubin, Z., editor. *Doing unto others*. Englewood Cliffs, NJ: Prentice Hall; 1974. p. 17-26.
- Wellman B, Wortley S. Different strokes from different folks: Community ties and social support. *American Journal of Sociology*. 1990; 96:558–588.
- Yesavage JA, Brink TL, Rose TL, Lum O, Huang V, Adey MB, Leirer VO. Development and validation of a geriatric depression screening scale: A preliminary report. *Journal of Psychiatric Research*. 1983; 22:37–49.

Table 1
Socio-demographic Baseline Characteristics of Respondents N=216*

	N (%)
Gender	
Female	162(75)
Male	54(25)
Marital Status¹	
Not Married	171 (80)
Married	44 (20)
Race¹	
White	121 (56)
African American or Mixed Race	94 (44)
Ethnicity	
Hispanic	64 (30)
Not Hispanic	152 (70)
Experienced a permanent geographic move	
Yes (Nursing Home/ALF)	117 (54)
No (Home & Community Based Services)	99 (46)
Income²	
0-\$19,999	106 (68)
\$20,000- or more	49(32)
	Mean (SD)
Age (years; range 60-97)	81.0 (8.49)
Education (years; range 0-25)	12.0 (5.10)
Depressive Symptoms (GDS-SF; range 0-15)	4.4 (3.31)
Quality of Life³ Mental Health MCS3 (range 16.23-76.18)	49.9 (10.13)
Quality of Life³ Physical Health PCS3 (range 10.86- 70.76)	36.6 (10.61)
Number of Adult Children (range 0-13)	3.0 (2.46)
MMSE Score (range 20-30)	25.5 (2.73)

* N=216, except where noted:

¹ N=215;

² N=155;

³ N=211

Table 2
Bivariate and Multivariate Associations between Independent Variables (Sociodemographic and Clinical Parameters) and Health Discussion Network Size

Variable	Unadjusted				Adjusted			
	β	SE	95% CI		β	SE	95% CI	
Time	-.01**	.00	-.02	-.00	-.00	.00	.00	.00
Race								
Non-White (reference)								
White	.09	.05	-.01	.19	-.01	.06	-.13	.10
Gender								
Male								
Female	.01	.06	-.10	.12				
Ethnicity								
Hispanic (reference)								
Not Hispanic	-.05	.05	-.15	.05				
Geographic Move								
Did Not Move (reference)								
Moved	-.19***	.05	-.28	-.10	-.10	.05	-.21	.00
Marital Status								
Not Married (reference)								
Married	.09	.05	-.02	.20	-.04	.05	-.14	.06
Income								
\$20,000 or more (reference)								
\$0-19,999	.03	.06	-.08	.14				
Age	-.01	.00	-.01	.00	.00	.00	.00	.01
Education	.00	.01	-.01	.01				
Depression	.01	.01	-.01	.02				
Quality of Life – MOS SF12 Mental Health MCS	.00	.00	-.00	.01				
Quality of Life - MOS SF12 Physical Health PCS	-.01***	.00	-.01	-.01	-.01***	.00	-.01	-.00

Variable	Unadjusted			Adjusted		
	β	SE	95% CI	β	SE	95% CI
Number of Adult Children	.02**	.01	.01	.01*	.01	.00
Mini Mental State Examination Score	.03***	.01	.02	.03***	.01	.02

 $p < .001$.

**
 $p < .01$.

*
 $p < .05$.

Table 3
Bivariate and Multivariate Associations between Independent Variables (Sociodemographic and Clinical Parameters) and Health Discussion Network Composition

Variable	β	Unadjusted			β	SE	Adjusted		
		SE	95% CI	Upper			SE	95% CI	Upper
Time	.05**	.02	1.02	1.09	.05**	.02	.02	.02	.09
Race									
Non-White (reference)									
White	-.02	.17	.69	1.37					
Gender									
Male (reference)									
Female	.20	.20	.83	1.79					
Ethnicity									
Hispanic (reference)									
Not Hispanic	.58**	.18	1.25	2.55	.35	.23	-.10	.80	
Geographic Move									
Did not move (reference)									
Moved	.05	.17	.75	1.47					
Marital Status									
Not Married									
Married	-.55**	.21	.39	.88	-.48*	.21	-.89	-.07	
Income									
\$20,000 or more (reference)									
\$0-19,999	.07	.22	.69	1.67					
Age	.02	.01	.99	1.04	.01	.01	-.01	.03	
Education	.05**	.02	1.01	1.08	.03	.02	-.12	.06	
Depression	.03	.03	.98	1.08					
Quality of Life – Mental Health MCS	-.00	.01	.98	1.01					
Quality of Life - Physical Health PCS	.00	.01	.99	1.02					
Number of Adult Children	-.04	.03	.91	1.01					

Variable	Unadjusted			Adjusted		
	β	SE	95% CI	Lower	Upper	95% CI
MMSE Score	.00	.02	.96	1.05		

 $p < .001$

**
 $p < .01$

*
 $p < .05$.