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# Food choice patterns among frail older adults: The associations between social network, food choice values, and diet quality

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ABSTRACT

Social network type might affect an individual's food choice because these decisions are often made as a group rather than individually. In this study, the associations between social network type, food choice value, and diet quality in frail older adults with low socioeconomic status were investigated. For this cross-sectional study, 87 frail older adults were recruited from the National Home Healthcare Services in Seoul, South Korea. Social network types, food choice values, and diet quality were assessed using The Practitioner Assessment of Network Type Instrument, The Food Choice Questionnaire, and mean adequacy ratio, respectively. Results showed that frail older adults with close relationships with local family and/or friends and neighbors were less likely to follow their own preferences, such as taste, price, and beliefs regarding food health values. In contrast, frail older adults with a small social network and few community contacts were more likely to be influenced by their food choice values, such as price or healthiness of food. Frail older adults who tend to choose familiar foods were associated with low-quality dietary intake, while older adults who valued healthiness or use of natural ingredients were associated with a high-quality diet. The strength and direction of these associations were dependent on social network type of frail older adults. This study explored the hypothesis that food choice values are associated with a certain type of social network and consequently affect diet quality. While additional research needs to be conducted, community-based intervention intended to improve diet quality of frail older adults must carefully consider individual food choice values as well as social network types.


## 1. Introduction

Food choice decisions of older adults are influenced by various environmental factors that subsequently contribute to diet quality and health status (Dean, Raats, Grunert, Lumbers, & Food in Later Life Team, 2009; Kamphuis, van Lenthe, Giskes, Brug, & Mackenbach, 2007; Koehler & Leonhaeuser, 2008; Locher et al., 2009; Payette & Shatenstein, 2005). Social network type might affect an individual's food choice because these decisions are often made as a group rather than individually (Falk, Bisogni, & Sobal, 1996; Sobal & Bisogni, 2009). It is suggested that individuals who participate in a certain type of social network are subjected to social controls and peer pressures that influence normative health behaviors (Umberson, 1987; Umberson, Crosnoe, & Reczek, 2010). For example, extreme weight loss behaviors among young females have been associated with group reports of peer concerns regarding thinness and dieting, peer pressure to lose weight and to be thin, and peer teasing (Fletcher, Bonell, & Sorhaindo, 2011; Paxton, Schutz, Wertheim, & Muir, 1999).

However, the association between social network type and dietary behavior has not been well defined among older adults. Some studies have found positive relationships (McIntosh, Shifflett, & Picou, 1989; Toner & Morris, 1992 Payette & Shatenstein, 2005), whereas others have found diet quality to be unaffected by a poor social network (Rothenberg, Bosaeus, & Steen, 1993; Walke & Beauchene, 1991). It was suggested that number of social contacts (Sahyoun & Zhang, 2005) and mealtime interpersonal behaviors (Paquet et al., 2008) affect diet quality among the elderly population. To date, however, there is a paucity of empirical studies that definitively address the relationship between food choice pattern and social network.

In this study, the associations between social network type, food choice value, and diet quality were investigated and food choice

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patterns among communities of frail older adults with low socioeconomic status in South Korea were suggested. Specifically, two questions are examined: 1) What are the relationships between social network type and several food choice values? 2) Among various food choice values, which are related with higher or lower diet quality? It is hypothesize that frail older adults with low socioeconomic status delegate their food choice decisions to the people close to them, and this consequently affects diet quality.

## 2. Methods

### 2.1. Study design and participants

This study was designed as a cross-sectional study. Study participants were recruited by National Home Healthcare Services (NHHS) nurses in Gangbuk-gu, Seoul, South Korea. Registration for NHHS is limited by family income level, so only older adults living in or on the edge of poverty were recruited in this study ($572/month for a one-person household, $974/month for a two-person household). The recruitment strategy consisted of three steps. First, from April 1 to June 12, 2011, newly registered older adults aged 65 years or older were recruited from the NHHS database. Second, participants who could not walk a 3-m course within 5 s at their usual pace were identified. Third, a trained physiotherapist administered the usual gait speed (UGS) test, and a research dietitian performed a nutritional assessment of each eligible subject. Using this process, the researchers selected the study participants who met the frailty criteria.

This study used the operational definition of frailty from the Interventions on Frailty Working Group (Ferrucci et al., 2004; Kim, 2014; Kim & Lee, 2013). Participants were considered frail if their UGS was less than 0.6 m/s and if they scored less than 24 points on the Mini Nutritional Assessment (MNA). The MNA score appears to be a good single marker of frailty and has been correlated with weight loss and functional decline (Abellan van Kan & Vellas, 2011). An MNA score lower than 24 indicates a protein-calorie intake below the recommended value (Vellas et al., 2006). Participants who are unable to walk or are too functionally deteriorated (e.g., not able to transfer from bed to chair) to receive home healthcare service are automatically transferred to the National Long-Term Care Service; thus, all eligible subjects were able to at least walk across a room.

Of 258 persons in the NHHS database who were initially screened as UGS <0.6 m/s, a total of 120 frail elderly participants were reexamined by researcher assessors. Thirty participants did not meet the frailty criteria, and three participants declined to participate in the study. These exclusions resulted in a final analytic sample of 87 frail older adults. The entire processes of recruitment and consent were performed according to the study protocol, which was approved by the Institutional Review Board (IRB) of Ewha Womans University, Seoul, Republic of Korea. A home-visit doctor working in the NHHS in Gangbuk-gu disclosed information concerning research design and potential risk to everyone who agreed to participate. To optimize comprehension, each participant was given a simplified booklet that contained various illustrations and simple explanations of study topics. After conveying information, the investigator asked each participant to restate the protocol in his/her own words in order to assess understanding.

### 2.2. Measurements

In this study, social network types were assessed using *The Practitioner Assessment of Network Type Instrument (PANT)* developed by Wenger and Tucker (2002). Wenger's research on social support networks in the UK produced a typology of five social support networks, which has been widely used to identify older people at risk and to plan community and social care services in Europe (Wenger, 1991). The construct validity of Wenger's typology was also supported by the findings of an ecological study in low- and middle-income countries (A Thiyagarajan, Jotheeswaran, Prince, & Webber, 2014). Five different network types were identified using eight questions, and the differences noted between them were associated with the presence and availability of a local family network, the frequency of interactions within the networks, and the degree of involvement within the community (Wenger, 1991). These social network types included: 1) *the Local Family-dependent Network* is focused on close family ties, few neighbors, and peripheral friends; 2) *the Locally Integrated Network* includes close relationships with local family, friends, and neighbors; 3) *the Local Self-contained Network* typically has arm-length relationships or infrequent contact with at least one relative and a primary reliance on neighbors; 4) *the Wider Community-focused Network* is typified by an absence of nearby relatives but active relationships with distant relatives, usually children, and a high salience of friends; 5) *the Private Restricted Network* is associated with an absence of local kin, few nearby friends, and low levels of community contacts or involvement.

Food choice values were assessed using *The Food Choice Questionnaire (FCQ)* developed by Steptoe and colleagues (Steptoe, Pollard, & Wardle, 1995). The FCQ was initially developed in the UK but has been widely used to explore a variety of dietary behaviors in many different countries (Januszewska, Pieniak, & Verbeke, 2011; Prescott, Young, O'Neill, Yau, & Stevens, 2002). In particular, Locher et al. (2009) used this instrument to assess food choice motivation among homebound older adults in the United States. The FCQ is a multidimensional measure of 36 statements relevant to consumer food choices. Participants were asked 36 questions based on nine factors regarding the importance of various food attributes in making food choices, and importance was rated on a 4-point scale from not at all important to very important. The following food choice values were assessed: 1) health, 2) mood, 3) convenience, 4) sensory appeal, 5) natural contents, 6) price, 7) weight control, 8) familiarity, and 9) ethical concern.

Diet quality was assessed using the mean adequacy ratio (MAR). In order to determine the MAR, the nutrient adequacy ratio (NAR) was calculated for energy, protein, and 11 micronutrients (calcium, phosphorus, iron, zinc, vitamin A, thiamin, riboflavin, pyridoxine, niacin, vitamin C, and folate). The NAR was calculated as the percentage of a nutrient consumed divided by the recommended daily nutrient intake according to The Korean Nutrition Society (Korean Nutrition Society, 2005). Once the NARs were calculated, the MAR of the diet was determined as the sum of all NARs divided by the number of nutrients. For the MAR, 100% is the ideal value since it means that the intake is the same as the requirement (Preedy, Hunter, & Patel, 2013).

During structured interviews at the participants' homes, 24-h dietary recalls were conducted using the standard protocol (Witschi, 1990). A research dietitian was formally trained in the 24-h recall methods at the International Coordinate Program in Dietetics at Kyung Hee University. The recall was conducted using standardized probing questions and two-dimensional food models to estimate portion size. Each interview lasted approximately 20 min. Participants were contacted by telephone two more times over the following two weeks to obtain two additional 24-h dietary recalls, one of which was obtained on a weekend day (Sun, Roth, Ritchie, Burgio, & Locher, 2010). Dietary data were coded by the same research dietitian, and nutrient analysis was carried out using CAN-pro 3.0 (Korean Nutrition Society, Seoul, Korea). Baseline characteristics such as age, gender, education, household income, number of chronic diseases, and medication history were also