

Examining the Social Networks Types and Their Effects on Caregiving Experience of Family Caregivers for Individuals With Dementia: A Mixed-Methods Study

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Abstract

Background and Objectives: Social networks are crucial to personal health, particularly among caregivers of individuals with dementia; however, different types of social networks among caregivers of those with dementia and how these differences are associated with caregiver burden and positive appraisal, remain underexamined. This study aims to depict dementia caregivers' social network types, related factors, and impact on caregiving experiences.

Research Design and Methods: A questionnaire-based survey was conducted with a total of 237 family caregivers of individuals with dementia nested additional semistructured interviews conducted with 14 caregivers in Chongqing, China. A quantitative study was designed to collect data on personal and situational information, social networks, caregiver burden, and positive aspects of caregiving. Qualitative data were collected via semistructured interviews. Latent class analysis and multivariate regression analyses were applied to quantitative data, and inductive content analysis to qualitative data.

Results: The 3 social network types—family-limited ($n = 39$, 16.46%), family-dominant ($n = 99$, 41.77%), and diverse network ($n = 99$, 41.77%)—differed in age and sex of caregivers and individuals with dementia, stage of dementia, and caregiving intensity. Caregivers in family-dominant networks had a lower caregiver burden ($\beta = -0.299$, $p = .003$) and greater positive aspects of caregiving ($\beta = 0.228$, $p = .021$) than those in family-limited networks. Three themes—accessibility, reciprocity, and reliance—emerged as facilitators and barriers when asking for support. Caregivers frequently cited the perception of economic, practical, and emotional support, yet reported a lack of adequate formal support from healthcare providers.

Discussion and Implication: Family caregivers of individuals with dementia have different social network types that vary considerably among sociocultural contexts and perceive various types of support from social networks. Solid family networks and diverse social networks are contributors to long-term dementia care.

Translational Significance: This study underscores the critical role of social network types in shaping the experiences of dementia caregivers. Implementing interventions aligned with these network types can significantly alleviate caregiver burden and enhance positive caregiving experiences. For healthcare providers and policy-makers, this study offers a framework to develop more effective support mechanisms, both informal and formal, that cater to the unique needs of caregivers in different social contexts. Consequently, this approach will enhance caregivers' mental health and well-being, fostering more sustainable and person-centered dementia care practices at both individual and societal levels.

Keywords: Alzheimer's disease, Caregivers, Nursing, Social support, Social network

Background and Objectives

Dementia care support is a crucial component of the global action plan on dementia, playing a significant role in enhancing the well-being of both caregivers and individuals with dementia. Numerous studies have identified negative experience (i.e., caregiver burden) and positive aspects of caregiving in dementia caregiving and their various influencing factors,

such as patient factors (e.g., functional and cognitive status), caregiver factors (e.g., sociodemographic and psychological distress), context factors (e.g., kinship and cohabitation), and social factors (e.g., social support and usage of community service; van den Kieboom et al., 2020; Zwar et al., 2023). Meanwhile, different interventions have been developed to support family caregivers (Egan et al., 2018; Jprn, 2021;

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Williams et al., 2019). Among them, social support received the most attention because it is valuable and adjustable (Dam et al., 2016). A previous study revealed that higher perceived social support was associated with lower caregiver burden and higher positive aspects of caregiving in caregivers of individuals with dementia (Nemcikova et al., 2023). Nevertheless, actual social support is not always available to family caregivers of individuals with dementia, especially for those in social isolation (Dam et al., 2018; Van Orden & Heffner, 2022). Based on the convoy model perspective (Antonucci et al., 2014), social support stems from an individual's network of relationships with family, friends, and other members, where different layers of this social network safeguard a person's physical and mental health. Additionally, previous studies have suggested that the dementia caregiving process increasingly depends on assistance and support from social networks (Wang et al., 2017).

Social network is defined as the web of social relationships surrounding the individual and the characteristics of those ties, acting as the bridge between individuals and society (Antonucci & Akiyama, 1987). Caregiving for individuals with dementia often entails a significant transformation in the family caregiver's social interactions and network composition. This transformation can be attributed to the intense demands of caregiving, which may limit the family caregiver's time and energy for maintaining a wide range of social contacts, leading to a potential contraction of their social network (Friedman & Kennedy, 2021; Lee et al., 2019). Moreover, the nature of dementia caregiving, which may include complex and fluctuating care needs, can further strain or even alienate relationships that were once sources of support (Marques et al., 2019). However, dementia caregiving also presents opportunities for social network expansion through increased interactions with healthcare professionals, joining support groups, or connecting with other caregivers facing similar challenges (González-Fraile et al., 2021). These specialized interactions can lead to the formation of new, supportive relationships. Hence, the unique context of dementia caregiving introduces specific challenges and opportunities that shape these networks in distinct ways. Understanding these nuances is vital for developing targeted interventions that can bolster the support systems of caregivers.

The importance of social networks for caregivers of individuals with dementia has been highlighted in various studies, demonstrating that caregivers with stronger social networks experience a reduced caregiver burden and more positive appraisals of caregiving (Roth, 2020; Song et al., 2023; Wang et al., 2023). In contrast, several studies have indicated that the impact of social networks on health outcomes is not always positive, for instance, larger network size and higher support intensity do not necessarily improve individuals' subjective well-being (Fuller-Iglesias & Antonucci, 2016; Wittenberg-Lyles et al., 2014). A previous study in China observed that life satisfaction had an inverted U-shaped curve relationship with the size of social network, measured by one's "Bai Nian network"—the tradition of visiting friends and relatives during the Spring Festival—up to a threshold of 75 households, beyond which the extensive network may lessen satisfaction (Ma, 2015). In other words, the social networks in which individuals are embedded are complex social relations depending on the context, social culture, and characteristics of network members that reflect several different types of social network. The social network typology,

which refers to the combined characteristics of individuals' social connections and their extent, has become an important predictor of health outcomes. This field of study has gained increasing attention following Wenger's (1991) initial introduction of the term "social network type" (Wenger, 1991).

Social network typologies provide a different and much-needed perspective on the social determinants of individuals' well-being. Numerous studies have utilized cluster analysis and latent class analysis to explore the different social network types among older adults, revealing that having a rich and diverse social network contributes to better health outcomes like cognitive function and well-being (Cohn-Schwartz et al., 2021; Park et al., 2019; Ye, 2021). Nevertheless, empirical work to date on different social network types among caregivers of individuals with dementia and how these differences affect caregiving experience is still somewhat limited. A pilot study by Friedman and Kennedy clustered four social network types of different sizes among family caregivers of individuals with dementia with a small sample size ($n = 66$; Friedman & Kennedy, 2021). However, they did not discuss the composition and importance of individuals in the network or their impact on caregiving. Moreover, the social network types for family caregivers of individuals with dementia might differ in other sociodemographic characteristics, context, and culture, thereby deserving further studies.

Social network is a complex and dynamic phenomenon. The nuanced understanding of social network types and their implications for caregivers' experiences necessitates a comprehensive approach that can capture the complexity of these social structures. Therefore, a mixed-methods research design is imperative for this study. Mixed methods allow for the integration of quantitative data, which can provide a broad overview of social network types, prevalence, and impacts, with qualitative insights that can delve into the intricacies of these networks and the subjective experiences of caregivers. To our knowledge, these mixed methods have not been introduced to study the social network of family caregivers of individuals with dementia, which highlights the need for further research on this topic.

To unravel the potential mechanisms linking social network types with the caregiving experience in family caregivers of individuals with dementia, our study introduces a conceptual framework (Figure 1). Within this framework, we investigate the influence of individual factors (e.g., age, sex, education) and situational factors (e.g., care intensity and relationship quality) on the social network type of family caregivers of

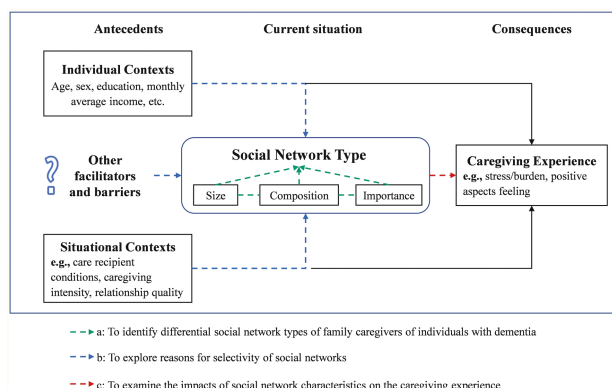


Figure 1. Conceptual framework of this study.

individuals with dementia. Further, we examine how different social network types in turn shape the caregiving experience. Recognizing the dynamics at play, we also identify both the enablers and obstacles to the development of these social networks. Consequently, our study aims to (a) characterize the varied social network types among family caregivers of individuals with dementia, (b) understand the factors driving the selectivity of these networks, and (c) assess how specific characteristics of social networks impact caregivers' experiences in family caregivers of individuals with dementia.

Research Design and Methods

Research Design and Participants

The study adopted a convergent design of mixed methods with different data on the same topic, which improved the reliability of the findings through triangulation. A total of 237 family caregivers of patients with dementia were recruited through convenience sampling from September 2022 to May 2023, in Chongqing, China. Subsequently, semistructured interviews were conducted simultaneously to compensate for the bias of single methods, mapping a comprehensive picture of the topics. A purposive sampling strategy was used to recruit participants from the quantitative study with a variety of gender, education, types of caregivers, stages of dementia, and care dependency of individuals with dementia. In total, 20 family caregivers of individuals with dementia expressed interest in taking part and 14 caregivers were interviewed in final. The study protocol was approved by the Ethics Committee of the first author's institution (Approval No. 2022-016).

Participants were recruited by researchers through the memory, rehabilitation, and neurology clinics of local hospitals, as well as local community health service centers that offer a series of activities for older adults. Potential participants were contacted face to face and via email, WeChat, and telephone. The inclusion criteria were as follows: (a) care recipients diagnosed by medical institutions with dementia, including Alzheimer's disease and vascular dementia, and aged 60 years and older; (b) caregivers were unpaid relatives aged above 18 years (spouse, adult children, siblings with dementia, etc.); (c) family caregivers who have been providing community- or home-based care for individuals with dementia for at least 6 months. The exclusion criteria were as follows: (a) caregivers with the presence of any tumor, mental illness, or other severe diseases; (b) caregivers who could not respond to questionnaires or communicate properly; (c) caregivers who provided palliative or end-of-life care or were in the bereavement stage.

Data Collection

Questionnaire survey

Care recipient characteristics, including age, sex, number of children, the stage of dementia, activities of daily living (ADLs), and neuropsychiatric symptoms (NPS). Family caregiver characteristics, including age, sex, marital status, reside type, education level, monthly average income, caregiving intensity, and relationship quality, social network, caregiver burden, and positive aspects of the caregiving. The stage of dementia was not evaluated by professional medical staff, which was reported by caregivers according to previous identification. ADL was evaluated by Katz's index (Katz et al., 1963). Neuropsychiatric inventory questionnaire (NPI) was administered to evaluate NPS (Leung et al., 2001). Caregiving

intensity was assessed through weekly care hours that were computed by two questions regarding how many hours a day and how many days a week a caregiver estimates to spend on caring for individuals with dementia. Higher scores indicated higher caregiving intensity. Relationship quality was measured by two questions regarding how close you feel to the relationship between you and your relatives and how well you and your relatives get along together. The six-item Lubben Social Network Scale (LSNS-6) including family network and friend network subscales was adopted to measure the social network of family caregivers of individuals with dementia (Lubben et al., 2006). Caregiving experience was evaluated using a six-item Zarit Burden Interview and nine items on the positive aspects of the caregiving scale (Higginson et al., 2010; Tarlow et al., 2004). The questionnaires were administered in Chinese. The details of these measurements are provided in [Supplementary Table 1](#).

Seven initial criterion variables assigned for the latent class analysis include caregiver type (1 = adult-child, 2 = spouse, 3 = other relatives), marital status (1 = married, 2 = divorced or single, etc.), number of children of individuals with dementia (1 = none or one child, 2 = two or more children), living arrangement (1 = with the care recipient only, 2 = with additional household members), relationship quality (1 = average or below, 2 = above average), family network (1 = isolation, 2 = nonisolation), and friend network (1 = isolation, 2 = nonisolation).

Semistructured interviews

In the qualitative part, we utilized a descriptive qualitative study design, which is aimed at providing a comprehensive summary of family caregivers' experiences, perceptions of seeking support from social network members within the context of dementia care. Data were collected through semistructured interviews, enabling a deeper understanding of the caregivers' perspectives and interactions. An organizing interview guide ([Supplementary Table 2](#)) was prepared according to the conceptual framework and discussions to ensure the reliability of the interview questions. First, the personal network of caregivers was interviewed and mapped in a network chart. It comprises individuals in their support network (family members living together, family members not living together, distant family members, neighbors and coworkers, friends, health providers, and others) and their importance (three concentric circles; the closer to the center, the more important the individual is for the caregiver). Next, the caregivers were asked which facilitators and barriers affected their selection of the individuals in their network. Finally, the support they perceived as unmet from these networks was examined within the interview. The interview data were combined with audio and written records to ensure that information was not omitted. Interviewees who disagreed with the voice recordings were reviewed by the two researchers. Eight caregivers were interviewed via telephone because of the impact of coronavirus disease 2019 (COVID-19) isolation during data collection. The first author conducted the interviews, which lasted between 23 and 47 min each. Two researchers checked the transcripts, transcribed within 48 hr of the interviews, to ensure text authenticity and integrity.

Statistical Analysis

First, latent class analysis was performed using the Mplus program, version 8.2, to derive the social network types. The

number of clusters was repetitively updated until the greatest model fit was achieved based on the largest entropy and the smallest Akaike information criterion, Bayesian information criterion (BIC), and adjusted Bayesian information criterion (aBIC) scores. The correct number of clusters was chosen based on statistically significant p values for the bootstrapped likelihood ratio test and Lo–Mendall–Rubin tests. Quantitative data were analyzed using the SPSS version 25.0 software. A descriptive analysis was performed on the characteristics of the individuals with dementia and caregivers. We compared the characteristics of social network types for caregivers and individuals with dementia, as well as the caregiving experience using a series of chi-squared (χ^2) tests, one-way analysis of variance (ANOVA), and Welch's ANOVA (for variance inequality). The Bonferroni post hoc test and the Games–Howell test (for variance inequality) were adopted to test pairwise multiple comparisons. Additionally, a linear regression analysis was performed to explore the associations between caregiving experience and social network type.

Qualitative data analysis was performed for each interview. Data collection stopped after 14 participants as these provided rich and detailed insights from multiple perspectives (Malterud et al., 2016). Inductive content analysis was performed to analyze the words and phrases in the interview data (Hsieh & Shannon, 2005). Data analysis began by reading all the data repeatedly to achieve immersion and obtain a sense of the whole. Subsequently, two researchers read the code word by word by highlighting the words that captured key opinions. Next, we noted and categorized the codes based on the links and differences between them. Two researchers independently reviewed and coded the data. When coding discrepancies arose, the team engaged in discussions to reach a consensus, consulting the original data and additional resources as needed to ensure a unified and accurate representation of the data. Network maps were analyzed using a mixed-methods network analysis (MMSNA) approach, which combines inductive and exploratory techniques to iteratively interpret the maps' meanings. MMSNA allows for an integrated examination of interaction patterns among network members, merging quantitative data on network structures with qualitative insights into the significance and dynamics of interactions within the network. This methodology has been successfully applied in other studies to explore support networks among patients and caregivers (Tabatabaee et al., 2022; Yousefi Nooraie et al., 2021). First, we looked at the big picture of each map to understand its overall layout. Then, we examined how closely connected the people in the network were and their roles. We also kept an eye out for any unexpected patterns that might pop up. After mapping out these key features, we grouped the maps to spotlight the most common and the most unique ones. This entire process involved team members sharing their observations and agreeing on the findings together. A mixed-methods matrix approach was employed to triangulate the quantitative and qualitative findings to enhance understanding of the data (O' Cathain et al., 2010).

Results

Participant Characteristics

In the quantitative analysis, 237 caregivers were included, with an average age of 62.43 (standard deviation = 12.38) years. Further details are presented in Table 1. In the qualitative part, 14 family caregivers (5 spouses, 7 adult children,

and 2 siblings) aged 58–77 years completed the interviews. The details are presented in Supplementary Table 3.

Quantitative Findings

Social network type

Supplementary Table 4 shows the fit indices of the models analyzed in this study, indicating that the three-cluster model had the best fit. Table 2 presents the proportions of criterion variables for the three social network types. The family-limited network comprised the smallest cluster ($n = 39$, 16.46%). This cluster was characterized by the family caregivers' strong integration within their family and friend networks, with no risk of social isolation. Most individuals in this cluster, whether adult children or other relatives and despite a high likelihood of being unmarried (58.3%), typically lived with the care recipient and other household members. Furthermore, it's notable that the majority of care recipients in this group had a limited family size, with 75.5% having only one child or none. The family-dominant network, which was composed of 99 (41.77%) of the sample, included the role of spouses with a stronger family network and weaker friend network. The cluster was distinguished by living with care recipients with two or more children and having higher-quality family relationships. The diverse network ($n = 99$, 41.77%), was assembled for individuals with strong family and friend networks. They were married adult/child caregivers, and 77.9% had an average and below-average relationship quality with family.

Comparisons of social network types in sample characteristics

Table 1 presents a comparison of social network types based on sample characteristics. Statistically significant differences were observed in age, sex, caregiver intensity, caregiver burden, and positive aspects of caregiving of caregivers, as well as in care recipients' age, sex, and stage of dementia among individuals in the three types of social networks ($p < .05$). Post hoc analysis revealed that individuals in the family-dominant network were older, mostly female, and experienced greater positive aspects of caregiving than those in both the family-limited networks and diverse networks.

Impacts of social network types on caregiving experiences

Linear regression analyses were conducted to examine social network types associated with caregiver burden and positive aspects of caregiving, controlling for sample characteristics. As shown in Table 3, caregivers in family-dominant networks had a lower caregiver burden ($\beta = -0.299$, $p = .003$) and greater positive aspects of caregiving ($\beta = 0.228$, $p = .021$) than those in the family-limited networks. Furthermore, compared with the family-limited networks, caregivers in the diverse networks also had lower caregiver burden ($\beta = -0.213$, $p = .030$).

Qualitative Findings

Network maps of family caregivers

The network maps of the family caregivers were compared. Figure 2 shows examples of these three network types. Three representative network types could be summarized, which were similar to quantitative findings: diverse, family-dominant, and family-limited networks. In the network maps, we found infrequent and weak interactions between caregivers and healthcare providers, and we coded this theme as tenuous connections

Table 1. Baseline Characteristics of the Participants by Social Network Type

Variables	Total (n = 237)	Family-limited network (n = 39)	Family-dominant network (n = 99)	Diverse network (n = 99)	F or χ^2 (p) ^a	Post hoc ^b
Caregivers						
Age in years	62.43 (12.38)	56.18 (13.74)	73.83 (5.36)	53.49 (6.31)	304.539 (<0.001)	1 < 2, 3 < 2
Sex					10.247 (0.006) ^a	
Male	97 (40.9)	17 (43.6)	51 (51.5)	29 (29.3)		3vs2
Female	140 (59.1)	22 (56.4)	48 (48.5)	70 (70.7)		3vs2
Education level					6.034 (0.197)	ns
Middle school and below	111 (46.8)	16 (41.0)	51 (51.5)	44 (44.4)		
High school	54 (22.8)	7 (17.9)	26 (26.3)	21 (21.2)		
College and above	72 (30.4)	16 (41.0)	22 (22.2)	34 (34.3)		
Monthly average income (Yuan, RMB)					6.903 (0.141)	ns
≤3,000	79 (33.3)	14 (35.9)	35 (35.4)	30 (30.3)		
3,001–5,000	98 (41.4)	10 (25.5)	41 (41.4)	47(47.5)		
>5,000	60 (25.3)	15 (38.5)	23 (23.2)	22 (22.2)		
Caregiving intensity	58.46 (37.04)	31.44 (19.96)	66.87 (35.26)	60.69 (39.23)	31.613 (<0.001) ^a	3 > 1, 2 > 1 ^c
Caregiver burden	14.84 (2.65)	16.00 (2.29)	14.51 (2.46)	14.72 (2.86)	4.774 (0.009)	1 > 3, 1 > 2
Positive aspects of caregiving	28.10 (4.79)	26.97 (4.78)	29.27 (4.94)	27.36 (4.42)	5.402 (0.005)	1 < 2, 3 < 2
Individual with dementia						
Age in years	76.24 (6.89)	74.15 (7.36)	75.10 (6.85)	78.20 (6.29)	7.546 (0.001)	3 > 2, 3 > 1
Sex					13.886 (0.001)	
Male	84 (35.4)	13 (33.3)	48 (48.5)	23 (23.2)		3vs2
Female	153 (64.6)	26 (66.7)	51 (51.5)	76 (76.8)		3vs2
Stage of dementia					16.436(0.002)	
Mild	62 (26.2)	15 (38.5)	21 (21.2)	26 (26.3)		ns
Moderate	121 (51.1)	20 (51.3)	61(61.6)	40 (40.4)		3vs2
Severe	54 (22.8)	4 (10.3)	17 (17.2)	33 (33.3)		3vs2
Care dependency					7.777 (0.255)	ns
No	119 (50.2)	21 (53.8)	53 (53.5)	45 (45.5)		
Mild	54 (22.8)	10 (25.6)	25 (25.3)	19 (19.2)		
Moderate	32 (13.5)	3 (7.7)	13 (13.1)	16(16.2)		
Severe	32(13.5)	5 (12.8)	8 (8.1)	19 (19.2)		
Neuropsychiatric symptom	24.38 (16.84)	27.59 (16.25)	24.29 (16.73)	23.19 (17.19)	0.955 (0.386)	ns

^aWelch test

^bns = no significance; 1 = Family-limited network, 2 = Family-dominant network, 3 = Diverse network.

^cGames–Howell for post hoc test.

with healthcare providers. Six caregivers suggested that doctors, followed by nurses, were the main members of their healthcare provider networks and were located in vital positions but not closely connected. Others indicated that they had never contacted or visited a doctor again after becoming aware of the disease: “My mother has been diagnosed with this disease for three years and has not gone to the doctor since” (C2).

Reasons for Selectivity in Social Networks

Accessibility

(a) Socio-geographic isolation. Caregivers face the dual challenge of a lack of social connections and the isolation

brought about by remote geographical locations. Individuals with loose connections with neighbors and children were busy with other social roles, which limited the support provided by these network members: “Now, our neighbors did not interact with each other ... we did not even know the people living next door” (C3). Living a long distance from hospitals also hindered family caregivers’ access to formal support, leading them to rely on informal social networks for support: “We lived in a remote rural area, a three-hour drive from the nearest hospital ... inconvenient ... rarely any regular contacts with doctors” (C4). (b) Futile assistance. Useless help was one reason for caregivers to stop seeking help from such

Table 2. Social Network Types Among Family Caregivers of Individuals With Dementia by Criterion Variables: Latent Class Analysis

Criterion	Family-limited network (<i>n</i> = 39, 16.5%)	Family-dominant network (<i>n</i> = 99, 41.8%)	Diverse network (<i>n</i> = 99, 41.8%)
Caregiver type			
Adult-child	0.495	0.000	1.000
Spouse	0.000	1.000	0.000
Other relatives	0.505	0.000	0.000
Marriage			
Married	0.417	1.000	0.908
Others (divorced, single, etc.)	0.583	0.000	0.092
Number of children of individuals with dementia			
None and one child	0.755	0.212	0.147
Two children and above	0.245	0.788	0.853
Reside type			
Living with care recipient only	0.396	0.677	0.000
Living with more members	0.604	0.323	1.000
Relationship quality with family			
Average and below	0.504	0.333	0.779
Average above	0.496	0.667	0.221
Family network			
Isolation	0.209	0.091	0.060
Nonisolation	0.791	0.909	0.940
Friend network			
Isolation	0.113	0.545	0.345
Nonisolation	0.887	0.455	0.655

Table 3. Multivariable Linear Regression of the Association Between Social Network Types and Caregiving Experience

Variables	Caregiver burden			Positive aspects of caregiving		
	<i>B</i> (<i>SE</i>)	β	<i>p</i>	<i>B</i> (<i>SE</i>)	β	<i>p</i>
Social network type (ref: Cluster 1)						
Cluster 2	-1.602 (0.525)	-0.299	.003	2.210 (0.948)	0.228	.021
Cluster 3	-1.141 (0.521)	-0.213	.030	-0.219(0.942)	-0.023	.816
Female (ref: male)	-0.233 (0.350)	-0.043	.506	0.638(0.633)	0.066	.314
Caregiver intensity	-0.001 (0.005)	-0.014	.850	0.010(0.009)	0.075	.301
Education level (ref: middle school and below)						
High school	-0.201 (0.462)	-0.032	.664	0.989(0.834)	0.087	.237
College and above	-1.153(0.462)	-0.200	.012	3.324(0.820)	0.320	<.001
Monthly average income (ref: ≤3,000 Yuan)						
3,001-5,000 Yuan	0.012(0.406)	0.002	.977	0.576(0.734)	0.059	.433
≥5,000 Yuan	-0.310(0.505)	-0.051	.541	-0.707(0.913)	-0.064	.440
Activities of daily living (ref: nondisability)						
Mild disability	0.386(0.426)	0.061	.366	-0.553(0.769)	-0.048	.473
Moderate disability	-0.059(0.520)	-0.008	.910	0.463(0.939)	0.493	.623
Severe disability	-0.090(0.592)	-0.012	.879	-0.320 (1.069)	-0.300	.765
Neuropsychiatric symptom	0.038(0.011)	0.241	.001	-0.029(0.021)	-0.101	.164

Notes: Cluster 1 = Family-limited network, Cluster 2 = Family-dominant network, Cluster 3 = Diverse network. *SE* = standard error.

individuals in the network: “They had no idea of dementia, and there was no use asking ... nothing they could do” (C14). (c) Technological empowerment. The development of online social media has accelerated the dissemination of information and promoted connections among network members: “There were several learning resources on the Internet. I paid

attention to a WeChat video Channel [sharing knowledge of dementia]” (C3).

Reciprocity

(a) Reciprocal debt anxiety. Some caregivers, especially spouses, highlighted the fear of troubling family and friends

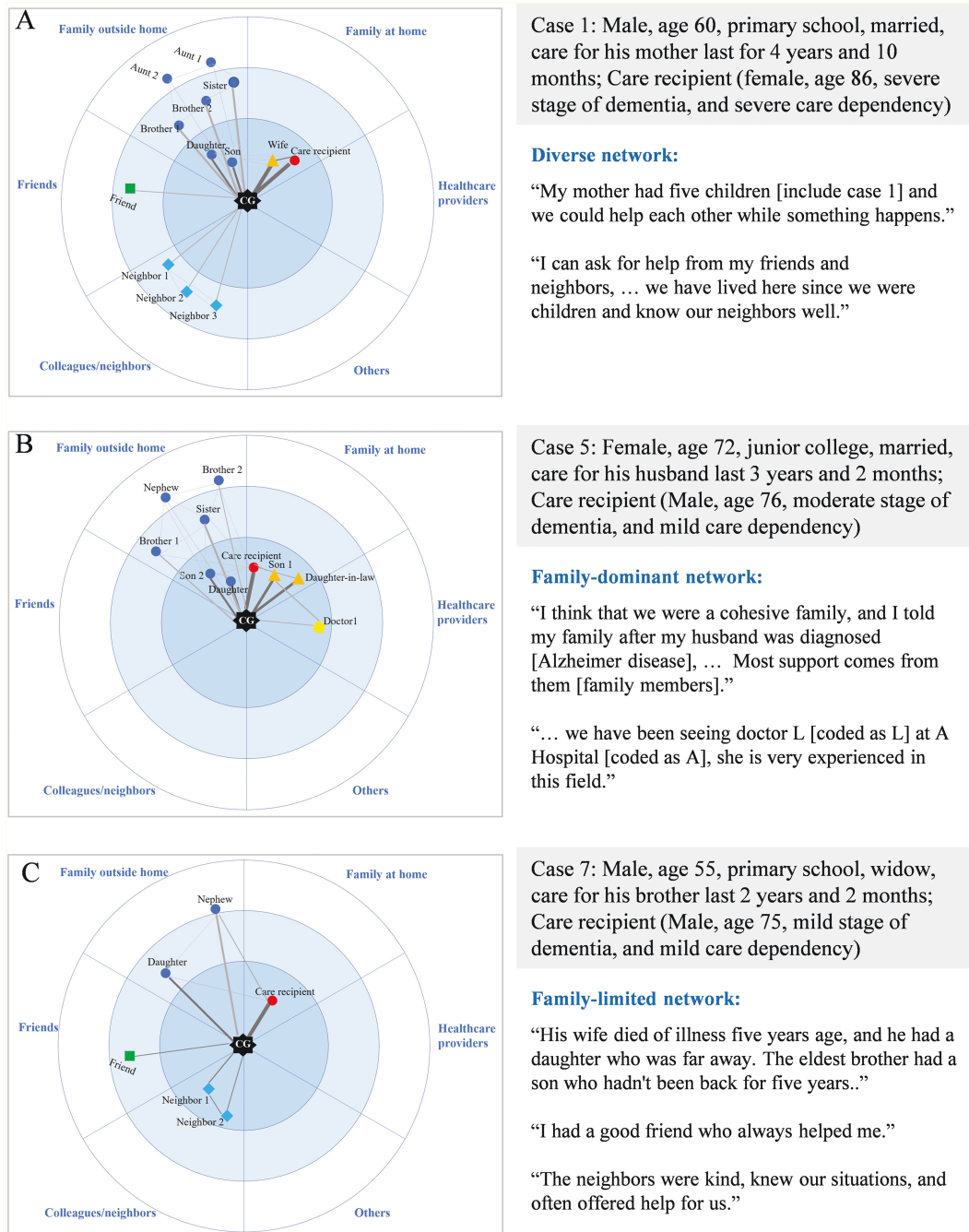


Figure 2. Three examples of network maps of family caregivers of individuals with dementia.

or worried about the inability to reciprocate one’s favor: “Others have no obligation to help you; favors are hard to return ... try not to trouble others” (C5). (b) Stigmatization barrier. The stigma of mental illness led caregivers to lose their confidence and dignity, which was a barrier to expanding their social networks: “People in the village were gossiping, and I wished to withhold information” (C9). (c) Mutual benefit of social participation. In the case of Participant 3, participation in social activities broadened the circle of friends: “I knew a social worker at X University ... I participated in some of their activities and met new friends.”

Reliance

(a) Trust deficiency. Caregivers may be unwilling to accept help and resources from outside the family due to distrust

in the quality of externally provided care services: “I did not want my husband to suffer; the nanny was impossible to look after him meticulously, ... even abused the older adults” (C5). (b) Social role constraints. The self-imposed limitations that caregivers place on themselves based on their perceived social responsibilities impact their willingness to depend on external support. C1 saw his role as an adult-child caregiver as being primary, thus feeling that seeking help for her caregiving duties might be viewed as a failure to meet her familial duties. Similarly, C11 might feel that his role as a provider precludes him from asking for financial assistance or emotional support because it could be construed as weakness or inability to cope. (c) Relationship quality enhancement. The profound emotional connections within a social network and good relationship quality enable caregivers to open up and

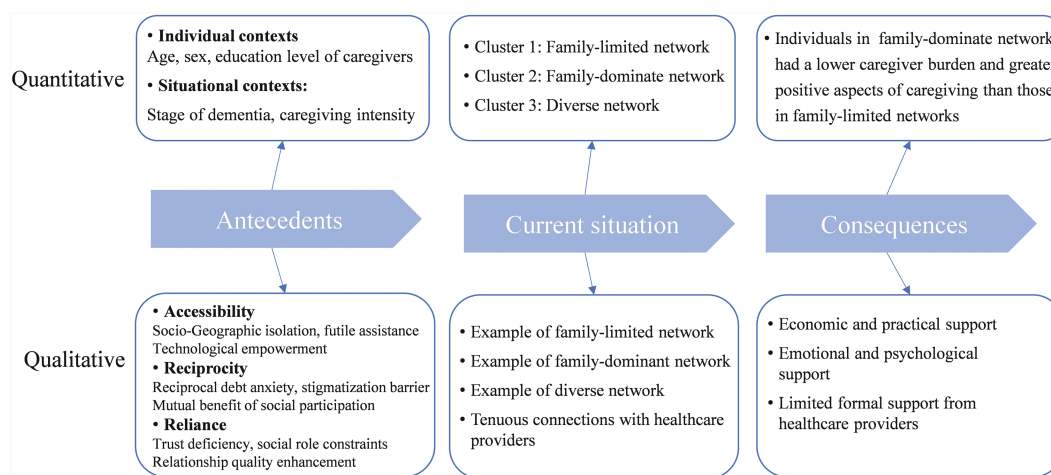


Figure 3. Integrated findings of qualitative and quantitative data.

trust others, sharing the personal burdens of care and seeking support: "... only talk about difficulties and ask help with my close relatives or friends" (C12).

Impacts of Social Networks on the Caregiving Experience

Economic and practical support

Economic and instrumental support was most frequently mentioned. Spouse caregivers usually mentioned money transfers from their adult children, whereas adult-child caregivers noted financial stress and expected financial support from outside the family: "This is my mother ... [sigh] ... had to take care of her, but for being stuck at home, I would have a good job ... If there are any funding projects, please give us priority" (C10). Colleagues and friends can provide information and resources. "I often ask my friends at the hospital about Medicare coverage for Alzheimer's disease" (C13). Caregivers could obtain the most instrumental support, such as coping with problems and consulting doctors, from close relatives. However, respite for caregivers, even just "having a break," was considered an unmet form of support: "It is so hard being the primary caregiver ... it really is; I wished there was a daycare center to give me a break" (C14).

Emotional and psychological support

Emotional support was also mentioned by caregivers, involving the companionship of those closest to caregivers and the configuration of those most trusted: "I was glad that I could talk to my friend about my pain and fatigue, and she understood me" (C1). Case 14 considered formal counseling and cognitive behavioral therapy and expressed the significance of stress management. Others also expressed the need to cope with a stressful mood: "I felt that I was an isolated person; as no one could understand my distress, I hoped to have partners [caregivers] to share their experiences" (C9).

Limited formal support from healthcare providers

Caregivers noted that the healthcare provider's role was medication prescription and adjustment to control disease progression. Most caregivers indicated that medical staff were limited in providing dementia care support, hoping for caregiver training and education: "Some measures suggested by medical staff were not easy to use and effective ... dementia care required practical experience" (C3).

Integration of Qualitative and Quantitative Data

Figure 3 presents the integrated findings. Both qualitative and quantitative data converge to identify three distinct social network types: diverse, family-dominant, and family-limited, each presenting unique characteristics and implications for caregiving. Quantitative analysis revealed that family-dominant networks, characterized by strong family ties and minimal friend network involvement, are associated with lower caregiver burden and greater positive caregiving aspects. This is complemented by qualitative insights where caregivers in such networks expressed a reliance on close family members for emotional and practical support, underscoring the importance of strong family bonds in mitigating caregiving challenges. Conversely, the diverse network was associated with reduced caregiver burden, a finding echoed in qualitative narratives where caregivers highlighted the value of broad social connections. The family-limited network was not specifically highlighted for its impact on caregiver burden or positive aspects of caregiving in quantitative analyses. However, qualitative data shed light on the potential isolations and challenges faced by caregivers within this network type, emphasizing the need for broader social engagement and support. Furthermore, the qualitative data expanded on the quantitative findings by exploring the tenuous connections between caregivers and healthcare providers. Despite their central role in care provision, healthcare professionals were often perceived as distant, with limited involvement in the caregivers' support networks.

Discussion and Implications

This study identified three social network types—family-limited, family-dominant, and diverse networks—using latent class analysis, which was confirmed qualitatively. The three social network types are associated with individual and situational factors, including age and sex of caregivers and individuals with dementia, stage of dementia, and caregiving intensity, as well as accessibility, reciprocity, and reliance on members in the network. Furthermore, we found that caregivers with family-dominant networks indicated less caregiver burden and greater positive aspects of caregiving and qualitatively explored economic, practical, and emotional support for caregiving challenges. Additionally, the qualitative part of the study found that healthcare providers were located in a

vital position but not closely connected to caregivers, playing a limited role.

The three social network types summarized in the qualitative section are similar to the findings of our quantitative section. The diverse type, including the most diverse and resourceful social ties, emerged as beneficial for alleviating caregiver burden. This might be attributed to the interactions with diverse members of the network that contribute to meeting the multiple support demands of caregiving, such as timely information and effective emotional support (Wang et al., 2017). Furthermore, this finding extends to previous studies that have identified the benefits of a diverse network on individuals' health outcomes, such as cognitive function and mood status (Cohn-Schwartz et al., 2021; Sakurai et al., 2019). Conversely, the types of family-limited and family-dominant had limited network diversity in the immediate family and friend networks, respectively. Family caregivers in the "family-dominant" network type experienced less caregiver burden and greater positive aspects of caregiving, which may stem from strong family support networks and the quality of close relationships. Even so, this type should be paid particular attention to because they are normally older with higher caregiving intensity, which are barriers to support-seeking (Dam et al., 2018). These three social network types were family-centered, while support networks outside the family played limited roles, which is in accordance with previous research on the social network of caregivers of patients with severe mental disorders (Tabatabaee et al., 2022). This implies that if support inside the family is disrupted, it is also difficult to obtain compensation from support outside the family, which suggests that we must provide family support to maintain resilience and expand other social relationships among caregivers (Velloze et al., 2022).

Previous studies have identified that individuals' social network types vary considerably among sociocultural contexts and often change with time (Friedman & Kennedy, 2021; Sung et al., 2022). Transitions into family caregivers of individuals with dementia substantially affected the personal social network. In addition to the sociocultural context of caregivers, this study explores the facilitators and barriers of asking for support from network members. Consistent with previous studies (Dam et al., 2018; Murphy et al., 2021), practical factors such as time and distance, alongside a lack of help regarding "accessibility," the fear of troubling others, and stigma of dementia under the theme of "reciprocity" are barriers that limit family caregivers in asking for help. Additionally, a lack of trust in the provision of dementia care was another barrier, especially from healthcare providers. An integrative review revealed that although healthcare professionals are well-positioned to support family caregivers of individuals with dementia in China, they are not prepared for this process (Zhao et al., 2022a). These findings indicate that education and training on dementia care are urgently needed for primary caregivers and all potential healthcare providers, while strategies, such as publicity of dementia friendliness to reduce stigma, are extremely necessary (Krier et al., 2023; Zhao et al., 2022a). Moreover, persistent efforts to build trust between network members help improve dementia care management and caregivers' well-being (Papastavrou et al., 2015; Tilburgs et al., 2018). Conversely, the convenience of online social media, social activity engagement, and high-quality relationships with families stimulated frequent connections with network members and support-seeking behaviors. It

highlights the need for diversified support programs, such as online support groups, to alleviate the social isolation of family caregivers of individuals with dementia, maintaining adequate social support (González-Fraile et al., 2021).

Family caregivers reported various types of support within the study, such as economic, instrumental, and emotional support, similar to previous studies (Li et al., 2022; Tabatabaee et al., 2022). Notably, respite support from personal networks does not satisfy family caregivers of individuals with dementia. Few adult day respite services in China are available for family caregivers, which supports other Chinese studies suggesting the need to develop respite care services (Zhao et al., 2022b). Family caregivers highlighted the demands for psychological feelings and stress regulation, even with formal counseling and cognitive behavioral therapy, which was in accordance with previous studies on demands analysis (Lee et al., 2019; Tatangelo et al., 2018). Psychological support was not included in caregivers' initial list of support types in the previous study (Tabatabaee et al., 2022). Currently, studies on psychosocial interventions for family caregivers of individuals with dementia are flourishing (von Känel et al., 2020; Wiegmann et al., 2021).

Additionally, this study was the first to explore the role of healthcare providers in the social support networks of family caregivers of individuals with dementia. Family caregivers acknowledged the importance of the role of healthcare providers, focusing on the diagnosis and treatment of dementia, which is consistent with the evidence from a scoping review on the topic (Bergmann et al., 2022). Nevertheless, family caregivers are not satisfied with formal support from healthcare providers and express an unmet need for NPS management and self-psychological adjustment. Long distance from hospitals is considered a contextual factor that potentially influences social networks of family caregivers of individuals with dementia. Family caregivers and individuals with dementia living farther from healthcare facilities might experience greater challenges in accessing formal support services, thereby leading them to rely more heavily on informal social networks for emotional support, information, and assistance with caregiving tasks. Furthermore, formal support can enhance the capacity of informal networks by providing caregivers with expert advice, resources, and respite services, which can alleviate some of the caregiving burden and enable more positive interactions within their personal networks. Healthcare professionals can act as a bridge by facilitating access to support groups and community resources, thereby expanding the informal network of family caregivers of individuals with dementia. Therefore, it is essential for healthcare professionals to receive specialized training not only in providing formal dementia care but also in facilitating and supporting the development of robust informal social networks, which are crucial for family caregivers and individuals with dementia situated far from medical facilities. Future research should investigate effective practices and factors that enhance formal dementia care support, with a focus on the dynamic relationship between professional services and informal caregiver networks.

Implications for Practice and Research

The findings of this study hold vital implications for both clinical practice and future research in the care of individuals with dementia and their caregivers. From a practice perspective, there's an opportunity to develop interprofessional

care models that more directly involve healthcare providers in caregivers' social networks. For instance, regular home visits or telehealth check-ins by a multidisciplinary team could reinforce the caregivers' network, offering both medical and psychosocial support. In addition, interventions should be designed to help caregivers expand their social ties beyond immediate family and friends through community engagement activities, online support groups, and educational workshops that encourage caregivers to build broader, resource-rich networks.

For research, this calls for the integration of artificial intelligence and digital tools to personalize caregiver assistance and predict needs, potentially alleviating caregiver burden preemptively. Incorporating machine learning algorithms could tailor resources and support to the unique dynamics of each caregiver's social network type. Another innovative research avenue is the application of social network analysis techniques to track and enhance the flow of support within existing caregiver networks. This could lead to the development of new interventions that strengthen weak ties and foster the formation of new, supportive relationships.

Strengths and Limitations

To the best of our knowledge, this study is one of the first to identify dementia caregivers' latent social network profiles, together with their predictors and impact on the caregiving experience. The latent class analysis methodologies contributed to a profound understanding of the multifaceted structure and patterns of the social network in dementia caregivers. Further, the mixed-method approach adopted based on the convoy model is another key strength.

Our study had several limitations that should be addressed when interpreting our findings. First, three social networks generated by the latent class analysis were not validated in additional samples, and the use of convenience sampling, which was restricted to a specific region rather than encompassing a nationally representative sample, may limit the generalizability of our findings. Fortunately, our sample size was enough to use latent class analysis, and our fit statistics robustly identified three social network types. To some extent, the triangular mutual evidence of the qualitative and quantitative findings increases the rigor and reliability of the conclusions. Second, the cross-sectional study design limits the causal inferences of the findings. Furthermore, eight caregivers were interviewed via telephone because of COVID-19, which resulted in the limitations of telephone interviews, such as shorter responses and missing nonverbal signals. Nevertheless, qualitative interviews performed by telephone are valid and trustworthy alternatives to traditional face-to-face interviews and have been acknowledged as a widely accepted method for their efficiency, utility, and protection of privacy for both parties (Davies et al., 2020; Saarijärvi & Bratt, 2021). Additionally, sufficient information power check ensured a comprehensive collection of interview materials for this study.

Conclusions

This study suggests that the social network types of dementia caregivers varied and centered on family, generated as a result of accessibility, reciprocity, and reliance on members in the network, in addition to individual and situational contexts. Friends, coworkers, neighbors, and healthcare providers provided minimal support to caregivers. It also suggests

that caregivers in the "family-dominant network" experience less burden but greater positive feelings of caregiving. Thus, dementia care support should focus on caregivers who may have loose social networks and insufficient support.

Supplementary Material

Supplementary data are available at *Innovation in Aging* online.

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Conflict of interest

None.

Data Availability

The datasets will be available from the corresponding author upon reasonable request. This study was not preregistered.

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