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The impact of caregiver burden on sense of coherence in Chinese family caregivers of people with dementia: the mediating effect of family resilience

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Abstract

Objectives The caregiver burden frequently experienced by family members tending to people with dementia significantly impacts their psychological well-being and family quality of life. Thus, the objective of this study is to examine the link between caregiver burden and sense of coherence (SOC) among Chinese caregivers of people with dementia, as well as to explore the mediating effect of family resilience on this relationship.

Methods This cross-sectional research took place from November 2023 to June 2024 across two public tertiary hospitals and a community setting in Hangzhou Province, China. In total, 326 family caregivers who cared for members with dementia were recruited. Data were collected using the Zarit Burden Interview (ZBI), the Family Resilience Rating Scale (FRAS), and the Sense of Coherence Scale (SOC- 13). The relationships between caregiver burden, family resilience, and sense of coherence (SOC) were analyzed using Pearson correlation techniques. Furthermore, the mediating effect of family resilience on the relationship between caregiver burden and SOC was assessed utilizing Amos 27.0.

Results In this study, the total scores of caregiver burden, family resilience, and SOC were 45.64 ± 17.04, 175.30 ± 34.38, and 52.29 ± 15.91 among family caregivers of people with dementia. Caregiver burden, family resilience, and SOC of family caregivers were at a moderate to high level. Caregiver burden was negatively correlated with family resilience and SOC ($p < 0.05$). The mediating effect of family resilience on the relationship between caregiver burden and SOC was found to be significant ($p < 0.05$), accounting for 45.9%.

Conclusions In this research, caregiver burden and family resilience emerged as critical factors influencing SOC. Additionally, the family resilience served as an important mediator in the connection between caregiver burden and SOC. Healthcare professionals should pay attention to the family dynamics of people with dementia and adopt intervention programs that focus on reducing caregiver burden and improving family resilience to improve the SOC of family caregivers of people with dementia.

Keywords Dementia, Family caregiver, Caregiver burden, Family resilience, Sense of coherence

Introduction

As the aging population continues to expand rapidly worldwide, dementia is becoming a public health concern on a global scale [1]. A study estimated that the population of individuals diagnosed with dementia is expected to rise from 55.2 million in 2019 to 83.2 million

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by the year 2030 [2]. According to data sources, China has the highest percentage of dementia patients worldwide—roughly 1/4 of all dementia patients worldwide [3]. In China, many people with dementia primarily receive care at home from family members, largely due to restricted access to professional nursing services and the impact of traditional filial piety values [4]. The complex and advancing characteristics of the illness lead family caregivers of people with dementia to take on numerous caregiving tasks, including activities of daily living, safety monitoring, and medication management [5, 6]. The above situations not only increase the burden on caregivers but may also have an adverse impact on the quality of family relationships and mental health of caregivers [7, 8].

Caregiver burden encompasses the physical, emotional, social, and financial strains, along with feelings of stress and dissatisfaction, that individuals providing care endure over time while looking after patients [9]. Due to the lack of knowledge about dementia and the difficulty in seeking professional guidance and help, the family caregivers face multiple burdens [10]. Family caregivers of people with dementia invested considerable time and energy in providing care, which led to diminished opportunities for rest as well as negative influences on caregivers' physical and mental health and overall quality of life [11, 12]. In a longitudinal study conducted by Connors et al. [13], it was found that most family caregivers of people with dementia reported experiencing a moderate degree of caregiver burden, which tended to rise progressively over time. In addition, negative emotions such as despair and guilt caused by seeing the rapid deterioration of the patient's physical function will also consume the positive psychological resources of the caregivers, increase the psychological pressure and burden of family caregivers, and easily lead to psychological problems such as anxiety and depression [14]. According to the study by Jaracz et al. [15], caregivers of stroke patients experience a greater caregiver burden and a lower sense of coherence (SOC) as the duration of care increases. Although previous studies have explored the association between caregiver burden and SOC in caregivers of people with dementia, there is a gap in the understanding of the potential mechanisms driving this relationship in the Chinese cultural context, and our study aimed to explore this mechanism.

Sense of coherence (SOC) is the core concept of the Salutogenic Model of Health. Antonovsky proposed the concept of SOC in 1987 and defined it as a general tendency of confidence that is controllable and meaningful when individuals deal with internal and external environmental stimuli in life [16]. SOC reflects an individual's ability to actively seek coping resources to solve problems [17]. People with a high level of SOC will more actively adjust themselves to adapt to stress, adopt positive coping strategies, and then have better health outcomes. Studies have shown that SOC can buffer the psychological pain caused by stress, increase individuals' confidence in coping with stress and finding coping resources [16, 18], and high SOC will encourage individuals to choose appropriate strategies to cope with difficulties with a positive and optimistic attitude [18]. Gonçalves-Pereira et al. found that among caregivers of people with dementia, lower SOC was associated with higher psychological distress and less emotional support [19].The shaping of a high level of SOC is inseparable from the support of resources. As Antonovsky stated, generalized resistance resources (GRRs) are the foundation of a strong SOC [20]. GRRs are divided into three levels: individual, family, and society. Among these, family-level resources are the most diverse and have a greater impact on individual social capital [20].

Family resilience is the ability of a family to recover from misfortune. It highlights that when faced with stress or a problem [21], family members consider the family as a whole, encourage adjustment and adaptation by strengthening shared values and strengths, and eventually restore damaged family functioning [21, 22]. According to Antonovsky's applicable theory, family resilience is a GRRs resistance resource at the family level that is intimately tied to the SOC of family caregivers. The entire family faced a crisis as a result of the dementia diagnosis and treatment. As they navigate through challenges, the family's capacity to cope, their family strength, family resilience, and family relationships are affected. Long-term excessive caregiver burden will introduce conflicts between family members, deteriorate family relationships, and have a negative impact on family resilience [23]. Furthermore, long-term stress depleted caregivers' psychological and family resources, impaired their coping abilities, and compounded the detrimental impact of burden on family resilience [24].

In studies involving caregivers of people with cancer, stroke, or other chronic diseases, pairwise correlations among caregiver burden, family resilience, and SOC have been investigated. First of all, multiple studies have found a significant negative correlation between caregiver burden and SOC [25, 26]. Secondly, cross-sectional studies of caregivers of patients with advanced cancer and stroke have shown that increased caregiver burden is associated with decreased family resilience [27, 28]. Finally, some studies have also illustrated that family resilience may be an important factor in enhancing family caregivers' SOC. Caregivers of people with chronic diseases have claimed that the resources and support networks available to the family affect their SOC and ability to provide high-quality care [29]. Cheng et al. also proposed in their study that high family resilience can promote the positive development of individual resilience [30]. Based on the above findings, we can infer that high family resilience can promote the positive development of SOC in caregivers of people with dementia, and family resilience can be a mediator in the relationship between caregiver burden and SOC. Although researchers have investigated pairwise associations among caregiver burden, family resilience, and SOC, they have not clarified relationships between the three of them, especially among Chinese dementia caregivers. Considering the tremendous pressure that caregivers of people with dementia endure during the care process under the unique cultural and social context of China, it is necessary to explore the relationship between family caregiver burden, family resilience, and SOC of caregivers of people with dementia to provide a theoretical basis for further intervention research.

Conceptual framework

McCubbin's model is based on the ABC-X model proposed by Hill [31], which mainly includes two stages: adjustment and adaptation. The adaptation stage means that if a major stressful event leads to maladaptation of the family, the family's resilience to stress is effectively stimulated. The family will restore the balance and harmony within the family by establishing a new way of family operation. In the "Salutogenic Model of Health", Antonovsky stated that a family member's illness may be considered a significant stressful event or stressor [32]. When faced with stressful events, individuals mobilize internal and/or external resources around them to deal with the stressor, including resistance resources from the family level [20]. The conceptual framework of this study integrates McCubbin's Resiliency Model of Family Stress Adjustment and Adaptation (RMFAA) and Antonovsky's Salutogenic Model of Health. McCubbin's model highlights the impact of family dynamics and resources on resilience, while Antonovsky's theory emphasizes the role of personal and external resources in managing stress. We hypothesize that higher caregiver burden is associated with lower SOC, and family resilience of caregivers will mediate the association between caregiver burden and SOC. Therefore, this study suggests the following hypothesis based on the theoretical framework and previous studies (Fig. 1):

> Hypothesis 1: Caregiver burden is negatively correlated with SOC.
> Hypothesis 2: Caregiver burden is negatively correlated with family resilience.
> Hypothesis 3: Family resilience is positively correlated with SOC.

Fig. 1 Hypothesized conceptual model

> Hypothesis 4: Family resilience mediates the relationship between caregiver burden and SOC.

Methods

Participants

This was a cross-sectional study using a convenience sampling method. Data were collected via questionnaires from November 2023 to June 2024. The study subjects were family caregivers of people with dementia from two hospitals and one community in Hangzhou, China. Inclusion criteria: (1) the patient is diagnosed with dementia by a psychiatrist or neurologist; (2) the primary caregiver should be the patient's adult relative (spouse, children, brothers, sisters, etc.); (3) familiar with the patient's condition; (4) provide care time >3 months; (5) willingly partake in this research endeavor. Exclusion criteria: (1) having mental problems or having serious physical diseases; (2) being unable to participate in the investigation due to communication or literacy difficulties. To attain desirable levels of power for models of typical complexity in structural equation modeling (SEM) investigations, aim for a sample size of more than 200 [33]. In this study, a total of 330 caregivers were recruited for the study, resulting in a final participation count of 326.

Procedure

After the Ethics Committee approved our study, the research team recruited 30 caregivers of dementia patients at a large hospital (China, Zhejiang Province) to conduct a preliminary investigation. Before the investigation, investigators received training on knowledge related to dementia, the purpose and main content of the research, and the notes for filling out the questionnaire, with special emphasis on how to communicate with caregivers of dementia and respect for privacy and confidentiality. The formal survey will be conducted from November 2023 to June 2024. After obtaining authorization, the investigators entered hospitals and community health service centers to investigate carers who met the inclusion criteria.

This research adhered to the ethical guidelines established in the Declaration of Helsinki and has received approval from the Ethics Committee (approval number: ZCMU:20231107–13). Before the survey commenced, the researchers provided an explanation of the study's aims and procedures to the participants, also letting them know that they had the option to withdraw at any moment. Each participant filled out the questionnaire and signed the informed consent form. All data is anonymous and strictly confidential.

Measures

Socio-demographic information

A questionnaire created by the researchers was utilized to gather demographic data regarding both the patients and their caregivers. The information collected from the dementia patients included gender, age, duration of illness, and self-care assessment, etc. The caregivers' sociodemographic data included age, gender, education level, working status, monthly income, care time per day, etc. More information is available in Table 1.

Zarit burden interview (ZBI)

The Chinese version of the 22-item Zarit Burden Interview (ZBI) scale [34]. The scale consisted of two subscales, namely, personal burden and responsibility burden. Each item was evaluated on a five-point Likert scale. The total score range of 0 to 88, and the total score was categorised as either very low (score 0–19), low (score 20–39), moderate (score 40–59), high (score 60–88). A greater score reflects a more significant caregiver burden. In previous studies, the Chinese version scale has shown good reliability and validity (Cronbach's alpha =0.96) [35]. In our study, Cronbach's alpha was 0.942.

Family resilience rating scale (FRAS)

Chinese scholar Dai created the scale in 2008 [36]. The scale contains 49 items and is divided into 10 dimensions, namely: dilemma interpretation, positive forward thinking, life excellence, problem solving, intimacy harmony, social support, orderliness, emotional sharing, clear communication, and cooperation coordination. The scale employs a five-point Likert scoring system, with scores that range from 49 to 245. A higher total score indicates greater family resilience. In our study, Cronbach's alpha was 0.910.

Sense of coherence scale (SOC)

The Sense of Coherence Scale (SOC- 13), adapted by Chinese scholar Bao in 1997 from Antonovsky's original SOC- 29 scale [37], measures an individual's overall sense of coherence through three subdimensions: comprehensibility (5 items), sense of control (4 items), and sense of significance (3 items). The scale uses a 7-point Likert system, with five reverse-scored items. The total score ranges from 13 to 91, with higher scores indicating a stronger SOC. Score ranges are 13–63 as mild, 64–79 as moderate, and 80–91 as severe. In our study, the scale demonstrated excellent internal consistency, with a Cronbach's alpha of 0.939.

Analysis approach

SPSS 27.0 (IBM) statistical software was used for data analysis. Continuous variables were checked for normality with the P-P plots and were described as mean ± standard deviation (M ± SD); count data were described by frequency and composition ratios. Pearson correlation analysis was used to explore the relationship between caregiver burden, family resilience, and sense of coherence. The statistical significance was set at $P \leq 0.05$.

IBM AMOS 27.0 was applied to construct the mediating effect model, and the bootstrap method was used to test the mediating effect. A bootstrap method was used to randomly select 5000 samples from the raw data and model to fit these data. When the 95% CI did not include zero, mediation effects were regarded as significant [38].

Results

Sociodemographic information about participants

A total of 326 caregivers of people with dementia were included in this study. The mean age of caregivers was 53.04 years (SD =13.10), comprising 114 men (35%) and 212 women (65%). Around 43.6% of these caregivers were in employment, while 55.8% indicated that their monthly household income per capita exceeded 5000 RMB. Most participants had an educational level of primary high school or above 286 (87.7%). 76.1% of the caregivers lived with the patient, and the caregiver's care time varied from day to day: 4 h 89 (27.3%), 5–8 h 87 (26.7%), 9–16 h 68 (20.9%), and >16 h 82 (25.2%) (Table 1). This study included 326 dementia patients, with the mean average age of caregivers being 75.97 years (SD =8.51), and 308 patients (94.5%) were over 60 years old, 141 (43.3%) men and 185 (56.7%) women. The disease type of the patients was mainly Alzheimer's disease in 178 (54.6%) cases. The diagnosis time of the disease was varied: 38 cases (11.7%) <1 year, 135 cases (41.4%) 1–3 years, 99 cases (30.4%) 4–6 years, and 54 (16.6%) >6 years.

Caregiver burden, family resilience, and SOC level

Table 1 shows that the caregivers' SOC scores in this study did not reveal any statistically significant variations when analyzed by gender, age, or disease type ($p >$ 0.05). In contrast, dementia diagnosis time (year), patient self-care status, caregiver gender, caregiver's work status, monthly household income, caregiver's education level, whether the caregiver lived with the patient, and average

Table 1 Demographic characteristics of the participants

Variable	N (%)	SOC(M ± SD)	t/F-value	*P*
Patient gender			0.146[a]	0.346
Males	141(43.3%)	51.33 ± 16.95		
Females	185(56.8%)	53.01 ± 15.08		
Patient age(in years)			2.368[a]	0.125
< 60	18(5.5%)	53.5 ± 12.39		
> 60	308(94.5%)	52.21 ± 16.11		
Disease Type			1.592[b]	0.162
Alzheimer	178(54.6%)	53.33 ± 15.23		
Lewy body dementia	26(8.0%)	49.38 ± 13.74		
Vascular dementia	53(16.3%)	50.94 ± 16.55		
Parkinson's disease dementia	38(11.7%)	54.13 ± 14.97		
Frontotemporal dementia	30(9.2%)	49.8 ± 20.35		
Other types	1(0.30%)	N/A		
Time since dementia diagnosis year (patient)			10.489[b]	< 0.001
< 1	38(11.37%)	64.16 ± 18.93		
1–3	135(41.4%)	49.36 ± 15.36		
4–6	99(30.4%)	50.24 ± 14.33		
> 6	54(16.6%)	55 ± 13.73		
Patient self-care status			10.385[b]	< 0.001
Independent	0(0%)	N/A		
Partially dependent	73(22.4%)	58.64 ± 17.07		
Moderately dependent	129(39.6%)	52.86 ± 12.75		
Severely dependent	124(38.0%)	48.23 ± 16.97		
Caregiver age(in years)			1.490[b]	0.227
< 30	13(4.0%)	55.62 ± 13.14		
30–50	106(32.5%)	54.08 ± 16.42		
> 50	207(63.5%)	51.15 ± 15.76		
Gender of the caregiver			0.321[a]	< 0.001
Males	114(35.0%)	56.57 ± 16.31		
Females	212(65.0%)	50.01 ± 15.26		
Employment status			13.668[b]	< 0.001
Employed(full time)	88(27.0%)	45.8 ± 17.49		
Part-time job	54(16.6%)	57.89 ± 13.09		
Resigned	57(17.5%)	47.47 ± 10.81		
Retired	127(39.0%)	56.69 ± 15.43		
Monthly income (RMB, yuan)			23.416[b]	< 0.001
≤ 1000	20(6.1%)	30.19 ± 16.57		
1001–3000	41(12.6%)	45.02 ± 12.42		
3001–5000	83(25.5%)	54.78 ± 13.54		
> 5000	182(55.8%)	55.42 ± 15.1		
Education status			17.992[b]	< 0.001
Primary and below	40(12.3%)	39.46 ± 18.86		
Secondary school	140(42.9%)	51.65 ± 12.55		
College and above	146(44.8%)	56.03 ± 16.28		
Living with patients			− 3.627[a]	< 0.001
Yes	248(76.1%)	50.34 ± 14.83		
No	78(23.9%)	58.28 ± 17.65		
Care time per day (hours)			10.027[b]	< 0.001
≤ 4	89(27.3%)	58.32 ± 17.24		

Table 1 (continued)

Variable	N (%)	SOC(M ± SD)	t/F-value	P
5–8	87(26.7%)	54.19 ± 13.61		
9–16	68(20.9%)	48.94 ± 13.5		
> 16	82(25.2%)	46.54 ± 16.08		
Relationship with patient			1.19[b]	0.305
Spouse	82(25.2%)	49.95 ± 14.79		
Child	192(58.9%)	53.15 ± 16.59		
Other relatives	52(16.0%)	52.79 ± 14.98		

T = *t*-test statistic, *F F*-test statistic, *P p*-value, [a]*t*-value, [b]*F*-value

Table 2 Mean, Standard Deviation, and Range for Caregiver Burden (ZBI), Sense of Coherence (SOC- 13), and Family Resilience (FRAS)

Variable	M	SD	Range
ZBI Total	45.64	17.04	1–86
Personal burden	27.46	11.75	0–48
Responsibility burden	10.70	5.76	0–24
SOC- 13 Total	52.29	15.91	25–91
Comprehensibility	21.11	6.69	8–35
Manageability	16.64	5.45	9–28
Meaningfulness	14.53	5.73	5–28
FRAS Total	175.30	34.38	63–245
Dilemma interpretation	25.92	5.57	7–35
Positive forward looking	21.17	5.79	7–30
Life excellence	13.28	4.09	4–20
Problem solving	21.79	4.96	7–30
Intimate harmony	13.26	4.13	4–20
Social support	15.20	3.89	4–20
Orderliness	11.53	2.61	4–15
Emotional sharing	14.19	3.96	4–20
Clear communication	17.69	4.27	5–25
Cooperation and coordination	21.28	6.45	6–30

time per day of care were significantly different in SOC scores ($p < 0.001$). Table 2 shows the ZBI, SOC- 13, and Family Resilience Rating Scale three scales and mean value of each dimension score.

The correlation analysis of caregiver burden, family resilience, and SOC

Table 3 in Appendix presents the correlation coefficients for caregiver burden, family resilience, and SOC. The correlations among caregiver burden (ZBI total score), family resilience (FRAS total score), and SOC (SOC- 13 total score) were found to be statistically significant ($p < 0.001$). Caregiver burden was negatively correlated with both family resilience ($r = -0.592$, $p < 0.001$) and SOC ($r = -0.549$, $p < 0.001$). Family resilience (total score) and its ten dimensions demonstrated positive correlations with SOC ($r = 0.626$, $p < 0.001$) (Appendix, Table 3).

Regression analysis

Multiple linear regression analyses were employed to investigate the factors influencing SOC among caregivers of people with dementia and the hypothesized interrelationships among the three study variables. Demographic factors that were statistically significant in the univariate analysis were selected as control variables, including time since dementia diagnosis year (patient), abilities of daily living, gender of the caregiver, employment status, monthly income (RMB, yuan), education status, living with patients, and care time per day (hours). Results of regression analysis in Appendix Table 4 show that caregiver burden was negatively associated with SOC ($\beta = -0.236$, $p < 0.001$). Meanwhile, family resilience was positively associated with SOC ($\beta = 0.328$, $p < 0.001$). The detailed analysis results of influencing factors are shown in Appendix Table 4.

Mediation effect test

The results indicated that caregiver burden had a significant negative effect on SOC (direct effect = − 0.526, 95% CI [− 0.765, − 0.311], $P < 0.001$). Caregiver burden had a significant negative effect on family resilience (direct effect = − 0.551, 95% CI [− 0.666, − 0.451] $P < 0.001$). Family resilience had a significant positive effect on SOC (direct effect = 0.809, 95% CI [0.540, 1.076], $P < 0.001$). Even after family resilience as a mediating variable, the predictive effect of caregiver burden on SOC remained significant (indirect effect = − 0.446, 95% CI [− 0.617, − 0.288] $P < 0.001$). The bootstrap 95% CI of the direct effect of caregiver burden on SOC and the mediating effect of family resilience did not include 0 in the upper nor lower limits, indicating that the differences were statistically significant ($P < 0.05$). Family resilience partially mediates the relationship between caregiver burden and SOC; the mediating effect of family resilience between caregiver burden and SOC was 45.9% (Table 3). Table 4 shows the model fit indices, and our mediation model fit the data well. The mediating effect plot is shown in Fig. 2.

Discussion

To the best of our knowledge, this study is the first to investigate the relationships among caregiver burden, SOC, and family resilience in the context of Chinese families caring for dementia patients. Our results support our initial hypotheses. Specifically, caregiver burden negatively correlated with SOC and family resilience, while family resilience positively correlated with SOC. Additionally, in accordance with McCubbin's and Antonovsky's theory model, we further verified the mediating function of family resilience. This suggests that caregiver burden can directly affect SOC and also influence SOC indirectly via family resilience.

Table 3 The mediating effect of SOC

Effect Type	Estimate	BOOT CI lower	BOOT CI upper	*P*	Percentage (%)
Direct effect					54.1
Caregiver burden → Sense of coherence	− 0.526	− 0.765	− 0.311	*P* < 0.001	
Caregiver burden → Family resilience	− 0.551	− 0.666	− 0.451	*P* < 0.001	
Family resilience → Sense of coherence	0.809	0.540	1.076	*P* < 0.001	
Indirect effect					45.9
Caregiver burden → Family resilience → Sense of coherence	− 0.446	− 0.617	− 0.288	*P* < 0.001	
Total effect	− 0.972	− 1.175	− 0.787	*P* < 0.001	100

Table 4 The model fit indicators

Model fitting index	RMSEA	NFI	TLI	CFI	GFI	AGFI
Results	0.023	0.961	0.993	0.994	0.961	0.946
Standard or critical value	< 0.08	> 0.9	> 0.9	> 0.9	> 0.9	> 0.9
Judgment of model fitness	Yes	Yes	Yes	Yes	Yes	Yes

Abbreviations: RMSEA Root-mean- square error of approximation, *NFI* Normed fit index, *TLI* Ticket-levis index, *CFI* Comparative fit index, *GFI* Goodness-of-fit index, *AGFI* Adjusted Goodness of fit

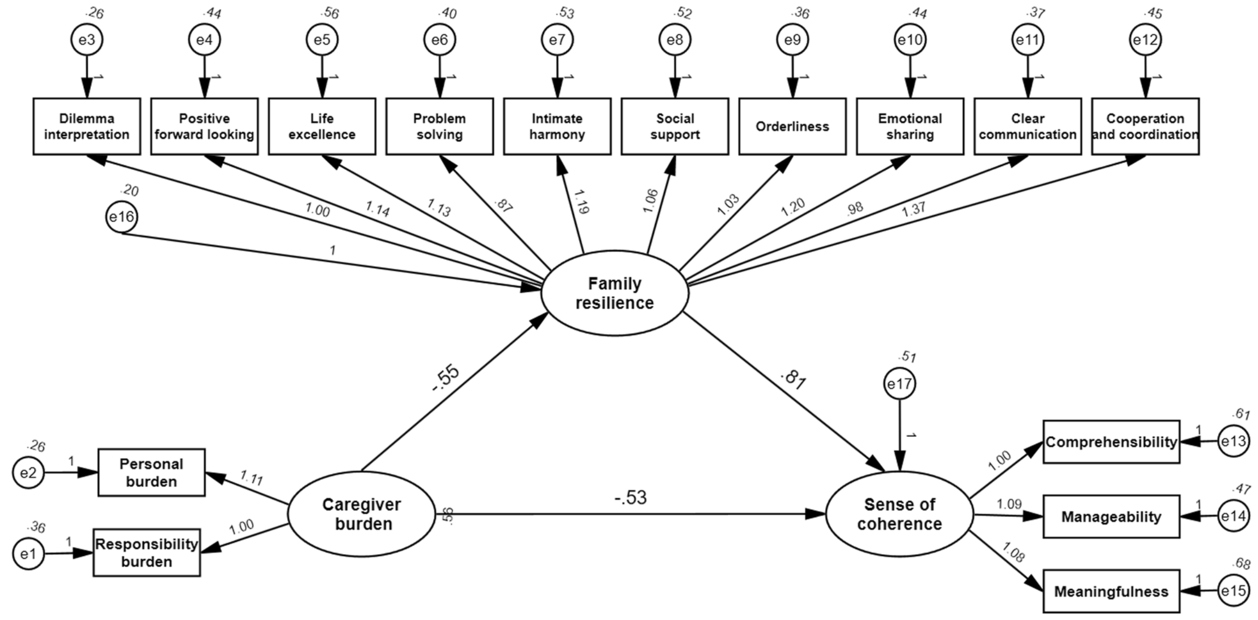

Fig. 2 Relationship between caregiver burden, sense of coherence and family resilience

The analysis of the results showed that caregivers of people with dementia had fairly low SOC scores (52.29 ± 15.91), compared to caregivers of liver transplant children (55.32 ± 13.91) [26]. This could be because dementia patients' symptoms deteriorate over time and are irreversible, unlike children who have had a liver transplant. During the care process, the patient's condition worsens, which is a frustrating experience for the caregiver itself [39]. This sense of powerlessness will aggravate the caregiver's negative emotions, thereby reducing the caregiver's SOC [29]. Furthermore, the SOC score in this study was slightly higher than that of caregivers of advanced cancer patients (54.76 ± 8.53) and relatives of the elderly (mean = 63.6) [40]. After reviewing the relevant literature, we hypothesize that this is due to the fact that most dementia patients exhibit emotional and behavioral abnormalities, as well as high dependence and disability [41], resulting in a heavier caregiver burden and increased consumption of their own and family resources. In addition, negative attitudes of healthcare professionals toward dementia care and inadequate social and economic security may also be associated with low SOC levels among caregivers of people with dementia [42, 43].

The results of the correlation analysis showed that the caregiver burden of caregivers was negatively correlated with SOC and family resilience, thereby confirming hypotheses 1 and 2. The results of this study showed that caregiver burden was negatively associated with SOC among caregivers of people with dementia, which is consistent with the findings of Turr-ó-Garriga et al. This result can be explained according to Antonovsky's "The Sense of Coherence in the Salutogenic Model of Health" and China's social and cultural environment. According to Antonovsky, life is inherently full of stressors. Under the influence of stressors, individuals will constantly identify and use their own resources to adapt and cope with stressors. When individuals lack sufficient resources, they cannot properly manage stress, which leads to damage to their physical and mental health [16]. The sense of coherence reflects a person's mental health and capacity to respond to stressful situations. Therefore, when caregiver burden is excessive and exceeds the caregiver's personal ability, the caregiver will find it difficult to cope, resulting in increased personal burden and a decrease in the level of SOC. In addition, Jeyagurunathan's study found that caregivers of people with dementia avoided or refused help from medical professionals due to affiliate stigma [44]. As a result, caregivers suffer from a lack of external resource support, which may increase their personal burden and reduce their SOC level. Shi et al. found that Chinese caregivers of people with dementia had higher than average levels of affiliate stigma [45]. In China, filial piety is highly valued, and filial culture pervades the entire caregiving process. Caregivers regard caring for parents with dementia as their responsibility and obligation [46]. Under the influence of filial culture, some caregivers refused to seek external help and delayed placing patients in nursing homes in pursuit of filial piety [47], which is related to the increased burden of responsibility for the caregivers. Our study suggests that caregiver burden is negatively associated with family resilience among caregivers of people with dementia, which is consistent with the findings of Shao et al. [35]. When confronted with caregiving stress and challenges, families typically possess various coping mechanisms and adaptive resources that assist caregivers in navigating adversity [48]. However, when the caregiver burden becomes excessively heavy and surpasses the family's capacity to cope, both the family's resource support and cohesion may diminish, resulting in a decline in overall family resilience [35, 49].

The findings of this research indicated that increased family resilience among caregivers of people with dementia was associated with elevated levels of SOC, supporting Hypothesis 3. Families with good resilience are better able to cope with various challenges and pressures, maintain a harmonious and stable family atmosphere, and promote the healthy growth and development of family members. When faced with adversity, strong family resilience motivates members to work together to address challenges by mobilizing more available resources [27]. For dementia caregivers, enhanced family resilience means that the family can provide more support resources when facing disease-related obstacles. At the same time, the care and companionship of other family members can also help improve the caregiver's self-confidence in coping with care difficulties, make it easier to cultivate positive emotions, and reduce the damage of caregiving stress to SOC [48]. However, family resilience does not remain static. A meta-analysis of qualitative studies found that when caring for patients requiring long-term support [50], persistent physical fatigue and significant economic pressure lead to decreased communication and interaction among family members. This situation often results in heightened tensions and lower levels of family resilience. Therefore, we need to develop long-term family intervention programs for families of people with dementia to promote positive interactions within the family and improve communication, thereby improving family resilience, family well-being, and caregivers' SOC.

Our study found that family resilience mediates the relationship between caregiver burden and SOC, thereby validating Hypothesis 4. The findings indicated that high levels of family resilience can buffer the impact of caregiver burden on the SOC of family caregivers. The theoretical model proposed by McCubbin explained how families cope with stress. When a stressful event occurs, the balance of the family ecosystem is disrupted, and family members are also affected. In order to eliminate or reduce the crisis caused by stressful events and maintain the balance of the family system, family members will jointly cope with stressful events by integrating internal and external resources and reconstructing the family structure. According to this theoretical model, when a family member suffers from dementia, the associated caregiver burden acts as a stressor that adversely affects the entire family system and the caregiver's SOC. Families with high resilience serve as a crucial support system for caregivers, providing essential resources that foster a positive attitude toward caregiving [48]. Additionally, the spiritual encouragement and psychological support from other family members can alleviate the caregiver's psychological pressure, thereby mitigating the impact of caregiver burden on their SOC. Conversely, a lack of family support, a negative emotional atmosphere, and low utilization of social support resources contribute to decreased family resilience, which may exacerbate the negative impact of caregiver burden on caregivers' SOC [49]. Family caregivers of people with dementia have expressed a strong desire for support from their family networks to help them cope with caregiving challenges. Smith et al. found that most family caregivers wish for their siblings to share caregiving responsibilities, noting that support and understanding from a sister or spouse can alleviate the pain and pessimism associated with caregiving [51]. However, there is a scarcity of studies focused on interventions aimed at enhancing family resilience in the context of dementia care. We suggest leveraging existing research on family resilience interventions for caregivers of other conditions, such as the programs developed by Park et al. [52] and Ren et al. [53] for children with chronic diseases and cancer, to design tailored intervention programs based on the unique family dynamics of those caring for people with dementia. In conclusion, strengthening family resilience can reduce the negative impact of caregivers' burden on caregivers' SOC and promote both physical and mental well-being. This is of great significance to promote the overall health and well-being of caregivers of dementia patients.

Implications

Drawing from the results of the study, several suggestions are proposed to enhance the SOC among caregivers of individuals with dementia. Firstly, health care personnel workers assess caregiver burden, comprehend their physical, emotional, knowledge, and social requirements, and teach them how to manage disease symptoms and the patient's daily life [54]. Secondly, the support provided by the family network is crucial for sustaining the SOC among caregivers of people with dementia. Therefore, medical staff should pay attention to family dynamics and family relationship atmosphere and improve family resilience and cohesion by implementing holistic family intervention programs, such as healthy family programs [55], family resilience intervention programs [53], and psychoeducation programs. Finally, we advocate for developing social assistance programs to increase social resources for families with dementia. For example, include more disease treatment drugs in medical insurance to decrease the economic strain, build patient care centers in the community, and arrange regular sharing and communication activities to relieve caregivers' psychological burdens and increase social contact.

Limitations

This research encountered several limitations. First, the study exclusively involved family caregivers from a single area (Hangzhou, Zhejiang Province, China), potentially limiting the generalizability of the findings to other locations. To enhance the generalizability of the results, it is advisable for future studies to recruit more caregivers of people with dementia from multiple regions. Secondly, this is a cross-sectional study and cannot explore the causal relationship between caregiver burden, family resilience, and SOC. It is recommended that longitudinal and intervention studies be conducted in the future to further determine the relationship between the variables. Lastly, it's possible that not all the variables influencing the SOC of caregivers of people with dementia were examined in this study. Consequently, in order to strengthen the results' persuasiveness, more variables that might influence SOC could be incorporated in the future.

Conclusion

In this research, caregiver burden and family resilience were identified as key predictors of SOC among family caregivers of people with dementia. Specifically, SOC is being influenced directly by caregiver burden and family resilience, while family resilience mediates this relationship. The findings indicated a negative correlation between caregiver burden and both SOC and family resilience, with family resilience serving as a partial mediator in the connection between caregiver burden and SOC. Therefore, we recommend that healthcare professionals focus on the positive psychological resources, family dynamics, and networks of family caregivers of people with dementia, as well as build relevant family support systems, in order to lessen the caregiver burden and strengthen caregivers' family resilience and SOC.

Abbreviations

SOC	Sense of Coherence
RMFAA	Resiliency Model of Family Stress Adjustment and Adaptation
ZBI	Zarit Burden Interview
FRAS	Family Resilience Assessment Scale
SEM	Structural Equation Model
SD	Standard Deviation
CI	Confidence Interval

Supplementary Information

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Supplementary Material 1.

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Authors' contributions

H.R.J.: Conceptualization, Investigation, Data curation and analysis, Writing–original draft, Writing–review & editing. J.Q.Z: Data curation and analysis, Writing–original draft, Writing–review & editing. L.Y.: Data analysis, Validation, Writing–review & editing. W.H.S and Z.Y.W: Investigation, Data collection. Y.R.W: Project administration, Supervision, Writing – review & editing, Writing–original draft. All authors reviewed and approved the final manuscript.

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Data availability

The datasets used and analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate

The study strictly followed the Declaration of Helsinki and was approved by the Ethics Review Committee of the Zhejiang Chinese Medical University (Ethics Review Approval Number: NO.20231117–3). All study participants provided informed consent, and the data collected are only available to researchers.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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