

RESEARCH

Open Access



# Supportive care needs and associated factors among caregivers of elderly patients with gastrointestinal cancer: an exploratory study

Mengxue Li<sup>1</sup>, Jie Zhang<sup>2</sup>, Lei Jia<sup>2</sup>, Liqing Su<sup>3</sup>, Yumeng Zhang<sup>1</sup>, Ziyi Zheng<sup>1</sup>, Huili Shen<sup>4</sup> and Jian Chang<sup>1,5\*</sup>

## Abstract

**Background** Gastrointestinal cancers, including gastric and colorectal cancers, are major contributors to cancer-related morbidity and mortality worldwide, placing significant burdens on patients and their informal caregivers. This study aims to evaluate the level of supportive needs among informal caregivers of patients with gastrointestinal cancer and to identify key factors influencing these needs.

**Methods** We conducted a descriptive survey involving 335 informal caregivers of patients with gastrointestinal cancer at a large hospital in Shanghai, China, from September 2023 to April 2024. Multivariate linear regression analysis was employed to examine potential factors affecting supportive needs, including demographic information, caregiver burden, and self-efficacy.

**Results** The average supportive needs score among the 335 caregivers was  $113.59 \pm 52.97$ . This score was positively correlated with caregiver burden ( $r = 0.363$ ,  $P < 0.001$ ), self-efficacy ( $r = 0.224$ ,  $P < 0.001$ ), and patients' Karnofsky Performance Status (KPS) score ( $r = 0.119$ ,  $P < 0.05$ ). Multivariate regression analysis revealed that the care experience, duration of caregiving, relationship (sibling), self-efficacy, caregiver burden, KPS score of patients, treatment duration of patients, and cancer type of patients were significant factors influencing the supportive care needs of caregivers for elderly gastrointestinal cancer patients ( $P < 0.05$ ).

**Conclusion** Informal caregivers of elderly patients with gastrointestinal cancer often have increased levels of supportive needs. Clinical practice should include comprehensive assessments of these needs and the development of targeted interventions to improve caregiving skills and reduce caregiver burden, thereby enhancing the quality of life for both caregivers and patients.

**Keywords** Gastrointestinal cancer, Elderly patients, Supportive care needs, Self-efficacy

\*Correspondence:

Jian Chang  
changjiancn@sjtu.edu.cn

<sup>1</sup>School of Nursing, Shanghai Jiao Tong University, 85 Wu Jin Road, Hongkou District, Shanghai 200001, China

<sup>2</sup>Department of Nursing, Shanghai General Hospital, Shanghai 201620, China

<sup>3</sup>Department of Nursing, Stomatological Hospital of Xiamen Medical College, Xiamen 361008, China

<sup>4</sup>Department of Medical Services, Shanghai General Hospital, Shanghai 200080, China

<sup>5</sup>Department of Nursing, Shanghai General Hospital, Shanghai 200080, China



© The Author(s) 2024. **Open Access** This article is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License, which permits any non-commercial use, sharing, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if you modified the licensed material. You do not have permission under this licence to share adapted material derived from this article or parts of it. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by-nc-nd/4.0/>.

## Introduction

Population aging is a significant challenge worldwide and a key area of research for scholars worldwide [1]. Over the past three decades, the number of people over age 60 has increased rapidly, and it is projected that by 2030, the elderly population will outnumber children under age 10 [2]. The United Nations defines elderly individuals as individuals aged 60 years and above [3]. China is among the countries experiencing the fastest aging rates. For example, by the end of 2020, the number of residents over 60 years old in Shanghai exceeded 5 million, accounting for more than 36% of the population [4]. In 2022, China reported 2.79 million cancer cases among elderly individuals, with 1.94 million deaths, representing 55.8% and 68.2% of the total cancer incidence and mortality, respectively [5]. Approximately 60% of new cancer diagnoses occur in patients aged 65 years and above [6]. Since 2010, the incidence, mortality, and associated burden of cancer have increased annually in China [7]. Gastrointestinal (GI) cancers, including gastric cancer (GC) and colorectal cancer (CRC), account for approximately 20% of all cancer cases and 22.5% of global cancer deaths [8]. Gastric cancer is the fifth most common cancer and the third leading cause of cancer death, whereas colorectal cancer ranks third in incidence and second in cancer death globally [9, 10]. The transformation of the social economy, population aging, and changing risk conditions are expected to increase the global cancer burden by 50% by 2040 compared with 2020.

The treatment of GI cancers often involves a combination of surgery, chemotherapy, and radiotherapy. In the early postoperative period, patients typically experience a range of symptoms, including nausea, fatigue, malnutrition, altered bowel habits, dumping syndrome, and emotional distress related to their condition [10]. Elderly patients are particularly vulnerable due to weakened bodily functions and reduced self-care abilities, which not only cause significant pain but also impose substantial psychological stress and demands on their caregivers. Caregivers must strive to provide optimal care while managing the various symptoms and complications that arise during the postoperative, chemotherapy, radiotherapy, and rehabilitation stages. The multifaceted pressures and abrupt shifts in family roles frequently leave caregivers physically and mentally exhausted, resulting in extensive care needs during the caregiving process [9].

Supportive care needs (SCNs) encompass the assistance and support required by cancer patients and their families to address the physiological, psychological, and social challenges associated with cancer and its treatment [11]. Fitch [11] introduced the concept and theoretical framework of the SCNs, highlighting the importance of regular, iterative assessments and support in seven key areas: information, emotion, practical aspects, physical

needs, psychological well-being, social support, and spiritual care. This comprehensive approach aims to enhance the patient experience and care outcomes [12]. In 2017, Ktistaki et al. [13] expanded on this definition, emphasizing the need for support in physical, emotional, psychological, social, informational, mental, and practical domains throughout diagnosis, treatment, and end-of-life care.

Research indicates that the quality of life of caregivers is closely linked to that of patients [14]. As the quality of life of patients declines, caregivers' quality of life is adversely affected, increasing their care burden and SCNs. Coleman et al. [15] reported that caregivers' lack of disease-related knowledge and care skills not only diminishes their caregiving ability but also directly impacts patients' postoperative recovery and quality of life. Owing to limited resources, the current formal healthcare system often falls short in meeting the diverse care needs of different cancer patients [16].

Family caregivers (also known as informal caregivers) play a crucial role in supporting patients through the cancer survival period or palliative care. Family caregivers, often family members or friends, provide unpaid and continuous care, typically involving parents, children, spouses, or siblings of patients. Their responsibilities encompass daily life care, emotional support, and financial assistance. Research by Ma Haiping et al. [17] indicates that caregivers often lack adequate knowledge about disease care, which can jeopardize both their own health and the patient's recovery. As patients age and their diseases progress, the lack of disease-related knowledge, care skills, and effective care methods among many caregivers can lead to varying treatment outcomes, potentially accelerating the patient's condition and increasing the caregiver's burden. This, in turn, negatively impacts the quality of life for both patients and caregivers [18]. Thus, understanding the role of family caregivers in supporting patients' physical, social, emotional, and health needs is increasingly important.

Previous studies on other diseases have highlighted that patients' clinical characteristics and caregivers' sociodemographic traits are key factors influencing caregivers' supportive needs [18–22]. Additionally, two factors play crucial roles at the level of the SCNs. Caregiving burden refers to the pressures endured by family members when fulfilling caregiving responsibilities, encompassing physical, psychological, and economic pressures [23, 24]. This burden can negatively impact caregivers' health and quality of life, affect their ability to provide continuous care, and influence their supportive care needs, such as daily life, economic, and medical needs. Self-efficacy refers to an individual's conviction in their capacity to undertake certain behaviors and attain desired outcomes [25, 26]. Higher self-efficacy increases caregivers' confidence,

mitigates the impact of negative emotions during caregiving, and eases their burden.

While the supportive care needs (SCNs) of caregivers of patients with gastrointestinal cancers have been recognized, the specific factors influencing these needs, such as caregiving burden and self-efficacy, are not yet clearly understood. Therefore, this study aims to examine the impact of caregiving burden and self-efficacy on caregivers' well-being and effectiveness, providing a nuanced understanding of how these variables affect their ability to provide care. By addressing this gap in the literature, our study offers valuable insights into the unique challenges faced by caregivers of gastrointestinal cancer patients. Additionally, the findings can inform evidence-based strategies to alleviate caregiving burden and enhance self-efficacy, ultimately improving the quality of care for patients and the quality of life for both patients and caregivers.

## Method

### Study design and participants

This cross-sectional pilot study was conducted from September 2023 to April 2024. Using a convenience sampling method, data were collected from caregivers of patients with gastrointestinal (GI) cancers hospitalized in a large public hospital in Shanghai, China. A total of 335 caregivers participated in the study. The inclusion criteria were as follows: caregivers providing care for elderly patients diagnosed with primary gastric or colorectal cancer (if there were two or more caregivers, the caregiver primarily responsible for care was included); aged 18 years or older; living with the patient; and agreed to participate in this study without language communication barriers with the patient. The exclusion criteria were caregivers with mental disorders, unconsciousness, or communication difficulties, and those who had participated in other similar experiments.

### Sample size

On the basis of the sample size requirements for a cross-sectional study, the sample size should be 5–10 times the number of independent variables [27], taking into account a 15% churn rate. After a literature review, a total of 25 independent variables were determined, requiring a minimum of 144 to 288 cases. The study ultimately obtained 335 valid samples, which met the sample size requirements.

### Ethical considerations

This study accords with the Declaration of Helsinki and good clinical practice guidelines and was approved by the Shanghai General Hospital ethical review committee (2024[002]). Eligible caregivers were provided with written and oral information about the study and were

enrolled after signing an informed consent form. The participants had the right to withdraw from the study at any time without giving a reason.

## Assessment of questionnaire and scores

### Demographic questionnaire

The demographic questionnaire was designed by reviewing previous publications and consulting cancer care experts. The existing information in the questionnaire includes two parts. The first part is the patient's disease status: disease location, course of disease, treatment method, and source of medical expenses. The second part collected general information about the caregivers: sex, age, place of residence, marital status, education level, employment status, family per capita income, relationship with patients and care experience, duration of care, cumulative average time and type of care.

### The needs assessment of family caregivers—cancer (NAFC-C)

The NAFC-C assesses the support care needs of caregivers of cancer patients. The scale was developed by Kim et al. [28] in 2010 and translated and revised by Liu Mei et al. [29] and involves four dimensions—psychological needs, medical needs, economic needs and daily activity needs—and aims to assess the needs of family caregivers at different survival stages. The scale has 27 items, each item is scored on a 5-point Likert scale, and the five levels of “very not important”, “not important”, “generally”, “important” and “very important” are assigned 0–4 points, respectively. In this study, the Cronbach's  $\alpha$  of the scale was 0.965.

### Caregiver burden scale for cancer patients (CBS-CP)

The CBS-CP assesses the caring burden of caregivers of cancer patients. Developed by Li Qiuping et al. [30] in 2015, the scale consists of 29 items across five dimensions: physical burden, psychological burden, economic burden, social burden, and disease perception burden. It uses a 5-point Likert scoring method. Total scores < 29 indicate no burden; scores ranging from 29 to 58 indicate mild burden; scores ranging from 59 to 87 indicate moderate burden; and scores > 87 indicate severe burden. The Cronbach's  $\alpha$  coefficients for the total scale and the five factors are all greater than 0.7, with test-retest reliability greater than 0.79. In this study, the Cronbach's  $\alpha$  coefficient for the scale was 0.947.

### Karnofsky performance score (KPS)

Developed by Karnofsky [31], this scale assesses patients' physical functional status. Scores are based on patients' condition, self-care ability, and ability to perform normal activities, rated on 10-point intervals from 0 (death) to 100 (normal physical condition), with higher scores indicating better health status.

### General self-efficacy scale (GSES)

The GSES assesses the confidence of caregivers in their ability to complete caregiving tasks despite various challenges. Developed by Schwarzer et al. [32] and translated and revised by Wang Caikang et al. [33], it includes 10 items and uses a 4-point Likert scale. The total score is obtained by summing the scores of the 10 items and dividing by 10. A total score above 2.5 indicates higher general self-efficacy, with higher scores indicating higher self-efficacy. In this study, the Cronbach's  $\alpha$  coefficient was 0.897.

### Data collection

The clinical course, disease types, and treatment of patients with GI cancer were extracted from the hospital's electronic medical records. To meet the eligibility criteria for GI cancer patients, caregivers explained the purpose of the survey. Before the caregivers completed the questionnaire, the researchers adopted unified instructions; showed the respondents who identified; filled out the questionnaire the purpose, significance and matters needing attention; and provided informed consent. In the process of completing the questionnaire, the caregiver's questions were explained patiently, and attention was given to the use of neutral or nonsuggestive words. Withdraw questionnaires, pay attention to look for any items missing, such as nonstandard items, and please perform timely research. The screening questionnaire was used to screen out nonstandard void questionnaires and keep valid questionnaires.

### Statistical analysis

Before the input data were collected via the questionnaire by two investigators, unified coding was performed, and the data were checked. Epidata 3.1 software was used to input the data, and SPSS 27.0 was used for data processing and analysis. Descriptive statistical analyses of demographic and clinical characteristics were performed, with continuous data presented as the means  $\pm$  standard deviations ( $M \pm SD$ ) and categorical data presented as proportions and frequencies. Independent sample *t* tests and one-way analysis of variance were used for categorical variables, and Pearson correlation analysis was used for continuous variables. Multivariate linear regression analysis was used for multivariate analysis, the test was a two-tailed test, and  $P < 0.05$  was considered statistically significant.

### Results

A total of 350 questionnaires were distributed in this study, with 338 returned and a return rate of 96.6%. After 3 invalid questionnaires were excluded, the effective rate was 99.1%. Fewer than 5% of the questionnaires were missing, and the missing information for

some categorical variables was supplemented from the patients' medical records.

### Participant characteristics

A total of 335 primary caregivers participated in this study. Among these patients, 44.2% had colon cancer, 32.5% had stomach cancer, and 23.3% had colorectal cancer. Most caregivers were women (64.2%), and most were under the age of 65 (80.6%). Among the nursing staff, 79.7% had no nursing experience related to disease, and most of the caregivers reported average daily care duration of approximately 7–12 h (53.4%). Caregiver education varied, with 45.4% having a college degree or higher. The detailed sociodemographic data of the participants are shown in Table 1.

### Supportive care needs level

The NAFC-C score of 335 caregivers of GI cancer patients was  $113.59 \pm 52.97$ . Table 2 lists the four dimensions of scoring. The score of each item on the scale was ranked, and the top 10 items with the highest scores are listed in Table 3.

### Univariate analysis

Univariate analysis revealed that the caregiver's sex, age, education level, marriage status, employment status, relationship with patients, cumulative length of care, average daily care time, family per capita monthly income source of patients and health care costs, place of residence, sickness status, and treatment are factors that affect caregivers of SCNs patients with GI cancer ( $P < 0.05$ ) (Table 1).

### Correlation analysis

The total NAFC-C score of 335 caregivers with GI cancer was  $113.59 \pm 52.97$  (range 0–384). The caregiver burden score was  $34.97 \pm 15.89$  (range 8–77), which was at a mild burden level. The self-efficacy score was  $2.56 \pm 4.86$  (range 1–4). The KPS score was  $77.55 \pm 9.94$  (range of 60~90). SCNs was positively correlated with caregiver burden ( $r = 0.363$ ,  $P < 0.001$ ), self-efficacy ( $r = 0.224$ ,  $P < 0.001$ ), and KPS ( $r = 0.119$ ,  $P < 0.05$ ). Table 4 lists the caregivers of each dimension score and the NAFC-C scores and caregiver burden, self-efficacy, and the correlation of the KPS score.

### Multiple linear regression analysis

The multivariate regression analysis used the SCN of the caregiver as the dependent variable and the items with significant differences in univariate analysis, caregiver burden, social support, self-efficacy, and KPS as the independent variables. Multivariate regression analysis revealed that care experience, relationship with patients, cumulative care time, source of patients' medical expenses, place of residence, disease location, disease

**Table 1** Sociodemographics and associations with the NAFC-C score ( $n = 335$ )

Characteristic	$n(\%)$	NAFC-C score ( $M \pm SD$ )	F/t	$p$
<b>Gender</b>			2.033 <sup>b</sup>	<0.001
Male	120 (35.8)	4.58 $\pm$ 3.05		
Female	215 (64.2)	4.00 $\pm$ 0.85		
<b>Age (years)</b>			5.231 <sup>a</sup>	0.002
18–35	64 (19.1)	3.98 $\pm$ 0.46		
36–45	62 (18.5)	3.92 $\pm$ 0.63		
46–65	144 (43.0)	4.67 $\pm$ 2.67		
$\geq 66$	65 (19.4)	3.67 $\pm$ 1.64		
<b>Education Level</b>			3.923 <sup>a</sup>	0.021
Middle school or below	91 (27.2)	3.87 $\pm$ 1.51		
High school or technical	92 (27.5)	4.01 $\pm$ 0.99		
College or above	152 (45.4)	4.53 $\pm$ 2.52		
<b>Marital Status</b>			2.093 <sup>b</sup>	0.001
Married	277 (82.7)	4.26 $\pm$ 2.14		
Single or divorced	58 (17.3)	3.96 $\pm$ 0.46		
<b>Employment Status</b>			7.321 <sup>a</sup>	<0.001
Employed	129 (38.5)	4.03 $\pm$ 0.69		
Unemployed	86 (25.7)	5.02 $\pm$ 3.27		
Retired	117 (34.9)	3.80 $\pm$ 1.43		
Resigned due to caregiving	3 (0.9)	4.48 $\pm$ 0.46		
<b>Caregiving Experience</b>			3.264 <sup>b</sup>	<0.001
Yes	68 (20.3)	5.35 $\pm$ 3.59		
No	267 (79.7)	3.92 $\pm$ 1.08		
<b>Relationship to Patient</b>			5.028 <sup>a</sup>	<0.001
Spouse	120 (35.8)	4.08 $\pm$ 1.20		
Child	152 (45.4)	4.49 $\pm$ 2.57		
Parent	9 (2.7)	1.64 $\pm$ 1.86		
Grandchild	34 (10.1)	4.19 $\pm$ 0.36		
Sibling	20 (6.0)	4.02 $\pm$ 0.81		
<b>Duration of Caregiving</b>			46.017 <sup>a</sup>	<0.001
1–6 months	222 (66.3)	3.84 $\pm$ 1.10		
6–12 months	73 (21.8)	3.96 $\pm$ 0.74		
> 12 months	40 (11.9)	6.68 $\pm$ 4.24		
<b>Daily Caregiving Hours</b>			3.361 <sup>a</sup>	0.036
7–12 h	179 (53.4)	4.46 $\pm$ 2.45		
13–18 h	142 (42.4)	3.89 $\pm$ 1.11		
19–24 h	14 (4.2)	4.14 $\pm$ 1.21		
<b>Type of Caregiving</b>			0.987 <sup>b</sup>	0.119
Assisted by others	196 (58.5)	4.30 $\pm$ 2.32		
Sole caregiver	139 (41.5)	4.08 $\pm$ 1.29		
<b>Income Level (CNY)</b>			2.743 <sup>a</sup>	0.043
< 5000	44 (13.1)	3.93 $\pm$ 1.18		
5000–8000	106 (31.6)	4.01 $\pm$ 1.25		
8000–11,000	115 (34.3)	4.63 $\pm$ 2.94		
> 11,000	70 (20.9)	3.99 $\pm$ 0.79		
<b>Source of Medical Expenses</b>			16.497 <sup>b</sup>	<0.001
Out-of-pocket	6 (1.8)	1.06 $\pm$ 1.52		
Health insurance	329 (98.2)	4.26 $\pm$ 1.92		
<b>Place of Residence</b>			17.832 <sup>a</sup>	<0.001
Urban	76 (22.7)	5.33 $\pm$ 3.39		
Town	221 (66.0)	3.86 $\pm$ 0.99		
Rural	38 (11.3)	3.99 $\pm$ 1.47		

**Table 1** (continued)

Characteristic	n(%)	NAFC-C score (M ± SD)	F/t	p
<b>Cancer Type</b> (Patients)			10.616 <sup>a</sup>	<0.001
Gastric cancer	109 (32.5)	3.92 ± 0.81		
Colon cancer	148 (44.2)	3.98 ± 1.13		
Rectal cancer	78 (23.3)	5.08 ± 3.50		
<b>Duration of Therapy</b> (Patients)			3.263 <sup>a</sup>	0.039
< 6 months	207 (61.8)	4.39 ± 2.32		
6 months-1 year	75 (22.4)	3.73 ± 1.19		
> 1 year	53 (15.8)	4.16 ± 0.98		
<b>Treatment Method</b> (Patients)			-3.076 <sup>b</sup>	<0.001
Surgery	216 (64.5)	3.91 ± 1.08		
Chemotherapy	119 (35.5)	4.75 ± 2.88		

Note: M, mean. SD, standard deviation. CNY, Chinese Yuan. t, independent sample t test. F, one-way ANOVA. A, F value. B, t value

**Table 2** NAFC-C total scores and each dimension score (n = 335)

Variable	Number of items	Items average score (M ± SD)
Psychosocial	9	4.45 ± 2.23
Medical	7	4.35 ± 2.46
Financial	3	3.09 ± 2.30
Daily Activity	8	4.23 ± 1.99
Total score	27	4.65 ± 2.19

Note: M, mean. SD, standard deviation

**Table 3** Top 10 items with the highest scores on the NAFC-C (n = 335)

Items	M ± SD
5.Help patients out of the disease	5.27 ± 2.93
3.Communicate with patients about his fears	5.02 ± 2.71
4.Free yourself from the patient’s disease	4.87 ± 2.87
13.Obtain information about the patient’s disease (e.g., prognosis, treatment, side effects, nutrition)	4.85 ± 3.31
2.Deal with your emotional problems (such as anger, anxiety, depression, fear, resentment, etc.)	4.83 ± 3.25
11.Communicate with the patient’s medical staff	4.82 ± 2.87
22.Give yourself time off	4.71 ± 2.65
1.Help patients deal with emotional distress (such as anger, anxiety, depression, fear, resentment, etc.)	4.64 ± 2.87
21.Get help from others and give yourself time to rest	4.62 ± 2.66
23.Have time to reunite with family and friends	4.61 ± 2.58

Note: M, mean. SD, standard deviation

**Table 4** Correlations between the NAFC-C, CBS-CP, GESE, PSSS and KPS (n = 335)

Variable	Psychosocial	Medical	Financial	Daily Activity	Total score
CBS-CP	0.281**	0.290**	0.246**	0.432**	0.363**
GESE	0.289**	0.221**	0.038	0.127*	0.224**
KPS	0.154**	0.156**	0.045	0.015	0.119*

Note: CBS-CP, Caregiver Burden Scale for Cancer Patients. GSES, General Self-Efficacy Scale. KPS, Karnofsky Performance Score. \*\*, P < 0.001. \*, P < 0.05

time, caregiver burden, self-efficacy and KPS were the influencing factors of SCNs among caregivers (R<sup>2</sup>=0.530, F=13.966, P<0.001) (Table 5).

**Discussion**

One of the objectives of this study was to evaluate the current status of SCNs among caregivers of elderly patients with GI cancer. The results indicated that the average SCNs score for these caregivers was 4.65 ± 2.19. Various factors, including caregiver experience, relationship with patients, duration of caregiving, residence, source of medical expenses, cancer type, treatment duration, general self-efficacy (GESE) score, Karnofsky Performance Status (KPS) score, and caregiver burden, significantly impact the SCNs.

Our findings, indicating an average SCNs score of 4.65 ± 2.19, are consistent with those of Kim’s [28] research but slightly lower than those reported by Wu [34]. When the four dimensions of the Needs Assessment for Family Caregivers-Cancer (NAFC-C) scale were examined, we found that the economic dimension score was significantly lower than that reported by Wu [34]. This discrepancy may be attributed to Shanghai’s development status, where per capita monthly household income is relatively high. Additionally, most patients in Shanghai have basic medical insurance, which covers a substantial portion of cancer treatment costs, thereby reducing the economic burden on caregivers.

The psychological dimension scored the highest in this study, with caregivers being most concerned about “helping patients recover from illness,” which is consistent with previous findings [35]. Caregivers often experience involuntary psychological distress and burden, including feelings of isolation, fear, anxiety, and shame, which may persist over time [36]. Our results emphasize that the role of caregiving for elderly GI cancer patients involves dealing with uncertainty about the future and the complexity of the disease. Research indicates that

**Table 5** Regression of SCNs on critical explanatory factors ( $n = 335$ )

Independent variables		B	SE	Beta	t	P value
(Constant)		-32.421	46.273		-0.701	
Age		1.731	4.642	0.033	0.373	0.709
Gender		-6.095	4.933	-0.055	-1.236	0.218
Education Level		0.480	4.319	0.008	0.111	0.912
Marital Status		8.589	12.655	0.061	0.679	0.498
Duration of Therapy (patient)		-28.377	5.063	-0.403	-5.605	< 0.001
Income(CNY)		-1.142	3.412	-0.021	-0.335	0.738
Caregiving Experience		-14.211	6.056	-0.108	-2.347	0.020
Duration of Caregiving		40.911	5.685	0.540	7.197	< 0.001
KPS		0.556	0.251	0.104	2.210	0.028
GSES		1.965	0.640	0.180	3.073	0.002
CBS-CP		0.758	0.206	0.227	3.679	< 0.001
Employment Status	Unemployed	1.423	7.313	0.012	0.195	0.846
	Retired	-16.083	9.135	-0.145	-1.761	0.079
	Left job to care	-24.447	24.774	-0.044	-0.987	0.325
	Employed	reference				
Relationship	Child	-9.641	7.903	-0.091	-1.220	0.223
	Grandchild	-16.369	17.083	-0.050	-0.958	0.339
	Parents	-4.501	16.612	-0.026	-0.271	0.787
	Sibling	30.543	14.902	0.137	2.050	0.041
	Spouse	reference				
Residence	Town	-11.759	6.212	-0.105	-1.893	0.059
	Rural	-13.020	9.752	-0.078	-1.335	0.183
	Urban	reference				
Cancer Type(Patients)	Colon cancer	13.450	5.398	0.126	2.492	0.013
	Rectal cancer	31.250	6.346	0.250	4.924	< 0.001
	Gastric cancer	reference				
Source of Medical Expenses	Insurance	56.696	20.886	0.142	2.714	0.007
	Self-paid	reference				

Note:  $R = 0.728$ ,  $R^2 = 0.530$ , adjust  $R^2 = 0.493$ ,  $F = 13.966$ ,  $P < 0.001$ . SE, Standard Error. CNY, Chinese Yuan. CBS-CP, Caregiver Burden Scale for Cancer Patients. GSES, General Self-Efficacy Scale. KPS, Karnofsky Performance Score

the caregiving burden in China encompasses multiple aspects, such as psychological, physical, economic, and social burdens [37]. Caregivers of elderly patients with GI cancer face significant psychological and social pressures, leading to a continuous and universal caregiving burden. This heavy burden negatively impacts caregivers' health and quality of life, increasing their risk of illness and potentially affecting their ability to continue providing care, ultimately impacting the quality of care received by elderly patients [8]. In clinical practice, medical staff should pay close attention to the needs of caregivers of elderly patients with GI cancer. Active communication, accurate needs assessment through the NAFC-C scale, and timely identification of caregivers with high supportive needs are essential. Interventions such as mindfulness therapy [38] and peer support [39] should be provided accordingly.

In China's family-centered cultural context, spouses and adult children play crucial roles in the caregiving process. Our research indicates that caregivers who are the children of patients have a significantly greater SCNs,

which is consistent with the findings of previous studies [40]. Young and middle-aged caregivers often juggle multiple social roles and responsibilities, requiring more care and support. Additionally, caregiving experience and duration significantly affect SCNs, with experienced caregivers having greater needs. Caregivers frequently face significant psychological pressure, such as pain and depression, because they observe patients' disease progression, leading to a greater demand for psychological and informational support [41].

Consistent with previous research [34, 35], our study suggests that caregivers' SCNs levels are influenced by patients' living areas and sources of medical expenses. Caregivers of patients living in urban areas with basic medical insurance have higher SCNs levels than do those living in rural areas or patients paying out-of-pocket. The treatment methods, such as surgery or chemotherapy, reflect the illness stage and influence caregiver needs. These variables provide valuable insights into how different stages of the disease impact the caregiving experience. Caregiver SCNs levels also change with

the duration of the patient's treatment. Previous studies have shown that caregivers' unmet needs decrease over time as they become more familiar with the disease and treatment plans [42–44]. However, during chemotherapy and radiotherapy, caregivers' medical and informational demands usually increase due to treatment-related symptoms. Girgis et al. [42] reported that nearly half of caregivers reported three or more unmet needs 6 months after cancer diagnosis, whereas the proportion of caregivers with unmet needs decreased to 17.5% 24 months after diagnosis. Kim et al. [43] reported that caregivers of cancer patients two months after diagnosis had a high rate of unmet psychosocial needs (67.9%), which was much higher than that reported by caregivers of cancer survivors two and five years after diagnosis. An analysis of the causes could be performed as an extension of treatment time, with caregivers for patients with cancer providing disease information and a more familiar method of diagnosis and treatment planning and intervention, which also decreases the degree of various requirements. Secondly, during the course of chemotherapy and radiotherapy, cancer treatment often leads to a range of symptoms such as nausea, vomiting, pain, and fatigue. Consequently, caregivers typically experience an increased demand for medical assistance and information [44].

Our study also revealed that the type of cancer affects caregivers' SCNs levels. Caregivers of elderly colorectal cancer patients have greater SCNs than do those of gastric cancer patients. Despite the improved 5-year survival rate for patients with colorectal cancer, elderly patients still face long-term challenges, such as postoperative changes in intestinal function and psychological issues, increasing the burden on caregivers [45]. Caregivers must manage stoma care, nutritional status, and postoperative complications [46] in addition to dealing with aging-related comorbidities, thus increasing their need for support.

Unlike previous studies [40, 43, 47], our research revealed a positive correlation between patients' KPS scores and caregivers' SCNs. The KPS score is a reliable indicator of patients' functional status and illness severity, both of which are linked to caregiving demands. Lower KPS scores in elderly patients often correspond to more significant functional impairments, which result in increased caregiving demands. In such cases, caregivers may need to manage complex medical tasks and provide a higher level of care, which in turn increases their psychological and physical burden. Conversely, caregivers of patients with higher KPS scores may have higher expectations for the patient's prognosis, adding to their psychological pressure and demand for medical resources.

Our study revealed that caregiver self-efficacy is positively associated with psychological, medical, and daily

activity needs. Duggleby et al. [48] reported that caregivers' self-efficacy and hope for the level of cancer treatment. Higher self-efficacy leads caregivers to have higher expectations for cancer treatment [49], actively pursue comprehensive patient care, and focus on various patient needs, increasing their psychological and medical demands. This high self-efficacy encourages continuous learning and improvement in caregiving skills but also results in more stress and resource demands.

Our findings indicate that greater caregiver burden is correlated with greater psychological, medical, economic, and daily activity needs. An increased caregiving burden leads to greater psychological stress, emotional burden, and medical information needs [50]. Long-term intensive caregiving can cause mental health issues such as anxiety and depression, significantly increasing the demand for psychological support and mental health services. As the burden of caregiving increases, caregivers need more time and energy to manage medical care, necessitating professional knowledge and skills training [51]. Severe caregiving burdens may also reduce caregivers' working hours or lead to job withdrawal, exacerbating economic stress and increasing the need for financial support [52, 53]. Additionally, as the burden of caregiving increases, caregivers must undertake more daily care tasks, increasing their need for external assistance and support services [54].

In conclusion, the caregiving burden of caregivers of elderly patients with GI cancer is positively correlated with their psychological, medical, financial, and daily activity needs. Clinical practice should address the comprehensive needs of caregivers and provide multifaceted support and resources to reduce their burden and improve their quality of life.

#### Limitations

Despite the valuable insights obtained from this study on caregivers of elderly patients with GI cancer, several limitations should be noted. First, the use of convenience sampling from a single large hospital in Shanghai limits the generalizability of our findings to broader populations. Multicenter studies would enhance the representativeness of caregiver experiences. Second, the study's cross-sectional design prevents the establishment of causal relationships between caregivers' characteristics and their supportive care needs. Longitudinal studies could help clarify these relationships and provide deeper insights into how caregiver needs evolve over time. Third, although we collected data on patients' KPS scores as proxy indicators of functional status and complications, we did not gather direct data on the frequency of hospitalization or specific treatment-related complications. Including these variables in future research would allow for a more comprehensive analysis of how different



aspects of patient health affect caregiver needs. Addressing these limitations in future studies will enhance our understanding of caregivers' needs and support strategies, ultimately improving caregiving outcomes for patients with GI cancer.

## Conclusion

This study highlights the significant prevalence of supportive care needs among caregivers of elderly patients with GI cancer, with psychological needs emerging as particularly prominent. Our findings underscore the critical role of mitigating the burden of caregiving in reducing these supportive care needs. The key factors identified in our analysis that influence caregivers' supportive care needs include caregiver care experience, relationship with the patient, residence, self-efficacy, caregiving burden, and characteristics of the patient, such as duration and type of illness, as well as the source of medical expenses. Future research should further investigate the specific factors influencing caregivers' supportive care needs across different socioeconomic contexts and geographic regions. Additionally, longitudinal studies could provide valuable insights into the evolving needs of caregivers over time, facilitating the development of targeted interventions that meet these evolving needs effectively.

## Abbreviations

GI	Gastrointestinal
GC	Gastric cancer
CRC	Colorectal cancer
SCNs	Supportive care needs
N AFC-C	The needs assessment of family caregivers- cancer
CBS-CP	Caregiver burden scale for cancer patients
KPS	Karnofsky performance score
GSES	General self-efficacy scale
M	Mean
SD	Standard deviation
CNY	Chinese yuan

## Acknowledgements

The authors are grateful to the patients with cancer who participated in this study and to the hospital managers for their strong support in collecting samples.

## Author contributions

Conceptualization: M.X.; Data curation: M.X., Y.M. & Z.Y.; Formal analysis: M.X.; Funding acquisition: J.C.; Methodology: M.X., J.C.; Project administration: J.C.; Resources: J.Z.; Software: M.X., J.Z.; Supervision: L.J. & H.L.; Validation: J.Z., L.Q.; Visualization: M.X., J.Z., J.C.; Writing - original draft: M.X.; and Writing-review & editing: J.C. All authors critically reviewed the manuscript draft and approved the final version.

## Funding

This study was funded by the Center for Scientific Research and Development in Higher Education Institutes, P. R. China (2023HT065), Shanghai Jiao Tong University School of Medicine: Nursing Development Program (grant number SJTUHLXK2024), and Shanghai Songjiang District Science and Technology Research Project (grant number 225JKJGG12).

## Data availability

The data that support the findings of this study are available from the corresponding author upon reasonable request.

## Code availability

Not applicable.

## Declarations

### Ethics approval and consent to participate

This study was conducted with the first author (M.X.) delivering a consistent exposition of the research objectives and methodology to all participants. All participants in the study provided their informed consent. The study obtained ethical approval from the Ethics Committee of Shanghai General Hospital, under the ethical approval number 2024[002], and it adhered to the principles stipulated in the Helsinki Declaration.

### Consent for publication

Not applicable.

### Competing interests

The authors declare no competing interests.

Received: 6 August 2024 / Accepted: 21 November 2024

Published online: 02 December 2024

## References

- Lee R. The outlook for population growth. *Science*. 2011;333(6042):569–73. <https://doi.org/10.1126/science.1208859>
- Rivadeneira MF, Mendieta MJ, Villavicencio J, et al. A multidimensional model of healthy ageing: proposal and evaluation of determinants based on a population survey in Ecuador. *BMC Geriatr*. 2021;21(1):615. <https://doi.org/10.1186/s12877-021-02548-5>
- United Nations, Department of Economic and Social Affairs, Population Division. World Population Ageing 2019: Highlights. United Nations. 2019. <https://www.un.org/en/development/desa/population/publications/pdf/ageing/WorldPopulationAgeing2019-Highlights.pdf>
- Xie Q. Implementation study of basic pension insurance policies for urban and rural residents in Shanghai under the background of population aging. [Dissertation]. East China Normal University; 2022. <https://doi.org/10.27149/d.cnki.ghdsu.2022.004725>
- Ju W, Zheng R, Zhang S, et al. Cancer statistics in Chinese older people, 2022: current burden, time trends, and comparisons with the US, Japan, and the Republic of Korea. *Sci China Life Sci*. 2023;66(5):1079–91. <https://doi.org/10.1007/s11427-022-2218-x>
- Shahrokni A, Pozdniakova H, Nightingale B. Cancer and older adults: the introduction. In: Wasserman MR, Bakerjian D, Linnebur S, Brangman S, Cesari M, Rosen S, editors *Geriatric medicine*. Springer, Cham. [https://doi.org/10.1007/978-3-030-74720-6\\_123](https://doi.org/10.1007/978-3-030-74720-6_123)
- Qi J, Li M, Wang L, et al. National and subnational trends in cancer burden in China, 2005–20: an analysis of national mortality surveillance data. *Lancet Public Health*. 2023;8(12):e943–55. [https://doi.org/10.1016/S2468-2667\(23\)00211-6](https://doi.org/10.1016/S2468-2667(23)00211-6)
- Tong Y, Gao H, Qi Q, et al. High fat diet, gut microbiome and gastrointestinal cancer. *Theranostics*. 2021;11(12):5889–910. <https://doi.org/10.7150/thno.56157>
- Kuntz S, Krieghoff-Henning E, Kather JN, et al. Gastrointestinal cancer classification and prognostication from histology using deep learning: systematic review. *Eur J Cancer*. 2021 Sep;155:200–15. <https://doi.org/10.1016/j.ejca.2021.07.012>
- Kim J, Lee HK. Potential role of the gut Microbiome in Colorectal Cancer Progression. *Front Immunol*. 2022;12:807648. <https://doi.org/10.3389/fimmu.2021.807648>
- Fitch MI. Supportive care framework. *Can Oncol Nurs J*. 2008 Winter;18(1):6–24. <https://doi.org/10.5737/1181912x181614>
- Rittenberg CN, Johnson JL, Kuncio GM. An oral history of MASCC, its origin and development from MASCC's beginnings to 2009. *Support Care Cancer*. 2010;18(6):775–84. <https://doi.org/10.1007/s00520-010-0830-0>
- Ktistaki P, Alevra N, Voulgari M. Long-term survival of women with breast Cancer. Overview supportive care needs Assessment Instruments. *Adv Exp Med Biol*. 2017;989:281–4. [https://doi.org/10.1007/978-3-319-57348-9\\_25](https://doi.org/10.1007/978-3-319-57348-9_25)

14. Lu L, Pan B, Sun W, et al. Quality of life and related factors among caregivers in China. *J Neuropsychiatry Clin Neurosci*. 2010;64(5):505–13. <https://doi.org/10.1111/j.1440-1819.2010.02131.x>
15. Coleman EA, Ground KL, Maul A. The family caregiver activation in transitions (FCAT) Tool: a new measure of family caregiver self-efficacy. *Joint Comm J Qual Patient Saf*. 2015;41(11):502–7. [https://doi.org/10.1016/s1553-7250\(15\)41066-9](https://doi.org/10.1016/s1553-7250(15)41066-9)
16. Yang S, Liu D, Li H, et al. Research status and implications of health needs assessment tools for elderly family caregivers at home and abroad. *Chin Nurs Manag*. 2017;17(09):1213–6. <https://doi.org/10.3969/j.issn.1672-1756.2017.09.014>
17. Ma H, Yao J, Wei X, et al. Investigation on caregiver burden and caregiving knowledge of spinal cord injury patients. *J Nanchang Univ (Med Sci)*. 2014;54(04):87–90. <https://doi.org/10.13764/j.cnki.ncdm.2014.04.026>
18. Krishnasamy M, Hyatt A, Chung H, et al. Refocusing cancer supportive care: a framework for integrated cancer care. *Support Care Cancer*. 2022;31(1):14. <https://doi.org/10.1007/s00520-022-07501-9>
19. Goerling U, Bergelt C, Müller V, et al. Psychosocial distress in women with breast Cancer and their partners and its impact on supportive care needs in Partners. *Front Psychol*. 2020;11:564079. <https://doi.org/10.3389/fpsyg.2020.564079>
20. Tragantzopoulou P, Giannouli V. Echoes of support: a qualitative Meta-synthesis of caregiver narratives in Lung Cancer Care. *Healthc (Basel)*. 2024;12(8):828. <https://doi.org/10.3390/healthcare12080828>
21. Langedård U, Cajander Å, Ahmad A, et al. Understanding the challenges and need for support of informal caregivers to individuals with head and neck cancer - A basis for developing internet-based support. *Eur J Oncol Nurs*. 2023;64:102347. <https://doi.org/10.1016/j.ejon.2023.102347>
22. Aung SHH, White K, Bloomfield J. The experiences and the needs of caregivers of patients with Head and Neck Cancer: an integrative review. *Cancer Nurs* 2021;44(6):E361–73. <https://doi.org/10.1097/NCC.0000000000000833>
23. Morgan SP, Lengacher CA, Rodriguez CS. Caregiver burden in caregivers of patients with advanced stage cancer: a concept analysis. *Eur J Oncol Nurs*. 2022;60:102152. <https://doi.org/10.1016/j.ejon.2022.102152>
24. Karimi Moghaddam Z, Rostami M, Zeraatchi A, et al. Caregiving burden, depression, and anxiety among family caregivers of patients with cancer: an investigation of patient and caregiver factors. *Front Psychol*. 2023;14:1059605. <https://doi.org/10.3389/fpsyg.2023.1059605>
25. Sun Q, Li J, Fang X, et al. Current status and influencing factors of care burden of pancreatic cancer caregivers under COVID-19. *Front Psychol*. 2023;13:1066278. <https://doi.org/10.3389/fpsyg.2022.1066278>
26. Lee YH, Liao YC, Shun SC, Yang PC, Hsieh PY, Lai YH, et al. Trajectories of caregiver burden and related factors in family caregivers of patients with lung cancer. *Psychooncology*. 2018;27(6):1493–500. <https://doi.org/10.1002/pon.4678>
27. Rodríguez Del Águila M, González-Ramírez A. Sample size calculation. *Allergol Immunopathol (Madr)*. 2014 Sep-Oct;42(5):485–92. <https://doi.org/10.1016/j.aller.2013.03.008>
28. Kim Y, Kashy DA, Spillers RL, et al. Needs assessment of family caregivers of cancer survivors: three cohorts comparison. *Psychooncology*. 2010;19(6):573–82. <https://doi.org/10.1002/pon.1597>
29. Liu M, Wang X, Li R, et al. Cultural adaptation and reliability validity study of the Cancer Patient Family Caregiver needs scale. *Nurs Res*. 2017;31(28):3600–3. <https://doi.org/10.3969/j.issn.1009-6493.2017.28.032>
30. Li Q, Xu X, Lin Y, et al. The development of the cancer patients, family caregivers burden scale and their reliability validity evaluation. *China care*. 2017;111490–4. <https://doi.org/10.3969/j.issn.1672-1756.2017.11.011>
31. Clancey JK. Karnofsky performance scale. *J Neurosci Nurs*. 1995;27(4):220.
32. Schwarzer R, Born A, Iwawaki S, et al. The Assessment of optimistic Self-Beliefs: comparison of the Chinese, Indonesian, Japanese, and Korean versions of the General Self-Efficacy Scale. *Psychologia*. 1997;40(1):1–13. [https://doi.org/10.1002/\(SICI\)1099-1611\(199703\)6:1<79::AID-PON245>3.0.CO;2-S](https://doi.org/10.1002/(SICI)1099-1611(199703)6:1<79::AID-PON245>3.0.CO;2-S)
33. Wang C, Hu C, Liu Y. General self-efficacy scale reliability and validity of the study. *J Appl Psychol*. 2001;01:37–40.
34. Wu XY. Survey and analysis of supportive care needs of family caregivers of lung cancer patients. *Inner Mongolia Med Univ*. 2021. <https://doi.org/10.27231/d.cnki.gnmyc.2020.000378>
35. Li JL. Analysis of the current status and influencing factors of primary caregivers' needs for glioma patients [Dissertation]. *China Medical University*; 2023. <https://doi.org/10.27652/d.cnki.gzyku.2022.001503>
36. Balfe M, O'Brien K, Timmons A, et al. The unmet supportive care needs of long-term head and neck cancer caregivers in the extended survivorship period. *J Clin Nurs*. 2016;25(11–12):1576–86. <https://doi.org/10.1111/jocn.13140>
37. Wang J. Longitudinal study on caregiving burden and influencing factors of family caregivers of colorectal cancer patients [Dissertation]. *Beijing University of Chinese Medicine*; 2020. <https://doi.org/10.26973/d.cnki.gbjzu.2020.000597>
38. Brodar KE, Carlisle V, Tang PY, et al. Identification and characterization of peer support for Cancer Prevention and Care: a practice review. *J Cancer Educ*. 2022;37(3):645–54. <https://doi.org/10.1007/s13187-020-01861-8>
39. Kubo A, Kurtovich E, McGinnis M et al. A Randomized Controlled Trial of mHealth Mindfulness intervention for Cancer patients and Informal Cancer caregivers: a feasibility study within an Integrated Health Care Delivery System. *Integr Cancer Ther* 2019;18:1534735419850634. <https://doi.org/10.1177/1534735419850634>
40. Chen SC, Chiou SC, Yu CJ, et al. The unmet supportive care needs-what advanced lung cancer patients' caregivers need and related factors. *Support Care Cancer*. 2016;24(7):2999–3009. <https://doi.org/10.1007/s00520-016-3096-3>
41. Cui X, Wang H, Xu CY. Survey and analysis of current status and influencing factors of primary caregivers' needs for patients with advanced liver cancer. *J Xinjiang Med Univ*. 2019;42(09):1211–5. <https://doi.org/10.3969/j.issn.1009-5551.2019.09.024>
42. Girgis A, Lambert S, Lecathelinais C. The supportive care needs survey for partners and caregivers of cancer survivors: development and psychometric evaluation. *Psychooncology*. 2011;20(4):387–93. <https://doi.org/10.1002/pon.1740>
43. Kim Y, Carver CS, Ting A, et al. Passages of cancer caregivers' unmet needs across 8 years. *Cancer*. 2020;126(20):4593–601. <https://doi.org/10.1002/cncr.33053>
44. Herring B, Lewis-Smith H, Paraskeva N, et al. Exploring the experiences and psychosocial support needs of informal carers of men with breast cancer: a qualitative study. *Support Care Cancer*. 2022;30(8):6669–76. <https://doi.org/10.1007/s00520-022-07095-2>
45. Ye XT, Zheng CM, Qin HY. Survey of the needs for postoperative supportive care and symptom distress in colorectal cancer patients with ostomy. *Mod Clin Nurs*. 2022;21:14–20. <https://doi.org/10.3969/j.issn.1671-8283.2022.01.003>
46. Lee LJ, Kim Y, Shamburek R, et al. Caregiving stress and burden associated with cardiometabolic risk in family caregivers of individuals with cancer. *Stress*. 2022;25(1):258–66. <https://doi.org/10.1080/10253890.2022.2037548>
47. Zavagli V, Raccichini M, Ostan R, et al. Identifying the prevalence of unmet supportive care needs among family caregivers of cancer patients: an Italian investigation on home palliative care setting. *Support Care Cancer*. 2022;30(4):3451–61. <https://doi.org/10.1007/s00520-021-06655-2>
48. Duggleby WD, Williams A, Holstlander L, et al. Hope of rural women caregivers of persons with advanced cancer: guilt, self-efficacy and mental health. *Rural Remote Health*. 2014;14:2561.
49. Duggleby W, Lee H, Nekolaichuk C, et al. Systematic review of factors associated with hope in family carers of persons living with chronic illness. *J Adv Nurs*. 2021;77(8):3343–60. <https://doi.org/10.1111/jan.14858>
50. Jenkins C, Ho HT, Nghiem HPL, et al. A qualitative study on the needs of cancer caregivers in Vietnam. *Glob Health Action*. 2021;14(1):1961403. <https://doi.org/10.1080/16549716.2021.1961403>
51. Niu A, Guo C, Zhong D, et al. Identifying the Unmet supportive care needs, with concomitant influencing factors, in Family caregivers of Cancer patients in China. *Asia Pac J Oncol Nurs*. 2021;8(3):276–86. [https://doi.org/10.4103/apjon.apjon\\_52\\_20](https://doi.org/10.4103/apjon.apjon_52_20)
52. van Hof KS, Hoesseini A, Dorr MC, et al. Unmet supportive care needs among informal caregivers of patients with head and neck cancer in the first 2 years after diagnosis and treatment: a prospective cohort study. *Support Care Cancer*. 2023;31(5):262. <https://doi.org/10.1007/s00520-023-07670-1>
53. Zhang M, Wang X, Shao M, et al. Supportive care needs and associated factors among caregivers of patients with colorectal cancer: a cross-sectional study. *Support Care Cancer*. 2024;32(3):194. <https://doi.org/10.1007/s00520-024-08390-w>

54. Beach SR, Schulz R. Family caregiver factors Associated with Unmet needs for care of older adults. *J Am Geriatr Soc.* 2017;65(3):560–6. <https://doi.org/10.1111/jgs.14547>

#### **Publisher's note**

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.