Identifying the Unmet Supportive Care Needs, with Concomitant Influencing Factors, in Family Caregivers of Cancer Patients in China

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Abstract

Objective: The objective of the study is to assess the unmet needs of cancer caregivers and to identify the possible predictors of their supportive care needs in China. Methods: This multicenter, cross-sectional study enrolled 449 cancer patients’ family caregivers’ dyads. Patients provided general information and Karnofsky performance status (KPS); caregivers provided general information and completed a survey of Chinese version of the Supportive Care Needs Survey-Partners and Caregivers Scale. The independent samples t-test, one-way analysis of variance, and multiple stepwise regression were used to analyze the factors that influence the needs of caregivers. Results: A proportion of caregivers who had no needs were 5.6%. A proportion of caregivers with ≥5 moderate or high unmet needs and with ≥10 moderate or high unmet needs were 77.7% and 63.2%, respectively. Healthcare services and information needs and communication and relationship needs were the most prominent areas of caregivers’ unmet needs. The item “Finding out about financial support and government benefits for you and/or the person with cancer” was the highest level of unmet needs at 78.6%. The level of unmet needs was related to the patient’s physical function (KPS score), caregiver’s educational levels, financial burden of healthcare, as well as the level of burden related to caregiving (working status, caring for others, caregiving experience, and total caregiving time). Conclusions: The level of unmet needs of family caregivers of cancer patients in China was higher. In clinical practice, more attention should be paid to family caregivers who take care of the patient with poor physical function, those who are highly educated, faced with higher financial burden of healthcare, and are currently working, as well as those who need to take care of others, spend more time caregiving, and have no caregiving experience.

Key words: Cancer, family caregiver, needs

Introduction

At present, the incidence of cancer is increasing year by year. It was estimated that there would be 18.1 million
new cases and 9.6 million cancer deaths worldwide in 2018, of which nearly 24% of these cancer cases and 30% of deaths have occurred in China. The age-standardized cancer incidence in China is comparable to that of the overall worldwide incidence. However, China has a much higher cancer mortality than the UK and the USA.[1] With the continuous implementation of new clinical treatment modalities, the 5-year survival rate of cancer patients worldwide has reached as high as 68%,[2] and malignant tumors have now become a chronic, exhausting condition that threatens the well-being of families.

Given the effect of the disease itself as well as the impact of surgery, radiotherapy, and chemotherapy, cancer patients require ongoing attention and care from their caregivers for years or even decades. In China, the caregivers of cancer patients are often members of the family, with family carers undertaking 70%–80% of the care.[3] Traditional Chinese values such as Confucianism placed a heavy emphasis on filial piety and mutual support among kinship groups. It is an obligation for families to take care of sick parents, children, spouses, and other relatives.[4] The focus of the whole family was the cancer patients. Moreover, family caregivers’ health was somewhat neglected.

Studies have shown that caregivers encounter various problems when providing care, particularly physical, psychosocial, and mental health effects, as well as economic stress.[5,6] Every day, caregivers need to deal with many problems from family, work, hospital, and society. They are too busy to aware of their own unmet needs and also unsure how to address them.[7,8] As a result, many needs are being overlooked and not met.[9] It has been shown that when caregivers’ need for support and help in caring for cancer patients is not met, the caregiver’s quality of life and their physical and psychological well-being suffer.[10] Their long-term quality of life,[11] their ability to care, and the quality and standard of care they provide all experience a negative impact.[12,13] Ultimately, the patient’s treatment, recovery, and subsequent quality of life with illness will be affected, which increases the suffering of the patient.[14]

China’s existing healthcare system mainly focuses on cancer patients and does not view family caregivers as service receivers. Family caregivers, as a special group, have been given only negligible attention and have not received sufficient professional assistance to meet the challenges of caregiving. [15] At present, there are very few reports on the supportive care needs of cancer patient caregivers in China. Therefore, this study explored the current state of unmet needs of caregivers in China, as well as the factors that contribute to unmet needs, to provide a theoretical basis for targeted interventions that can be clinically implemented.

The purpose of this study was to examine the unmet needs of family caregivers of cancer patients in China. The specific aims were as follows:
1. To examine the prevalence of unmet needs
2. To identify factors that influence unmet needs.

Methods

Design and sample

In this study, a convenience sampling method was used to recruit participants from 15 departments treating cancer patients in five tertiary hospitals in Xi’an. The study was approved by the institutional review board. Informed written consent was obtained from all participants before their enrollments in this study.

Inclusion criteria

Patients
1. Inpatients with a pathologically confirmed diagnosis of cancer
2. The patient had no history of psychiatric disorders and had the capacity to communicate normally
3. Voluntary participation in the study.

Family caregiver
1. The caregiver was over the age of 18 years
2. The caregiver had been identified as such by the main caregiver himself/herself or by the patient, and the cumulative care time in the hospital was >72 h
3. The caregiver had no history of mental illness or psychiatric disorder and can complete the questionnaire by themselves or with the help of the investigator
4. The caregiver had knowledge of the patient’s condition, agreed to participate in the research, and signed a consent form.

Exclusion criteria

Caregivers who withdrew mid-way through the study or those who refused to participate in the study were excluded.

Instruments

General situation questionnaire

Patients’ and caregivers’ demographic data were collected by self-report, and medical factors were collected from the medical record review with their consent. Information gathered on the patient included demographic characteristics (e.g., gender, age, religious, education level, marital status, and occupation) and their clinical situation (e.g., type of cancer, medical treatment, number of treatments). The information of caregiver included demographic data (e.g., living arrangement, relationship to patient, working status, chronic health condition, self-appraised health status, and
financial burden), and caregiving situation (e.g., daily time spent caregiving, type of care, hours of sleep per day, weekly respite, previous caregiving experience, caring for others, and total time spent caregiving).

**Karnofsky performance status**

The Karnofsky performance status (KPS) was defined by Dr. Joseph H. Bruchenal and Dr. David A. Karnofsky in 1949. The KPS has been widely used throughout the world for performance assessment of cancer patients for many years.\(^{[16]}\) The functional status of a patient is assessed on an 11-point scale ranging from full well-being (100) to death (0), decreasing ten points at each level. According to the assessment results, the patients are divided into three groups; Group 1 (100–80, independent) can independently perform daily activities, Group 2 (70–50, semi-independent) can perform daily activities with help, and Group 3 (<40, dependent) requires continuous assistance and approaches death progressively.\(^{[17]}\)

**Supportive Care Needs Scale for Caregivers of Cancer Patients**

In 2011, Girgis *et al.*\(^{[18]}\) carried out SCNS-P and C reliability, validity, and psychometric testing, which demonstrated that this tool had good reliability, validity, and internal consistency and was suitable for evaluating caregivers of cancer patients throughout a disease. Furthermore, the tool was not only capable of distinguishing between the multifaceted supportive care needs of caregivers at different stages of the disease but could also identify their unmet needs. In 2016, Chinese researchers conducted psychometric tests on SCNS-P and C, and it was found that the tool had good internal consistency. The Cronbach’s alpha coefficient was between 0.79 and 0.89, and the total of the four subscales was 0.94, indicating that the tool could be used effectively to evaluate the supportive care needs of the partners and caregivers of Chinese cancer patients. The SCNS-P and C-C is comprised of a total of 45 items and four domains, including healthcare service and information needs, social and work needs, communication and relationship needs, as well as psychological and emotional needs, and mainly measures the caregiver’s needs in the past month. The level of need is calculated on a 5-point scale. 1 point represents “no need,” 2 points represents satisfied need, and 3 points represents a low level of unmet needs, which means the caregiver’s needs have not yet been met and a little additional help is required. The higher the score, the more help is required, and the higher the level of unmet needs.\(^{[19]}\) According to each response, we calculated the percentage of the five levels of help needed. Across four dimensions, the level of need in every entry, rank of each entry, and percentage of unmet needs were evaluated. We summed the scores overall and for each domain that generated descriptive statistics for all variables. Cronbach’s alpha for the SCNS-P and C-C in this study was 0.92.

**Data collection**

The data were collected by two study assistants who were trained in data collection for 1 day. From 2015 to 2016, the study participants were informed about the purpose of the study, selection criteria, and procedures, including how to fill the questionnaires. The investigator conducted the survey after obtaining consent from the relevant departments of the hospital. After the patient and caregiver signed the informed consent form, the investigator issued the questionnaire. If the caregiver or patient was unable to independently complete the questionnaire due to problems with vision, education levels, or other reasons, the investigator read the questionnaires to them and filled in their responses to each question. After the survey, responses were reviewed on the spot, and if certain parts of the questionnaire were left out or completed incorrectly, the investigator, with the caregiver’s agreement, would ask for the relevant sections to be completed or amended, to ensure survey quality. The total time for data collection took approximately 30 min.

**Statistical analysis**

SPSS statistical software (version 21.0, IBM Corp., Armonk, NY, USA) was used to analyze the data. Frequency, percentage, mean, and standard deviation were used to describe the general information of the caregivers and patients, as well as the needs of caregivers. The independent samples *t*-test, one-way variance analysis, and multiple stepwise regression were used to analyze the factors that influence the needs of caregivers.

**Results**

**General information**

A total of 480 questionnaires were sent out to 15 departments that treat cancer patients in five tertiary hospitals in Xi’an, and 463 questionnaires were returned. 449 questionnaires were valid, giving a questionnaire efficiency of 96.9%.

The demographical and clinical characteristics data of the considered study subjects are detailed in Table 1 and Table 2. The mean age of the patients was 54.29 ± 13.18 years, the most common cancer was gastrointestinal malignancy (40.8%), diagnosed between 1 and 6 months ago (42.5%), and chemotherapy/radiotherapy was the most common treatment (67.0%). The mean age of the caregivers was 40.75 ± 12.91 years. Most caregivers were married (85.7%), currently not working (76.4%), and living with family (94.7%). Most caregivers were the son or daughter of the patients (47.2%), with family monthly
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In terms of domains, healthcare service and information needs ranked highest for unmet needs (60.9%), while psychological and emotional needs ranked least for unmet needs (38.4%). 61.6% of the caregivers indicated “no need or satisfied” to psychological and emotional needs. The results of this study showed that 5.6% of caregivers had no needs and a proportion of caregivers with ≥5 moderate or high unmet needs and with ≥10 moderate or high unmet needs were 77.7% and 63.2%, respectively. Table 3 lists top 10 entries for the percentage of unmet needs. Among the top 10 entries, eight entries belong to the healthcare service and information dimension. The need items corresponding to the top three highest level of unmet needs were “Finding out about financial support and government benefits for you and/or the person with cancer,” “Managing concerns about the cancer coming back,” and “Accessing information about the benefits and side‑effects of treatments.” Other results are summarized in Tables 3 and 4.

Factors influencing of unmet needs

After testing the data for normality and homogeneity of variance, we screened for single factors (t‑test and one‑way analysis of variance) that independently influenced each dimension of SCNS‑P and C [Table 5]. The results reveal that one or more single factor/s were associated with and significantly influenced each dimension of SCNS‑P and C. Further these factors were subjected to multiple linear stepwise regression analysis, the results of which are listed in Table 6.

Discussion

The level of unmet supportive care needs of the caregivers was relatively high. The level of needs that have been unmet in caregivers was higher than that in cancer patients in China and higher than the level in caregivers in Taiwan and abroad (American, Australia, and Germany). The results of this study showed that the proportion of caregivers who had no needs and those whose needs had been met (5.6%) were less than that reported in Sklenarova et al.’s survey of supportive needs of caregivers of cancer patients (14.4%). A proportion of caregivers with ≥5 moderate or high unmet needs and with ≥10 moderate or high needs were 77.7% and 63.2%, respectively, which were higher than the levels reported by Sklenarova et al. (56.4% vs. 43.6%).[20] These findings indicate that the survey respondents had an overall high degree of unmet needs. The rate of unmet needs for caregivers in all domains was 38.4%–60.9%, which was

| Table 1: Sample characteristics of patients (n=449) |
|-----------------------------------------------|
| Variable                        | n (%)  |
| Gender                          |        |
| Male                            | 226 (50.3) |
| Female                          | 223 (49.7) |
| Age (years)                     |        |
| 18-40                           | 59 (13.1)  |
| 40-50                           | 72 (16.0)  |
| 50-60                           | 157 (35.0) |
| ≥60                             | 161 (35.9) |
| Religious (n=363)               |        |
| No                              | 339 (93.4) |
| Yes                             | 24 (6.6)   |
| Education                      |        |
| Primary or below                | 110 (24.5) |
| Secondary                      | 246 (54.8) |
| College or above                | 93 (20.7)  |
| Marital status                  |        |
| Single                          | 15 (3.3)   |
| Married                         | 418 (93.1) |
| Other                           | 16 (3.6)    |
| Occupation                      |        |
| Builder                         | 71 (15.8)  |
| Farmer                          | 161 (35.9) |
| Executive                       | 62 (13.8)  |
| Science and technology          | 66 (14.7)  |
| Business                        | 58 (12.9)  |
| Other                           | 31 (6.9)   |
| Cancer type                     |        |
| Lung cancer                     | 74 (16.5)  |
| Gastrointestinal malignancy     | 183 (40.8) |
| Breast cancer                   | 61 (13.6)  |
| Hematological malignancies      | 69 (15.4)  |
| Gynecological malignancies      | 36 (8.0)   |
| Other                           | 26 (5.7)   |
| Time since diagnosis (months)   |        |
| <1                              | 115 (25.6) |
| 1-6                             | 191 (42.5) |
| 6-12                            | 52 (11.6)  |
| ≥12                             | 91 (20.3)  |
| Medical treatment               |        |
| Surgery                         | 51 (11.4)  |
| Chemo/radiotherapy              | 301 (67.0) |
| Symptomatic treatment           | 21 (4.7)   |
| Supportive treatment            | 73 (16.3)  |
| Other                           | 3 (0.7)    |
| Number of treatments            |        |
| First treatment                 | 104 (23.2) |
| Multiple treatment              | 345 (76.8) |
| KPS                             |        |
| ≤40                             | 57 (12.7)  |
| 50-70                           | 88 (19.6)  |
| ≥80                             | 304 (67.7) |

KPS: Karnofsky performance status
slightly higher than that reported in lung cancer patients by Giuliani et al. (22.0%–66.0%).[21] The rate of top ten unmet needs was 66.4%–78.6%, which was higher than the level of unmet needs for supportive caregivers of lung cancer patients reported by Chen et al. (56.1%–78.3%).[22] Since China has an economy that is still in the development phase, and the country has a relatively large population and insufficient number of medical and nursing staffs, we, as a country, have not been giving enough attention to caregivers. Indeed, as a group, family caregivers have been overlooked by public health and community services, as well as hospitals. As a result of cultural influences, caregivers view caring for patients as their own duty and responsibility. They are too busy to aware of their own unmet needs and also unsure how to address them.[7,8] As a result, many needs are being overlooked and not met. Most do not actively seek professional support. As such, as medical professionals, we should take the initiative to understand the needs of caregivers.

The results of this study showed that healthcare service and information needs and communication and relationship needs are the most prominent areas of caregivers’ unmet needs. Psychological and emotional dimension was the last in the list of SCNS-P and C; within this dimension, we found

### Table 2: Sample characteristics of caregivers (n=449)

| Variable                        | n (%)   |
|---------------------------------|---------|
| Gender                          |         |
| Male                            | 239 (53.2) |
| Female                          | 210 (46.8) |
| Age (years)                     |         |
| 18-40                           | 222 (49.4) |
| 40-50                           | 98 (21.8) |
| 50-60                           | 84 (18.7) |
| ≥60                             | 45 (10.0) |
| Religious (n=363)               |         |
| No                              | 331 (91.2) |
| Yes                             | 32 (8.8) |
| Residence                       |         |
| City                            | 287 (63.9) |
| Rural                           | 162 (36.1) |
| Education                       |         |
| Primary or below                | 25 (5.6) |
| Secondary                       | 239 (53.2) |
| College and above               | 185 (41.2) |
| Marital status                  |         |
| Single                          | 59 (13.1) |
| Married                         | 385 (85.7) |
| Other                           | 5 (1.1) |
| Relationship to patient         |         |
| Spouse                          | 190 (42.3) |
| Children                        | 212 (47.2) |
| Parent                          | 19 (4.2) |
| Other                           | 28 (6.2) |
| Occupation                      |         |
| Builder                         | 96 (21.4) |
| Farmer                          | 110 (24.5) |
| Executive                       | 51 (11.4) |
| Science and technology          | 65 (14.5) |
| Business                        | 89 (19.8) |
| Other                           | 38 (8.5) |
| Working status                  |         |
| Currently working               | 106 (23.6) |
| Currently not working           | 343 (76.4) |
| Living arrangement              |         |
| Living alone                    | 24 (5.3) |
| Living with family              | 425 (94.7) |
| Self-appraised health status    |         |
| Good                            | 243 (54.1) |
| Fair                            | 135 (30.1) |
| Poor                            | 62 (13.8) |
| Very poor                       | 9 (2.0) |
| Chronic health condition (yes/no)|         |
| No                              | 360 (80.2) |
| Yes                             | 89 (19.8) |
| Family monthly income per person|         |
| Lower than expenditure          | 247 (55.0) |
| The same as expenditure         | 128 (28.5) |
| Higher than expenditure         | 74 (16.5) |
| Financial burden of healthcare  |         |
| No significant burden           | 60 (13.4) |
| Some burden                     | 210 (46.8) |

### Table 2: Contd...

| Variable                        | n (%)   |
|---------------------------------|---------|
| Daily time spent caregiving (h) |         |
| <6                              | 38 (8.5) |
| 6-12                            | 78 (17.4) |
| ≥12                             | 333 (74.2) |
| Type of care                    |         |
| Caregiving with assistance      | 172 (38.3) |
| Caregiving alone                | 277 (61.7) |
| Hours of sleep per day (h)      |         |
| <6                              | 79 (17.6) |
| 6-8                             | 200 (44.5) |
| ≥8                              | 170 (37.9) |
| Weekly respite                  |         |
| No weekly respite               | 206 (45.9) |
| Scheduled weekly respite        | 103 (22.9) |
| Unscheduled weekly respite      | 140 (31.2) |
| Previous caregiving experience (yes/no) |         |
| No                              | 259 (57.7) |
| Yes                             | 190 (42.3) |
| Caring for others (yes/no)      |         |
| No                              | 224 (49.9) |
| Yes                             | 225 (50.1) |
| Total time spent caregiving (months) |       |
| <1                              | 99 (22.0) |
| 1-6                             | 216 (48.1) |
| 6-12                            | 66 (14.7) |
| ≥12                             | 68 (15.1) |

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that 61.6% of caregivers expressed no need and satisfied for help and 38.4% of caregivers had need for help. This result is inconsistent with the findings of other countries, such as Germany, Korea, and Iran.\textsuperscript{20,23,24} The highest level of unmet need in this study was the domain of healthcare service and information needs, which is consistent with the results of many previous studies.\textsuperscript{23,25-27} It can be attributed to the differences in research setting and context, as well as methodology. People from different countries may have different needs. At present, the distribution of medical resources in China is uneven. Patients are concentrated in tertiary hospitals, and there is a serious shortage of medical staffs, with a relatively large workload and a lack of communication between medical staffs and patients.\textsuperscript{28} Little attention is paid to caregivers. Although clinical departments have adopted methods to provide care-related information to caregivers, due to traditional and cultural factors in China, family members prefer patients to have no idea about their condition, which has a limiting effect on the information medical professionals provide. However, since caregivers still have a strong need for oncology professionals to provide relevant information and educational support, it is necessary for oncology professionals to communicate effectively with caregivers and provide disease-related services and information through appropriate health education methods.

The results of this study showed that the need item “Finding out about financial support and government benefits for you and/or the person with cancer” was the highest rate unmet needs, which is different from the results of many other countries (American, Australia, Germany, England, and Thai).\textsuperscript{10,20,29-33} The families of cancer patients often confront payment burden at the current medical system in China. The relationship between economic burden and needs may not so significant in other countries, such as American, Australia, Germany, and England. These countries have implemented free medical treatment for citizens, which has greatly reduced the financial burden on caregivers. At the same time, a series of policies and regulations have been introduced to address the problems faced by caregivers, offering much needed policy support and legal protection for caregivers, such as statutory sickness pay, incapacity benefits, nursing allowances, carer allowances, and grants for carers,\textsuperscript{32} all of which greatly reduce the financial burden on caregivers and at the same time provide a strong assurance for caregivers to focus on looking after patients. China is a developing country, where government investment in public hospitals is insufficient,
Table 5: Univariate analysis of supportive care needs (independent samples t-test or one-way analysis of variance, \(\bar{x} \pm s\))

| Variable                          | HCIN   | SWN    | CRN    | PEN    |
|-----------------------------------|--------|--------|--------|--------|
| Carers' gender                    |        |        |        |        |
| Male                              | 50.37±14.35 | 30.77±10.16 | 29.85±10.18 | 19.76±7.95 |
| Female                            | 47.66±14.21 | 28.97±9.47  | 29.00±10.04   | 19.14±6.96  |
| t/F                               | 2.009  | 1.932  | 0.893  | 0.872  |
| P                                 | 0.045  | 0.054  | 0.372  | 0.383  |
| Carers' age (years)               |        |        |        |        |
| 18-40                             | 49.13±14.53 | 30.09±10.08  | 29.05±10.10  | 19.46±7.77  |
| 40-50                             | 49.01±15.43 | 30.09±10.67  | 29.86±10.25  | 19.18±7.69  |
| 50-60                             | 51.92±12.13 | 30.94±8.77   | 31.13±10.09  | 20.57±6.70  |
| ≥60                               | 43.91±13.66 | 26.87±8.65   | 27.40±9.73   | 18.07±7.09  |
| t/F                               | 3.091  | 1.776  | 1.565  | 1.177  |
| P                                 | 0.027  | 0.197  | 0.318  |        |
| Carers' education                 |        |        |        |        |
| Primary or below                  | 40.16±14.87 | 28.08±9.74   | 27.68±8.82   | 18.64±6.32  |
| Secondary                         | 47.87±14.17 | 29.09±9.70   | 28.99±10.05  | 19.01±7.53  |
| College and above                 | 51.90±13.82 | 31.26±10.01  | 30.28±10.33  | 20.17±7.60  |
| t/F                               | 9.635  | 3.003  | 1.255  | 1.399  |
| P                                 | 0.000  | 0.051  | 0.286  | 0.248  |
| Self-appraised health status      |        |        |        |        |
| Good                              | 49.57±14.26 | 29.95±10.19  | 29.17±10.21  | 19.26±7.50  |
| Fair                              | 49.73±14.15 | 30.31±9.22   | 29.87±9.42   | 20.13±7.44  |
| Poor                              | 45.42±13.64 | 27.98±8.83   | 28.69±10.83  | 17.95±6.80  |
| Very poor                         | 52.44±21.20 | 37.11±14.53  | 35.89±11.62  | 25.44±10.21 |
| t/F                               | 1.708  | 2.481  | 1.474  | 3.209  |
| P                                 | 0.165  | 0.023  | 0.093  |        |
| Working status                    |        |        |        |        |
| Currently working                 | 52.30±14.45 | 32.51±10.38  | 30.13±10.03  | 20.54±7.87  |
| Currently not working             | 48.11±14.18 | 29.13±9.59   | 29.24±10.14  | 19.14±7.37  |
| t/F                               | 2.647  | 3.098  | 0.794  | 1.683  |
| P                                 | 0.008  | 0.002  | 0.407  | 0.093  |
| Family monthly income per person  |        |        |        |        |
| Lower than expenditure            | 50.31±13.73 | 31.06±9.71   | 30.59±9.93   | 20.38±7.39  |
| The same as expenditure           | 47.78±14.21 | 28.30±9.56   | 27.72±9.88   | 18.07±7.03  |
| Higher than expenditure           | 47.36±16.23 | 28.99±10.57  | 28.65±10.72  | 18.82±8.28  |
| t/F                               | 1.969  | 3.742  | 3.715  | 4.403  |
| P                                 | 0.141  | 0.024  | 0.025  | 0.013  |
| Financial burden of healthcare    |        |        |        |        |
| No significant burden             | 45.47±15.53 | 26.28±9.54   | 26.55±10.60  | 16.77±7.01  |
| Some burden                       | 48.93±14.16 | 29.54±9.95   | 28.92±9.89   | 19.12±7.33  |
| Significant burden                | 50.53±13.97 | 31.61±9.56   | 31.04±9.98   | 20.78±7.61  |
| t/F                               | 2.850  | 7.030  | 5.074  | 7.047  |
| P                                 | 0.059  | 0.001  | 0.007  | 0.001  |
| Daily time spent caregiving (h)   |        |        |        |        |
| <6                                | 50.45±15.33 | 31.82±10.98  | 29.08±11.37  | 20.29±8.98  |
| 6-12                              | 47.69±13.12 | 27.46±8.71   | 27.17±9.65   | 18.03±6.81  |
| ≥12                               | 49.28±14.31 | 30.29±9.93   | 30.03±10.02  | 19.71±7.46  |
| t/F                               | 0.569  | 3.389  | 2.574  | 1.852  |
| P                                 | 0.567  | 0.035  | 0.077  | 0.158  |
| Total time spent caregiving (months)|        |        |        |        |
| <1                                | 47.36±13.66 | 27.75±8.99   | 28.18±9.87   | 17.68±7.19  |
| 1-6                               | 50.25±14.08 | 30.50±10.00  | 29.99±10.03  | 20.01±7.55  |
| 6-12                              | 48.62±14.80 | 29.06±10.27  | 27.68±10.59  | 18.45±7.92  |
| ≥12                               | 48.44±15.58 | 32.12±9.85   | 31.29±9.98   | 21.34±6.83  |
| t/F                               | 1.024  | 3.185  | 2.168  | 4.151  |
| P                                 | 0.382  | 0.024  | 0.091  | 0.006  |

Contd...
the financial guarantee of the medical insurance system is weak, and individual out-of-pocket healthcare expenses are excessively high.\textsuperscript{[28]} Cancer not only increases the direct financial expenditure of families but also affects the ability of caregivers to continue working as before. Caregivers have to opt for unpaid leave, reduced working hours, lower pay jobs, or working from home to meet caregiving requirements.\textsuperscript{[33]} Caregiving commitment also reduces one’s opportunities for employment, further causing loss of income and benefits to family members and aggravating

| Table 5: Contd... |
|-------------------|-----------------|-----------------|-----------------|-----------------|
| Variable          | HCIN            | SWN             | CRN             | PEN             |
| Type of care      |                 |                 |                 |                 |
| Caregiving with assistance | 51.01±13.55    | 30.83±9.77      | 29.95±9.99      | 20.02±7.84      |
| Caregiving alone  | 47.92±14.70     | 29.37±9.91      | 29.14±10.19     | 19.12±7.28      |
| t/F               | 2.277           | 1.529           | 0.822           | 1.237           |
| P                 | 0.023           | 0.127           | 0.412           | 0.217           |
| Previous caregiving experience (yes/no) |                 |                 |                 |                 |
| No                | 50.66±13.26     | 30.58±9.63      | 29.86±9.87      | 19.69±7.30      |
| Yes               | 46.98±15.47     | 29.05±10.15     | 28.89±10.43     | 19.17±7.78      |
| t/F               | 2.708           | 1.623           | 0.996           | 0.724           |
| P                 | 0.007           | 0.105           | 0.320           | 0.470           |
| Caring for others (yes/no) |                 |                 |                 |                 |
| No                | 46.01±14.20     | 27.61±9.24      | 27.42±9.61      | 17.73±6.86      |
| Yes               | 52.18±13.82     | 32.24±9.96      | 31.48±10.21     | 21.20±7.73      |
| t/F               | −4.667          | −5.098          | −4.338          | −5.021          |
| P                 | 0.000           | 0.000           | 0.000           | 0.000           |

| Table 6: Factors influencing of unmet needs (multiple linear regression analysis) |
|-----------------------------|-----------------|-----------------|-----------------|-----------------|
| Dimension                   | Variable        | Unstandardized coefficients | Standardized coefficients | R²  | Cumulative R² | t   | P   |
| Healthcare service and information needs | Constant | 41.848 | 4.353 | 0.128 | 0.120 | 9.613 | 0.000 |
|                             | Caring for others | 5.915 | 1.276 | 0.207 | 0.200 | 4.636 | 0.000 |
|                             | Carers’ education | 4.894 | 1.087 | 0.200 | 0.200 | 4.502 | 0.000 |
|                             | Patient’ KPS score | −3.186 | 0.897 | −0.158 | −0.158 | −3.552 | 0.000 |
|                             | Caregiving experience | −3.577 | 1.288 | −0.123 | −0.123 | −2.776 | 0.000 |
| Social and work needs | Constant | 22.912 | 2.665 | 0.116 | 0.109 | 8.599 | 0.000 |
|                             | Caring for others | 4.335 | 0.884 | 0.220 | 0.220 | 4.904 | 0.000 |
|                             | Financial burden of healthcare | 2.404 | 0.662 | 0.166 | 0.166 | 3.633 | 0.000 |
|                             | Carers’ working status | −4.095 | 1.049 | −0.176 | −0.176 | −3.905 | 0.000 |
|                             | Total caregiving time | 1.025 | 0.463 | 0.100 | 0.100 | 2.217 | 0.027 |
| Communication and relationship needs | Constant | 23.870 | 2.719 | 0.071 | 0.065 | 8.778 | 0.000 |
|                             | Caring for others | 3.599 | 0.931 | 0.178 | 0.178 | 3.866 | 0.000 |
|                             | Financial burden of healthcare | 1.915 | 0.682 | 0.129 | 0.129 | 2.808 | 0.005 |
|                             | Patient’ KPS score | −1.643 | 0.651 | −0.116 | −0.116 | −2.524 | 0.012 |
| Psychological and emotional needs | Constant | 17.040 | 2.391 | 0.125 | 0.115 | 7.127 | 0.000 |
|                             | Caring for others | 3.034 | 0.672 | 0.202 | 0.202 | 4.515 | 0.000 |
|                             | Financial burden of healthcare | 1.670 | 0.501 | 0.151 | 0.151 | 3.331 | 0.001 |
|                             | Patient’ KPS score | −1.767 | 0.476 | −0.168 | −0.168 | −3.711 | 0.000 |
|                             | Total caregiving time | 1.005 | 0.355 | 0.129 | 0.129 | 2.833 | 0.005 |
|                             | Carers’ working status | −2.083 | 0.795 | −0.118 | −0.118 | −2.620 | 0.009 |

HCIN: Healthcare service and information needs; SWN: Social and work needs; CRN: Communication and relationship needs; PEN: Psychological and emotional needs; KPS: Karnofsky performance status

SE: Standard errors; KPS: Karnofsky performance status
The higher the education level of caregivers, the greater the burden of medical costs, the greater the level of unmet need, especially social and work needs and communication and relationship needs, which is consistent with the results of Balle et al. and Cui et al. A study by Girgis et al. found that as the treatment period lengthened, family carers’ expenditure on medical fees gradually increased, and due to the increase in waiting time for diagnosis, their level of unmet financial needs also gradually increased. Therefore, medical staffs should tailor interventions to address the unmet needs of caregivers based on the assessment of their needs.

The study also found that caregivers with a high burden of care experienced a high rate of unmet needs in all dimensions. This included working caregivers, who need to care for other family members, or who have to provide care for long periods, or who have no previous experience of providing care. In addition to their usual work commitment, caregivers who are still working must also manage the patient’s treatment and life in the hospital. They often have to travel between units and have a heavy burden of care, within both the hospital and family. Therefore, clinical medical staffs should give more attention and support to caregivers who are still working, to help them complete the transition of the role smoothly and thus improve the life quality of both the patient and family. Girgis et al. conducted a follow-up survey of caregivers of cancer patients. As the treatment period lengthened, caregiving commitment interfered with the daily activities of caregivers and their unmet needs increased over time. If the caregiver is responsible for many people, not only will this consume a lot of energy and time but extended periods of relatively heavy caregiving commitment will also affect the caregiver’s physical and mental health. Experienced caregivers have caregiving knowledge and skills, as well as the ability to deal with unexpected events that occur in relation to the patient. Caregivers without prior experience, on the other hand, feel that they are not prepared for caregiving or have no confidence in their caregiving ability. Therefore, healthcare workers should pay more attention to caregivers who have no experience in caregiving and help them to actively cope with various difficulties.

**Limitations**

There are many limitations to our research. First, the convenience sampling method which we used may be a source of sampling bias. Second, this study is a cross-sectional study that is specific to a point in time and with no analysis to track the changes in supportive care needs over time. Moreover, the study does not account for any preexisting need that the caregiver had that is totally not dependent on caregiving. Third, although the response rate of the questionnaire survey was high, we cannot rule out potential nonresponse bias. Compared with the patients and caregivers who were surveyed, the supportive care needs of nonresponders may be different. Fourth, the study does not address the relationship between the individual unmet needs and the desired outcomes. This is the problem that our research team needs to solve and the focus of our future research. The study should be replicated to verify whether the results are transferable to other settings.

**Conclusions**

This study found that the level of unmet needs of caregivers in China is higher, while healthcare service and...
information needs and communication and relationship needs are the most prominent areas of caregivers’ unmet needs. Cancer not only has physical and psychosocial effects on patients but also negatively affects caregivers and even the entire family. The caregivers of cancer patients should receive more attention from medical staffs and indeed from other sections of society. We must focus on the physical and mental state, as well as the supportive care needs of caregivers, especially those looking after patients with poor physical function, as well as those caregivers who are highly educated and burdened with medical costs and heavy care commitment. Although our results are derived from data from Xi’an, we hope that the results can be generalized to the other parts of the country. When formulating and implementing interventions for caregivers, full consideration should be given to the unmet needs of caregivers to improve their life quality and thus improve the quality of their caregiving and the life quality of patients.

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Conflicts of interest

There are no conflicts of interest.

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