Supportive Care Needs of Patients With Lung Cancer in Mainland China: A Cross-Sectional Study

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ABSTRACT

Background: The diagnosis and treatment of lung cancer necessitate a variety of supportive care needs. To our knowledge, no studies have been conducted that target specifically the supportive care needs of patients with lung cancer in Mainland China. Cross-cultural studies indicate that supportive care needs vary by cultural background. Thus, it is necessary to investigate the supportive care needs of patients with lung cancer in the cultural context of China.

Purpose: This study aimed to describe the level of supportive care required by patients with lung cancer in China and to examine the relationships between supportive care needs and demographic factors and between supportive care needs and treatment variables.

Methods: A cross-sectional descriptive study design was adopted. Five hundred fifty-four patients with lung cancer were recruited using a convenience sampling method from inpatient departments in four tertiary teaching hospitals that are affiliated with a medical university in Anhui Province, China. The Nursing Professional Social Support Needs Scale and background information list were used as the data collection instruments. A Wilcoxon rank sum test and a Kruskal–Wallis rank sum test were conducted to examine the differences among the professional supportive care needs of patients of different demographic characteristics and under different treatment conditions.

Results: Participants self-reported the highest scores in the domain of informational needs (M = 3.67, interquartile range = 1.25). The most common supportive care need was “to be cared for by nurses with skilled venipuncture techniques.” There were significant differences in needs across different genders, age groups, educational levels, and income levels (p < .05). Patients with metastasis and other illnesses had greater supportive care needs in terms of total and subscale scores in Stages III and IV (p < .05).

Conclusions: Patients with serious diseases and heavy socioeconomic burdens have greater supportive care needs. Therefore, healthcare providers should improve their awareness and expertise to identify the needs of their patients and to provide supportive care to patients with lung cancer. In addition, patients with high supportive care needs should be identified.

Key Words: lung cancer, need, supportive care needs.

Introduction

Lung cancer is the most prevalent form of cancer and the leading cause of cancer death both in China and around the world. About 18.1 million new cases and 9.6 million deaths were reported worldwide in 2018 (Bray et al., 2018). In China in 2015, the estimated incidence and mortality rate for lung cancer were 733.3 and 610.2 per 100,000 population, respectively (Chen et al., 2016). Lung cancer in China is typically diagnosed at a more advanced stage than most other cancers (Shao et al., 2015), and patients are frequently infected with metastatic disease at the time of diagnosis because of nonspecific symptoms and nonappropriate early screening methods (Wang et al., 2015). In addition, lung cancer progresses relatively rapidly, and the prognosis is worse than most other cancers (Shao et al., 2017), with an overall 5-year survival rate of only 18% (Siegel, Miller, & Jemal, 2015). The quality of life of patients with advanced lung cancer is poor (Dai, Yang, Chen, & Tang, 2016), as they generally experience more psychosocial and physical hardships related to their diagnosis and aggressive treatment than patients who are diagnosed with other major cancers (Iyer, Taylor-Stokes, & Roughley, 2013; Liao et al., 2011).

Reflecting the need to face these psychosocial and physical difficulties, prior research findings indicate that patients with lung cancer experience a high level of supportive care needs. Sanders, Bantum, Owen, Thornton, and Stanton (2010) used the Supportive Care Needs Survey Short Form 31 to investigate the supportive care needs of 109 patients with lung cancer, finding the greatest needs in the physical and daily living domains followed by the psychological needs, health system and informational needs, and patient care needs domains.

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(Sanders et al., 2010). A cross-sectional study of 152 patients with lung cancer at a medical center in Taiwan that used the Chinese version of the Cancer Needs Questionnaire found high levels of self-reported supportive care needs, with the highest needs in the three domains of health system and information, psychological, and patient care and support (Liao et al., 2011). Another study that used the Supportive Care Needs Survey Short Form 34 to investigate the supportive care needs of 89 patients with lung cancer identified health system and information, psychological, and physical as the top 3 need domains (Giuliani et al., 2016). These and other studies support the importance of providing humanistic supportive care to patients with lung cancer (Borimnejad, Mardani-Hamooleh, Seyedfatemi, & Tahmasebi, 2017).

Although previous studies indicate that demographic and disease factors influence the supportive care needs of patients, their findings are not consistent. Sanders et al. found no correlation between patient age, gender, marital status, or total score and supportive care needs (Sanders et al., 2010). In a cross-sectional survey of 830 patients with lung cancer, a logistic regression revealed several significant predictors of supportive care needs, including being female, being employed, having fewer family members, having a long period since initial cancer diagnosis, and not receiving chemotherapy (Yun et al., 2013). Liao et al. (2011) found age and educational level to relate significantly to the supportive care needs of a patient, with younger patients having relatively higher psychological needs and patients with higher levels of education having relatively higher physical and daily activities need scores (Liao et al., 2011). Jacobs-Lawson, Schumacher, Hughes, and Arnold (2009) investigated the relationship between educational level and information needs among 100 patients with lung cancer and found that patients with a lower educational level had significantly higher information needs. Li et al. (2017) studied 888 patients with lung, breast, prostate, intestinal, or skin cancer, finding that the advanced-stage patients had relatively higher supportive care needs. Furthermore, Sanson-Fisher et al. (2015) found being informed of the worse disease prognosis to be a predictor of patient psychological needs. Meanwhile, the treatment methods that patients received during the immediately preceding month were found to predict supportive care needs. Compared with patients receiving comprehensive treatment, patients receiving immunotherapy were found to have more health information needs, patients receiving chemotherapy or immunotherapy only were found to have greater sexual needs, and patients receiving surgery or radiotherapy were found to have similar sexual needs (Li & Girgis, 2006).

Supportive care needs are defined as the treatment during an illness that is necessary to manage illness-related symptoms and side effects, to enable adaptation and coping, to optimize understanding and informed decision making, and to minimize decrements in functioning (Richardson, 2003). Understanding the types and the correlation associated with supportive care needs in people diagnosed with lung cancer is an essential step toward providing effective supportive care. Despite clear evidence of the all-around supportive care needs experienced by patients with lung cancer, this population remains a neglected group because of the difficulties faced in recruiting patients and the high attrition rates (Schofield et al., 2008). With regard to China, no research has been published yet that specifically addresses the supportive care needs of patients with lung cancer. Cross-cultural studies indicate that supportive care needs vary with cultural background. Thus, it is necessary to investigate the supportive care needs of patients with lung cancer in China’s cultural context. To identify the supportive care needs of patients, the accuracy of assessment is critical (Richardson, Medina, Brown, & Sitzia, 2007). At present, universal appraisal tools are often used to conduct needs assessments for patients with lung cancer. Patients with different types of cancer have needs in common as well as have needs that are disease specific. However, no instrument is currently available for measuring the specific supportive care needs of patients with lung cancer. Therefore, this study designed the Nursing Professional Social Support Needs Scale (NPSSNS), which includes general and lung-cancer-specific modules (Song, 2015), to assess the supportive care needs of patients with lung cancer.

To address the limitations in the existing research in China, this study aimed to (a) assess supportive care need levels using a questionnaire that has been qualified to assess the needs of patients with lung cancer in the cultural context of China and (b) examine the relationships between supportive care needs and, respectively, demographic factors and treatment variables. On the basis of previous research, it was hypothesized that demographic and disease factors influence patient needs for supportive care. It is hoped that the findings of this study provide a foundation to further explore the supportive care needs of patients with lung cancer and for the clinical selection of nursing interventions in China.

**Methods**

**Design**

A cross-sectional descriptive study design was adopted to assess the level of supportive care needs of patients with lung cancer and to examine the relationships between supportive care needs and demographic factors and treatment variables, respectively.

**Participants and Procedure**

Ethical approval was granted by the Ethical Research Committee, Anhui Medical University (Approval Number 20150328) and the directors of the participating hospitals. The inclusion criteria included (a) a histological diagnosis of lung cancer, including both non-small-cell and small cell lung cancers; (b) currently undergoing treatment; and (c) over 18 years old. To fulfill the aim of this study, patients with mental disorders, cognitive impairments, or other serious, life-threatening diseases were excluded. From June to December 2016, the
research group identified and enrolled eligible patients from five inpatient departments in four tertiary teaching hospitals affiliated with a medical university in Anhui Province, China. After verbal and written information relevant to the research was presented, interested patients submitted their written consent to participate in the study. The questionnaires were reported anonymously and were collected on the spot after checking.

Data Collection

Nursing professional social support needs scale
The NPSSNS, a scale developed previously by the authors, was used to assess supportive care needs. This scale includes a general module and lung-cancer-specific modules (Song, 2015). The general module is a 49-item questionnaire in four domains, including informational needs (e.g., “tell me about my diagnosis,” “tell me if my illness is hereditary”), technical needs (e.g., “to be cared for by nurses with skilled venipuncture techniques,” “being able to help cope with the side effects of different treatments”), psychological needs (e.g., “support in understanding ‘why me?’,” “taking measures to relieve stressful situations”), care coordination and communication needs (e.g., “helping get support from family and friends,” “having the security of knowing a hospital bed is available if needed [acutely]”). The lung-cancer-specific modules cover 10 items (e.g., “teaching me the methods for respiratory function training”). The NPSSNS is scored using a 5-point Likert scale, with 1 = no need and 5 = always need. The final score for each domain is derived from the average score of all of the items in that domain, and the total score for the scale is derived from the average score of all of the scale items. The psychometric properties of NPSSNS were validated previously (Song, 2015). In this study, Cronbach’s alpha values were between .82 and .94 for the four domains of the general module and .86 for the lung-cancer-specific modules.

Background information list
This list included demographic characteristics (gender, age, marital status, education, occupation, income, religious belief, and the means of payment of medical expenses) and disease- and treatment-related factors (cancer metastasis, cancer stage, treatment status, and the presence of other illnesses).

Data Analysis
The data were analyzed using IBM SPSS Statistics 24.0 for Windows (IBM, Armonk, NY, USA). Demographic data and NPSSNS items were analyzed descriptively, and the median, interquartile range (IQR), and percentage were reported respectively after checking the normality of the data. Because the data were nonnormally distributed, a Wilcoxon rank sum test and a Kruskal–Wallis rank sum test were conducted to examine the differences in supportive care needs among patients with different demographic characteristics and treatment variables.

Results

Sample Characteristics
Of 585 eligible patients, 575 agreed to participate in this study and 554 completed the questionnaires (effective response rate: 96.35%). The primary reasons for not completing the questionnaires were being physically unwell and the requirement to undergo a physical examination. The age of the participants ranged from 28 to 88 years, with a median age of 62 (IQR = 14) years. Nearly three quarters of participants (n = 407, 73.47%) were men, 535 (96.57%) were married, most (73.82%) were educated to the junior high school level or less, and 341 (61.55%) were employed. Only 47 (8.48%) participants held religious beliefs.

Nearly two thirds of the participants (60.83%) had metastasis, most (45.85%) were in Stage IV, and 460 (83.03%) were receiving chemotherapy. The demographic information and disease-related characteristics are presented in Table 1.

Supportive Care Needs
The overall score for supportive care needs was 3.19 (IQR = 1.10), the score for the lung-cancer-specific modules was 2.80 (IQR = 1.53), and the scores in the four subdomains ranged from 2.77 (IQR = 1.78) to 3.67 (SD = 0.76). The greatest need was identified in the “informational needs” domain (M = 3.67, IQR = 1.25), followed by the “technical needs” domain (M = 3.55, IQR = 1.00). The distribution of supportive care needs is presented in Table 2.

In the “informational needs” domain, the greatest need was “being informed whether my treatment was effective,” with only 31 (5.60%) participants reporting “no need” for this item. In addition, participants reported a high level of need for “letting me know the signs of recurrence,” with 455 participants (82.13%) reporting “sometimes need” or greater. In the “technical needs” domain, the greatest need was “to be cared for by nurses with skilled venipuncture techniques,” with nearly all (93.50%) reporting “sometimes need” or greater, and the second highest need was “telling me the methods to protect my veins,” with half (50.50%) reporting “always need.” In the lung-cancer-specific modules, the greatest self-reported need was “teaching me the methods for respiratory function training.” The psychological needs domain earned the lowest score (M = 2.77, IQR = 1.78), with “being treated like a human instead of just another case” as the highest scored item in this domain. In the care coordination and communication needs domain, 493 participants (88.99%) responded with “sometimes need” or greater for the item “being allowed to have family or friends with me in hospital.” The ranking of the Top 10 supportive care needs for the participants is presented in Table 3.
Relationship Between Supportive Care Needs and Demographic Factors

The female participants had more needs than their male peers ($Z = -2.590$, $p < .05$) in the domains of technical needs ($Z = -2.489$, $p < .05$), psychological needs ($Z = -4.097$, $p < .01$), and care coordination and communication needs ($Z = -2.052$, $p < .05$). In terms of age, participants who were <40 years old earned relatively higher scores in the lung-cancer-specific modules ($w^2 = 8.594$, $p < .05$), whereas those 41–65 years old reported higher levels of informational needs ($w^2 = 8.459$, $p < .05$). Participants with a college degree or higher reported higher levels of psychological needs ($w^2 = 10.122$, $p < .05$). In terms of monthly income, the 249 participants (44.96%) reporting earning 1,000–2,999 RMB/month reported a higher overall level of supportive care needs ($w^2 = 12.243$, $p < .05$), especially in the domains of psychological needs ($w^2 = 10.738$, $p < .05$) and care coordination and communication needs ($w^2 = 13.160$, $p < .05$). However, participants who reported earning 500–999 RMB/month reported a higher level of needs in the lung-cancer-specific modules ($w^2 = 13.918$, $p < .01$). The relationships between supportive care needs and demographic factors are presented in Table 4.

Relationship Between Supportive Care Needs and Treatment Variables

Participants who had metastasis had more needs in total ($Z = -2.424$, $p < .05$), more informational needs ($Z = -2.087$, $p < .05$), more technical needs ($Z = -2.584$, $p < .05$), more psychological needs ($Z = -2.019$, $p < .05$), and more care coordination and communication needs ($Z = -2.052$, $p < .05$). In terms of age, participants who were <40 years old earned relatively higher scores in the lung-cancer-specific modules ($\chi^2 = 8.594$, $p < .05$), whereas those 41–65 years old reported higher levels of informational needs ($\chi^2 = 8.459$, $p < .05$). Participants with a college degree or higher reported higher levels of psychological needs ($\chi^2 = 10.122$, $p < .05$). In terms of monthly income, the 249 participants (44.96%) reporting earning 1,000–2,999 RMB/month reported a higher overall level of supportive care needs ($\chi^2 = 12.243$, $p < .05$), especially in the domains of psychological needs ($\chi^2 = 10.738$, $p < .05$) and care coordination and communication needs ($\chi^2 = 13.160$, $p < .05$). However, participants who reported earning 500–999 RMB/month reported a higher level of needs in the lung-cancer-specific modules ($\chi^2 = 13.918$, $p < .01$). The relationships between supportive care needs and demographic factors are presented in Table 4.
Meanwhile, participants in Stage IV had more needs in total ($\chi^2 = 14.128, p < .01$), in the lung-cancer-specific modules ($\chi^2 = 12.957, p < .05$), and in the technical needs domain ($\chi^2 = 10.901, p < .05$). The relationships between supportive care needs and treatment variables are presented in Table 5.

### Discussion

#### Supportive Care Needs

Consistent with prior research (Liao et al., 2011; Sanders et al., 2010; Yun et al., 2013), the participants in this study reported high levels of informational needs. The strongest informational need identified in this study was “being informed whether my treatment was working.” In terms of age group, the middle-aged group reported the highest level of informational needs. This may be explained by the greater family responsibilities and expectations that are shouldered by middle-aged people in China, which makes them relatively more interested in being informed about the effectiveness of treatments. Moreover, having a high reported need for “letting me know the signs of recurrence” and fear of cancer recurrence have been associated with unmet supportive care needs (Sarkar et al., 2015). Therefore, clinical workers should provide information on disease progression and the effect of treatment to reduce the unmet supportive care needs of patients with lung cancer.

The second most frequently reported needs among patients were in the technical needs domain, where the Top 2 technical needs were “to be cared for by nurses with skilled venipuncture techniques” and “telling me the methods to protect my veins.” This may reflect the fact that all of the participants were receiving treatment at tertiary teaching hospitals, which, in China, have many student nurses who are more likely to perform venipunctures improperly (Huang, Wu, Huang, Lu, & Wu, 2017) as well as the fact that over 80% of the participants had received chemotherapy, which is known to cause poor vascular conditions. Therefore, measures should be taken to improve the rate of venipuncture success to relieve patient pain.

The finding that the psychological needs domain earned the lowest score of all of the domains was an unexpected deviation from prior studies (Giuliani et al., 2016; Liao et al., 2011). Unwillingness to address psychological needs may reflect prevailing cultural norms (Lam, Fabrizio, Ho, Chan, & Fielding, 2009). Moreover, the findings of prior studies indicate that the prevalence of supportive care needs differs across cultures (Lam et al., 2011). A systematic review of the supportive care needs of patients with breast cancer showed that Chinese women reported more informational needs and fewer psychological needs than Western women (Fiszer, Dolbeault, Sultan, & Brédart A, 2014). This phenomenon may be because Chinese patients are more willing to share their concerns with family members. We found that most participants (88.99%) reported “sometimes need” or greater for the item “being allowed to have family or friends with me in hospital.” The average nurse–bed ratio is 0.63:1 in Chinese tertiary hospitals (Xu, Wu, Zhang, Ma, & Li, 2016). Thus, most patients likely believe that nurses are very busy, with little time to address patient psychological needs, making these patients unwilling to report their psychological needs to nurses. Moreover, some nurses have reported that lack of sufficient time and the task-oriented nature of their nursing work prevent their providing psychosocial care (Chen et al., 2017). In addition, prior studies indicate that most doctors do not deem psychosocial care as their responsibility (Lam et al., 2009).

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**TABLE 3.**

**Rank of Top 10 Supportive Care Needs Among Participants (N = 554)**

| Rank | Supportive Care Need                                                                 | n   | %     | Domain                      |
|------|--------------------------------------------------------------------------------------|-----|-------|-----------------------------|
| 1    | To be cared for by nurses with skilled venipuncture techniques                      | 518 | 93.50 | Technical needs             |
| 2    | Telling me the methods to protect my veins                                            | 501 | 90.43 | Technical needs             |
| 3    | Maintain a comfortable environment and tidy beds in the ward                        | 497 | 89.71 | Technical needs             |
| 4    | Receiving prompt nursing care                                                        | 493 | 88.99 | Technical needs             |
| 5    | Being informed whether my treatment was effective                                     | 493 | 88.99 | Care coordination and communication needs |
| 6    | Having the security of knowing a hospital bed is available if needed (acutely)        | 467 | 84.30 | Informational needs         |
| 7    | Help patient make the next doctor appointment or test                                | 463 | 83.57 | Care coordination and communication needs |
| 8    | Teaching me the methods for respiratory function training                             | 461 | 83.22 | Lung-cancer-specific modules |
| 9    | Letting me know the signs of recurrence                                              | 455 | 82.13 | Informational needs         |
### TABLE 4.
Relationship Between Supportive Care Needs and Demographic Factors (N = 554, Mean Rank)

| Variable                          | IN  | TN  | PN  | CCACN | LCSM | Total |
|-----------------------------------|-----|-----|-----|-------|------|-------|
| **Gender**                        |     |     |     |       |      |       |
| Female                            | 278.44 | 305.64 | 323.85 | 300.71 | 293.47 | 306.81 |
| Male                              | 277.16 | 267.34 | 260.76 | 269.12 | 271.73 | 266.91 |
| **Z**                             | −0.083 | −2.489* | −4.097** | −2.052* | −1.412 | −2.590* |
| **Age (years)**                   |     |     |     |       |      |       |
| ≤ 40                              | 202.82 | 321.41 | 334.27 | 292.41 | 294.23 | 281.86 |
| 41–65                             | 291.17 | 280.44 | 283.56 | 283.56 | 291.58 | 287.96 |
| ≥ 66                              | 255.69 | 269.27 | 264.98 | 264.98 | 249.48 | 257.16 |
| **χ²**                            | 8.459* | 1.442 | 3.762 | 1.747 | 8.594* | 4.538 |
| **Marital status**                |     |     |     |       |      |       |
| Unmarried                         | 496.00 | 424.50 | 235.75 | 154.75 | 409.25 | 350.00 |
| Married                           | 276.86 | 278.28 | 277.46 | 278.90 | 277.72 | 277.93 |
| Widowed or divorced               | 27.88  | 247.91 | 283.62 | 247.91 | 254.94 | 255.32 |
| **χ²**                            | 3.760 | 2.859 | 0.161 | 1.799 | 1.696 | 0.741 |
| **Education**                     |     |     |     |       |      |       |
| Elementary school                 | 255.95 | 274.18 | 263.99 | 264.04 | 270.64 | 264.01 |
| Junior high school                | 283.21 | 268.14 | 268.12 | 273.46 | 286.44 | 274.88 |
| Senior high school                | 307.14 | 290.34 | 294.44 | 306.63 | 285.73 | 300.60 |
| College or above                  | 299.42 | 299.69 | 329.98 | 299.69 | 265.82 | 303.18 |
| **χ²**                            | 0.823* | 2.493 | 10.122* | 5.613 | 1.548 | 4.987 |
| **Religious beliefs**             |     |     |     |       |      |       |
| No                                | 276.03 | 275.81 | 274.58 | 278.23 | 277.76 | 276.05 |
| Yes                               | 293.35 | 295.69 | 308.99 | 269.61 | 274.67 | 293.15 |
| **Z**                             | −0.710 | −0.815 | −1.410 | −0.354 | −0.127 | −0.701 |
| **Mode of paying medical expenses**|     |     |     |       |      |       |
| Self-payment                      | 295.00 | 291.42 | 290.25 | 306.02 | 316.48 | 306.08 |
| Free medical care                 | 222.45 | 340.06 | 298.15 | 281.15 | 248.25 | 281.30 |
| Medicare                          | 280.32 | 289.89 | 297.89 | 283.52 | 272.94 | 286.27 |
| New rural cooperative medical system | 276.27 | 266.41 | 262.51 | 271.58 | 278.98 | 269.75 |
| **χ²**                            | 1.507 | 4.449 | 6.452 | 1.369 | 1.718 | 2.009 |
| **Residence**                     |     |     |     |       |      |       |
| Urban                             | 279.43 | 267.88 | 292.87 | 276.43 | 257.91 | 275.29 |
| County                            | 308.43 | 314.93 | 315.40 | 324.55 | 302.70 | 318.50 |
| Town                              | 274.47 | 293.51 | 265.23 | 271.10 | 296.29 | 280.19 |
| Countryside                       | 271.35 | 270.26 | 266.03 | 270.64 | 276.77 | 269.76 |
| **χ²**                            | 2.519 | 4.895 | 6.273 | 5.408 | 4.557 | 4.313 |
| **Occupation**                    |     |     |     |       |      |       |
| Employed                          | 287.06 | 287.09 | 284.48 | 288.05 | 292.74 | 292.74 |
| Unemployed                        | 247.34 | 254.96 | 246.93 | 255.01 | 255.01 | 259.44 |
| Retired                           | 269.61 | 265.74 | 276.04 | 263.41 | 263.41 | 249.94 |
| **χ²**                            | 4.087 | 3.403 | 3.251 | 3.985 | 8.215* | 4.891 |
| **Income (RMB)**                  |     |     |     |       |      |       |
| ≥ 5,000                           | 222.03 | 286.14 | 238.41 | 211.34 | 211.79 | 217.96 |
| 3,000–4,999                       | 265.35 | 267.72 | 245.54 | 253.55 | 249.03 | 249.94 |
| 1,000–2,999                       | 286.09 | 291.72 | 295.19 | 298.13 | 293.52 | 295.81 |
| 500–999                           | 295.99 | 281.03 | 273.87 | 286.16 | 302.65 | 291.22 |
| ≤ 499                             | 279.25 | 243.13 | 291.42 | 272.71 | 280.60 | 278.45 |
| **χ²**                            | 6.491 | 6.396 | 10.738* | 13.160* | 13.918** | 12.243* |

Note. IN = informational needs; TN = technical needs; PN = psychological needs; CCACN = care coordination and communication needs; LCSM = lung-cancer-specific modules.

*p < .05. **p < .01.
Relationship Between Supportive Care Needs and Demographic Factors

This study found a significant difference in supportive care needs across genders, age groups, educational levels, and income levels. Consistent with previous research (Fitch & Steele, 2010), the female participants in this study reported having more needs than their male peers in terms of both total needs and the several NPSSNS subscales. Across the disease trajectory of lung cancer, female patients typically have more worries and face a higher incidence of psychological problems (Hill, Amir, Muers, Connolly, & Round, 2003; Sarna et al., 2006), especially in the realm of handling family tasks and self-care. This may relate to the role that women play in the home. However, Sanders et al. (2010) and Liao et al. (2011) found no significant difference in supportive care needs across genders. The different instruments used in these studies and the heterogeneity of samples may explain the differences in their findings. Sanders et al. indicated that age may not be a predictor of the supportive care needs of patients with lung cancer (Sanders et al., 2010). However, consistent with previous studies (Graves et al., 2007; Li & Girgis, 2006), this study found that participants below 40 years old had higher supportive care needs in certain dimensions. This may result from younger patients being more comfortable in expressing their needs (Sanson-Fisher et al., 2015). Therefore, clinical staff should meet the supportive care needs of their younger patients with lung cancer in a timely manner and should encourage older patients to express their needs (Liao et al., 2011). In this study, the participants holding a college degree or higher reported having higher psychological needs. This finding echoes the finding of prior studies that higher levels of education correlate with higher supportive care needs (Engelman et al., 2005; Squiers, Finney Rutten, Treiman, Bright, & Hesse, 2005; Wong et al., 2000). Receiving a diagnosis of lung cancer saddles some patients with a huge, new financial burden (Li et al., 2017). Yun et al. (2013) found that patients with lung cancer earning a monthly income of less than $2,000 faced significantly higher financial burdens. Similarly, this study found that participants with lower monthly incomes had higher supportive care needs in terms of both NPSSNS total and subscale scores. However, no significant difference in supportive care needs was found across marital statuses, which differed from previous research (Yun et al., 2013). The main reason for this inconsistency may be the very high percentage (96.57%) of participants in this study who were married.

### Relationship Between Supportive Care Needs and Treatment Variables

In this study, the participants with metastasis and other illnesses reported higher total and subscale needs in Stages III and IV. This finding is similar to previous studies, which found that patients with advanced lung cancer had more supportive care needs (Li & Girgis, 2006; Sanders et al., 2010). The findings related to treatment variables are as follows:

| Variable                  | IN     | TN     | PN     | CCACN  | LCSM   | Total  |
|---------------------------|--------|--------|--------|--------|--------|--------|
| **Cancer metastasis**     |        |        |        |        |        |        |
| Yes                       | 288.89 | 291.59 | 289.01 | 288.41 | 285.86 | 290.73 |
| No                        | 259.82 | 255.62 | 259.63 | 260.56 | 264.51 | 256.95 |
| Z                         | −2.087*| −2.584*| −2.109*| −2.000*| −1.533 | −2.424*|
| **With other illnesses**  |        |        |        |        |        |        |
| Yes                       | 285.39 | 286.36 | 284.46 | 290.76 | 289.16 | 289.17 |
| No                        | 266.14 | 264.73 | 267.48 | 258.41 | 260.70 | 260.68 |
| Z                         | −1.392 | −1.566 | −1.228 | −2.340*| −2.060 | −2.060*|
| **Cancer stage**          |        |        |        |        |        |        |
| I                         | 207.99 | 251.65 | 237.44 | 234.48 | 239.18 | 224.81 |
| II                        | 289.44 | 279.69 | 266.22 | 278.29 | 288.73 | 279.50 |
| III                       | 295.21 | 262.85 | 284.60 | 294.86 | 287.78 | 288.19 |
| IV                        | 290.36 | 299.07 | 286.07 | 287.15 | 289.61 | 292.59 |
| Unclear                   | 222.37 | 234.19 | 268.78 | 224.84 | 215.50 | 224.46 |
| $\chi^2$                  | 19.545**| 10.901*| 4.697  | 11.874*| 12.957*| 14.128**|
| **Treated with chemotherapy** |        |        |        |        |        |        |
| Yes                       | 280.73 | 276.06 | 279.18 | 278.85 | 272.37 | 278.24 |
| No                        | 261.70 | 284.53 | 269.28 | 270.90 | 302.61 | 273.24 |
| Z                         | −1.051 | −0.467 | −0.547 | −0.439 | −1.670 | −0.242 |

Note. IN = informational needs; TN = technical needs; PN = psychological needs; CCACN = care coordination and communication needs; LCSM = lung-cancer-specific modules.

* $p < .05$, ** $p < .01$. 

**TABLE 5.**

Relationship Between Supportive Care Needs and Treatment Variables (N = 554, Mean Rank)
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Limitations
Although results from this study provide important information for the supportive care needs of patients with lung cancer, several limitations should be taken into consideration when interpreting the data. First, this was a cross-sectional study that was not able to detect changes in supportive care needs over time. Second, the participants in this study were all being cared for in tertiary teaching hospitals. The fees and technologies applied in these hospitals may differ from hospitals of other levels, which may affect the supportive care needs of patients. Finally, to alleviate the burden of completing the questionnaires, this study only discussed the relationships between supportive care needs and demographic factors and treatment variables, respectively. However, psychosocial factors may also affect the supportive care needs of patients with lung cancer, which is an issue that should be explored in future studies.

Conclusions
Patients with lung cancer have many supportive care needs, with these needs particularly acute in the domains of informational needs and technical needs. Patients with other concurrent and serious diseases (e.g., other illnesses, metastasis) and those with high socioeconomic burdens (e.g., female, lower income levels) experience higher levels of supportive care needs. The results of this study support the hypothesis that demographic and disease-related factors influence the need for supportive care in patients with lung cancer. However, this study found that marital status, religious beliefs, and mode of medical expense payment do not significantly influence the need for supportive care.

Relevance to Clinical Practice
The results provide a basis for understanding the supportive care needs of patients with lung cancer in China. First, nurses should strengthen their awareness and expertise to effectively identify the needs of patients and provide supportive care to patients with lung cancer. Second, patients in categories that are known to have supportive care needs should be identified. Finally, culturally tailored interventions should be developed to target the supportive care needs of patients with lung cancer in China.

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