



# Nutritional Management of Lung Cancer Patients Undergoing Chemotherapy: A Qualitative Exploration of Patients' and Healthcare Professionals' Perspectives

Huan Rong<sup>a,b</sup>, Fangyi Li<sup>a,#</sup>, Chunmei Liu<sup>c</sup>, Linyu Zhou<sup>a</sup>, Hongyue Zhong<sup>a</sup>, Li Li<sup>a</sup>, Tian Xiao<sup>a</sup>, Ruihan Xiao<sup>a</sup>, Xiaoju Chen<sup>a,\*</sup>

<sup>a</sup> School of Nursing, Chengdu Medical College, Sichuan, Chengdu, China

<sup>b</sup> Chongqing Key Laboratory of Translational Research for Cancer Metastasis and Individualized Treatment, Chongqing University Cancer Hospital, Chongqing, China

<sup>c</sup> Chengdu Seventh People's Hospital, Sichuan, Chengdu, China

## ARTICLE INFO

### Key Words:

Lung cancer  
Chemotherapy  
Nutritional management  
Healthcare professionals  
Qualitative study

## ABSTRACT

**Objectives:** To describe the experiences of lung cancer patients undergoing chemotherapy in nutrition management and the problems in the process of implementing nutrition management for patients by healthcare professionals.

**Methods:** This is a qualitative descriptive study. Qualitative data were collected through semistructured interviews with lung cancer patients undergoing chemotherapy ( $N = 16$ ) and healthcare professionals ( $N = 24$ ) from the oncology department at three tertiary grade A hospitals.

**Results:** Three themes emerged from the patients' interviews: deficiency in nutritional management capabilities; barriers to implementing nutritional management; incentives to implementing nutritional management. Five themes emerged from the healthcare professionals' interviews: insufficient attention to nutritional management of lung cancer patients undergoing chemotherapy; lack of standardization in nutritional management; inadequate support for nutritional management; weak multidisciplinary awareness; poor compliance from patients and their families.

**Conclusions:** The nutritional management of lung cancer patients undergoing chemotherapy is a complicated and vital process that requires the joint efforts of healthcare professionals and patients. Formulating corresponding strategies from multiple perspectives is suggested to provide targeted nutritional guidance for patients.

**Implication for Nursing Practice:** This study can help nurses better understand the nutritional management needs and challenges of patients to provide individualized nutritional guidance to patients. Meanwhile, the study also found the existing problems of nutrition management in clinical work, which can help nurses to reflect on and better participate in the nutrition management of patients.

© 2024 Elsevier Inc. All rights are reserved, including those for text and data mining, AI training, and similar technologies.

## Introduction

Lung cancer stands as one of the predominant malignant tumors worldwide. According to the most recent global cancer burden data from 2022, there were approximately 2.48 million new lung cancer cases and 1.81 million associated deaths, placing lung cancer at the top of the list in terms of both incidence and mortality.<sup>1</sup> Chemotherapy serves as a crucial treatment option for lung cancer.<sup>2</sup> The

digestive side effects of cytotoxic drugs, including nausea, vomiting, loss of appetite, altered taste, and diarrhea, can greatly reduce the absorption of nutrients.<sup>3,4</sup> This can result in malnutrition or the patient's nutritional status worsening. Research indicates that the prevalence of malnutrition among lung cancer patients ranges from 24% to 55.4%, with malnourished patients exhibiting a poorer overall survival rate.<sup>5–8</sup> Moreover, malnutrition is linked to a reduced quality of life in lung cancer patients and serves as an independent factor for poor prognosis.<sup>9</sup> Therefore, maintaining optimal nutritional status is imperative for enhancing survival outcomes, treatment tolerance, and quality of life in lung cancer patients undergoing chemotherapy.

Nutrition management is the whole process of nutrition risk screening and assessment, nutrition diagnosis, nutrition planning,

\* Address correspondence to: Xiaoju Chen, School of Nursing, Chengdu Medical College, Sichuan No. 601, Tianhui Rd, Rongdu St, Sichuan 610083, China.

E-mail address: [chenxiaoju@cmc.edu.cn](mailto:chenxiaoju@cmc.edu.cn) (X. Chen).

# Fangyi Li contributed equally to this work and is co-first author.

## Layperson Summary

### What we investigated and why

Malnutrition is a major health concern among lung cancer patients undergoing chemotherapy. Healthcare professionals play an integral role in cancer nutritional support and care. Based on this, this study investigated the experiences of lung cancer patients undergoing chemotherapy in terms of self-management of nutrition and the problems in the process of implementing nutrition management for patients by healthcare professionals.

### How we did our research

We conducted in-depth face-to-face interviews with lung cancer patients undergoing chemotherapy, nurses, and doctors from the oncology department at three tertiary grade A hospitals.

### What we have found

The heavy burden of symptoms, the hopelessness for recovery, the challenge in accessing authoritative information, and so on are the hindrance factors affecting the nutritional management of patients; the support of family/patients/healthcare professionals, personal motivation for rehabilitation, family responsibilities are the promoting factors. There are some problems in the process of nutrition management for patients by healthcare professionals: such as insufficient attention; lack of standardization; weak multidisciplinary awareness.

### What it means

The incidence of malnutrition in lung cancer patients undergoing chemotherapy is high, and the nutritional support of patients faces many challenges. Guided by this clinical question, this study discusses the practical problems in the nutritional management of patients from the perspective of patients and healthcare professionals. The findings of patients will enhance nurses' understanding of the unique nutritional needs of these patients. The findings of healthcare professionals will inform the development of tailored improvement strategies for nursing practice.

Doctors and nurses can not only administer nutrition to patients but also promote nutrition-related health behaviors by guiding patients' families.<sup>15</sup> At present, most studies on tumor nutrition focus on patients with digestive system tumors and head and neck tumors,<sup>16,17</sup> and there are few studies on the nutritional support experience of lung cancer patients, especially patients with lung cancer undergoing chemotherapy. Healthcare professionals play a crucial role in providing comprehensive nutritional support and care for cancer patients.<sup>18</sup> However, the majority of studies have primarily focused on understanding nutrition management solely from the patient's perspective, with limited research exploring the viewpoints of healthcare professionals regarding nutritional management specifically for lung cancer patients undergoing chemotherapy.

In this study, we aimed to comprehensively understand the experiences of lung cancer chemotherapy patients in nutrition management and the problems existing in the implementation of nutrition management by healthcare professionals. The findings from this study are expected to contribute to identifying the existing problems in the current nutrition management model and provide a reference for developing nutrition management schemes that align with clinical practice needs. The results of this study will also facilitate multidisciplinary collaboration to provide more comprehensive and personalized nutritional guidance to patients.

## Research Questions

1. What are the experiences of lung cancer patients undergoing chemotherapy for nutrition management?
2. What are the problems in the process of implementing nutrition management for patients by healthcare professionals?

## Methods

*Design:* A qualitative descriptive study<sup>19</sup> was performed from July to October 2021 across three tertiary grade A hospitals in Western China. Semistructured, in-depth interviews were conducted by the first author with lung cancer patients undergoing chemotherapy, nurses, and doctors from the oncology department at the three hospitals. This study followed the Consolidated Criteria for Reporting Qualitative Research (COREQ) guideline.<sup>19</sup>

*Participants:* Participants were recruited through purposive sampling methods, spanning from July to October 2021, across three tertiary grade A hospitals in Western China. The inclusion criteria for the patient participants were as follows: (1) Diagnosis of lung cancer through histopathological and imaging techniques; (2) the patient knows their disease condition; (3) undergoing chemotherapy treatments; (4) capability to communicate effectively; (5) voluntary participation in the study with provided informed consent. The exclusion criteria for patients were: (1) Aged below 18 years; (2) presence of any mental illness. For the healthcare professionals participants, the inclusion criteria included: (1) Doctors or nurses with a minimum of 5 years of professional experience in oncology; (2) voluntary participation in the study. However, refresher doctors or nurses who make short visits to observe and study were not considered for this study. The determination of the study's sample size adhered to the principle of information saturation. Before data collection, the researchers explained the concept of nutrition management to the participants and explained the purpose, significance, and process of the interview.

*Data collection:* A topic guide was created, informed by literature and knowledge from experts. This was iteratively modified to reflect the research objective. Two pilot interviews were conducted with participants to verify the content and meaning of the topic guide. All the researchers participating in this study had received training in

and nutrition treatment carried out by healthcare professionals on the objects under management.<sup>10</sup> Active nutritional management is crucial for improving the treatment outcomes and prognosis of lung cancer patients undergoing chemotherapy. A study by Kiss showed that intensive nutritional interventions can prevent weight loss in lung cancer patients and enhance their satisfaction with nutritional care and quality of life.<sup>11</sup> Additionally, Porro's study has highlighted the potential role of nutrition in the onset and progression of lung cancer, suggesting that nutrition could serve as a novel strategy in lung cancer treatment.<sup>12</sup> Therefore, understanding the barriers to meeting nutritional needs is crucial. This knowledge can aid in supporting lung cancer patients undergoing chemotherapy and in developing interventions to enhance nutrition and quality of life within this demographic.

Due to the shortage of clinical dietitians, doctors and nurses take on a primary role in clinical work, directly interacting with patients and contributing significantly to their nutrition education and management.<sup>13</sup> German author Kroner pointed out in the study that the participation of doctors and nurses in nutrition management can effectively reduce the proportion of cancer inpatient weight loss.<sup>14</sup>

qualitative research. From July to October 2021, the first author conducted face-to-face semistructured interviews. Audio recordings were conducted only after obtaining explicit permission from each participant. The duration of each interview ranged from 30 to 40 minutes. Participants' gestures and other nonverbal communication were observed and recorded during the interviews. Subsequently, two researchers transcribed each interview verbatim within 24 hours. Interviews were conducted until data saturation. No interviews were repeated. The interview outline mainly includes the following questions (Table 1).

**Data analysis:** NVivo11.0 was used to organize all transcripts, and Colaizzi's seven-step analysis method was applied to the analysis.<sup>20</sup> First, recordings of each interview were carefully reviewed multiple times to grasp the participants' meanings and emotions. Second, important quotes from each transcript that discussed the experience of nutritional management were extracted. Third, meanings were formulated and coded based on these significant statements. Fourth, the codes were grouped into categories, themes, and subthemes. Next, transcriptions, themes, and subthemes were compared multiple times to confirm findings and identify the differences. Then, the theme and intrinsic of the participants' experience were described using their own words in complete detail. Lastly, each transcript and result were returned to the participants to affirm the findings.

## Results

Sixteen lung cancer patients undergoing chemotherapy, 15 nurses, and nine doctors participated in the study. The sample characteristics are detailed in Tables 2 and 3.

### The Experiences and Needs of Nutritional Management for Patients

#### Theme 1: deficiency in nutritional management capabilities

*The relationship between nutrition and chemotherapy is poorly understood*

While the majority of patients acknowledged the significance of nutrition for their overall health, a substantial portion of them remained uninformed about the intricate relationship between nutrition and chemotherapy. Some patients either resisted engaging in nutritional support or perceived a decline in their nutritional status as a typical side effect of the chemotherapy treatment. This lack of awareness resulted in a diminished sense of initiative and enthusiasm toward managing their nutrition, as they could not fully grasp their body's energy requirements and the transformation required in their roles as patients. Furthermore, there were instances where patients harbored misconceptions, believing that nutritional supplementation could potentially diminish the effectiveness of the chemotherapy treatment.

*"I just think that (nutritional support) isn't necessary, and losing weight is an indication that the chemotherapy is working."(P6); "I refuse to have a tube inserted for nutritional supplementation, even if it costs me my life."(P16); "Chemotherapy is supposed to kill cancer*

**Table 2**  
General Information of the Patients (n = 16)

No.	Gender	Age (y)	Education	Residence	Number of chemotherapy
P1	Female	59	Primary school	Rural	2
P2	Male	70	Junior high school	Urban	11
P3	Male	61	High school	Urban	2
P4	Female	55	University	Urban	4
P5	Female	57	Junior high school	Rural	21
P6	Male	57	Primary school	Rural	3
P7	Male	42	High school	Urban	1
P8	Male	64	Junior high school	Urban	7
P9	Female	72	None	Rural	8
P10	Male	62	Junior high school	Rural	3
P11	Male	65	High school	Urban	4
P12	Male	59	Primary school	Rural	9
P13	Male	66	Primary school	Rural	5
P14	Male	44	University	Urban	5
P15	Male	58	High school	Urban	8
P16	Male	56	Junior high school	Rural	7

*cells, and I am worried that too much nutritional supplementation will make cancer cells grow faster, affecting the effectiveness of the chemotherapy."(P11)*

#### Lack of nutritional management skills

Many reported that their primary method of boosting nutrition was "drinking soup," acknowledging the need for improved nutrition but admitting to being unsure of where to start and feeling somewhat in the dark about it. Most of the patients tended to assess their nutritional status based on "weight loss" and "fatigue."

*"I drank soup every day at home after discharge... I drank so much that I had foam at the corners of my mouth. We are just as blind, we don't know how to nourish ourselves, is it nutritious to drink soup like this every day?"(P7); "If my legs are weak, and I can't stand up, that means my nutrition isn't good."(P1); "They mainly look at the weight... I lost 10 pounds lighter before and after."(P8)*

#### Theme 2: barriers to implementing nutritional management

##### The heavy burden of nutrition impact symptoms

During chemotherapy, patients often experience a range of uncomfortable symptoms, including mouth ulcers, dry mouth, constipation, anorexia, nausea, vomiting, and loss of appetite. These symptoms are collectively referred to as nutritional impact symptoms,<sup>21</sup> which can significantly affect a patient's ability to eat and maintain proper nutrition. This study observed that patients experienced a substantial burden due to nutritional impact symptoms, impacting their nutritional intake and often leading to negative emotions. This made it challenging for them to implement nutritional management strategies effectively.

*"After chemotherapy, I get mouth ulcers, and my throat becomes sore, making it impossible for me to eat. My white blood cell count drops again, and I have to spend every day lying down for infusion. It's very frustrating."(P2); "I have a tumor compressing my*

**Table 1**  
List of Interview Questions for Patients and Healthcare Professionals

Patients	Healthcare professionals
1. Can you describe your nutritional status following chemotherapy?	Could you please share your knowledge and understanding of nutritional management for cancer patients?
2. Have your diet and nutritional habits changed since starting chemotherapy? How have you responded to these changes?	How is nutritional management for lung cancer patients undergoing chemotherapy currently conducted in the clinic?
3. What factors do you believe influence your approach to nutrition management?	In your opinion, what do you believe nutrition management encompasses for lung cancer patients undergoing chemotherapy?
4. Can you share your feelings and experiences regarding nutritional management during your chemotherapy treatment?	What do you perceive as the barriers to effective nutritional management for lung cancer patients undergoing chemotherapy?

**Table 3**  
General Information of the Healthcare Professionals (n = 24)

No.	Gender	Age (y)	Education	Professional title	Years working in oncology (y)
N1	Female	34	Junior college	Supervisor nurse	12
N2	Female	42	Undergraduate	Co-chief nurse	22
N3	Female	35	Junior college	Supervisor nurse	14
N4	Female	37	Undergraduate	Co-chief nurse	16
N5	Female	28	Undergraduate	Senior nurse	6
N6	Female	38	Undergraduate	Supervisor nurse	17
N7	Female	32	Undergraduate	Senior nurse	8
N8	Female	33	Undergraduate	Supervisor nurse	9
N9	Female	27	Junior college	Senior nurse	6
N10	Female	28	Undergraduate	Senior nurse	6
N11	Female	33	Undergraduate	Supervisor nurse	12
N12	Female	32	Undergraduate	Senior nurse	10
N13	Female	29	Junior college	Senior nurse	9
N14	Female	32	Undergraduate	Supervisor nurse	11
N15	Female	47	Undergraduate	Chief nurse	24
D1	Female	33	Master	Attending physician	7
D2	Male	33	Master	Attending physician	7
D3	Male	41	Doctor	Associate chief physician	17
D4	Female	43	Doctor	Associate chief physician	21
D5	Female	31	Master	Attending physician	6
D6	Male	35	Doctor	Attending physician	6
D7	Male	34	Master	Attending physician	7
D8	Female	45	Doctor	Associate chief physician	12
D9	Male	52	Doctor	Chief physician	25

esophagus, making it feel like I'm going to vomit before the food even reaches my esophagus. My case seems to be more severe compared to other patients, it's distressing.”(P13)

#### *The hopelessness for recovery*

Some patients shared that their illness disrupted their normal life rhythm, leading them to gradually lose hope in treatment and diminish their belief in recovery, which impacted management effectiveness. Conversely, patients who maintained confidence in their treatment were more proactive in nutritional management.

“I retired early when I was sick, and to be honest, I've been feeling depressed. You see my eldest sister in the bed next door... She's in pain after chemotherapy, she can't sleep, and can't eat, what's the point in talking about nutrition when she can't eat? She's really suffering.”(P4); “I eat everything, eating is better than taking medicine, my treatment is going really well, I am positive mindset, I eat plenty of nutritious food, and I actively cooperate with the treatment, I am still young, I have a long life ahead of me.”(P1)

#### *The challenge in accessing authoritative nutritional management information*

Almost all patients expressed a significant need for information regarding nutritional management during chemotherapy treatment, but few of them took the initiative to seek advice or information from healthcare professionals. Instead, they primarily obtained nutritional knowledge from fellow patients or through the Internet, and they found it challenging to discern the professionalism and accuracy of the information they received.

“At first, when I was a new patient, and I asked others if I didn't understand something, and they told me that chickens couldn't be eaten, so I think eggs must not be off-limits as well... I wasn't sure, so I just decided not to eat them.”(P10); “When I was just sick, I looked up information on the Internet, and I found conflicting statements from experts; one would say something is okay to eat, while another would say it's not. We really don't know what to believe, so we had to rely on our feelings.”(P4)

#### *The limitation of objective conditions*

The nutritional management of lung cancer patients undergoing chemotherapy is influenced by a variety of objective factors such as hospital environment, family economic status, and public health emergencies.

“The meal in the hospital, I don't know if it is a psychological effect or what, it is really not delicious, and it is not convenient to eat out during this epidemic.”(P14); “We are remote medical insurance, the reimbursement ratio is low, I don't know why it is so low. When we are in the hospital, to save money and for convenience, we just eat whatever is cheapest.”(P7); “In our rural areas, other types of meat are so expensive, we have only eaten during New Year celebrations and other festivals. On regular days, we mostly eat pork.”(P9)

#### *Theme 3: incentives to implementing nutritional management*

##### *The support and supervision of family/patients/healthcare professionals*

Most patients highlighted that the support and supervision from family members, healthcare professionals, or fellow patients during chemotherapy treatment played a crucial role in helping them maintain a positive attitude and pay attention to their nutritional intake.

“My daughter lives in the county, and she brings me fresh vegetables, fruits, meat, and she usually monitors what I eat through video calls.”(P12); “Like my patients, I've been here for so many years (six years), she's healthy, she can withstand the chemotherapy, and we try to follow her eating habits.”(P5); “Dr. Su told me not to have any dietary taboos, and also advised me to buy milk powder. She mentioned that protein powder only provides unilateral supplementation, while milk powder offers a more comprehensive solution. My daughter-in-law will buy milk powder for me.”(P9)

##### *Personal motivation for rehabilitation*

Patients who show a deep concern for their health condition tend to be more motivated to put effort into managing their disease, including paying attention to their nutritional needs.

*"I'm just worried about losing a few pounds all at once. That concerns me, and I can't afford to lose too much. Even if I can't eat now, there's no way around it. I'll make up for it when I go back."*(P4)

#### *Family responsibilities*

Some patients mentioned that managing their nutrition effectively is a responsibility to their families.

*"I still try my best to eat nutritiously and ask other patients for advice. I have four children. . . I take care of myself, and the white blood cells are maintained, without adding burden."*(P5)

### *The Current Status of Nutritional Management by Healthcare Professionals*

#### *Theme 1: insufficient attention to nutritional management of lung cancer patients undergoing chemotherapy*

All 24 respondents from the healthcare professionals affirmed the necessity of nutritional management for patients. However, they acknowledged that they did not pay sufficient attention to the nutritional management of lung cancer patients undergoing chemotherapy.

*"We pay more attention to patients with esophageal cancer, stomach cancer, and some head and neck tumors in our usual work, and pay less attention to the nutrition needs of lung cancer patients undergoing chemotherapy. Our approach is mostly limited to antiemetic treatments."*(D7); *"In our department, we conduct nutritional assessments, but currently, we only evaluate patients with digestive system tumors, and very few assessments are done for lung cancer patients because it does not involve the digestive tract."*(N15)

#### *Theme 2: lack of standardization in nutritional management Incorrect use of nutritional screening and assessment tools*

Healthcare professionals usually judge the patient's nutritional status based on the patient's chief complaints, biochemical test results, and clinical experience. Although the hospital nursing information system has been integrated with NRS2002 (a nutritional risk screening tool), almost all the nurses interviewed answered that there was no standardized nutrition management. They noted that while admission screening and evaluation are mandatory by the hospital, these procedures lack clear guidance for practical clinical application.

*"That NRS2002 was recently embedded in the nursing workstation in the hospital, requiring us to evaluate every admitted patient. However, it doesn't seem to be very useful."*(N13); *"Nutrition screening is relatively simple, and everyone knows how to do it. But the nutrition assessment scale is too complicated, and many times the assessment is inaccurate. I have been trained on it, but I'm still not confident in using it."*(N11)

#### *The timing and mode of nutritional support are subjective*

While a majority of physicians acknowledged the necessity of nutritional support for patients, they admitted that decisions regarding the timing of such support are largely based on personal experience. This approach has led to criticisms, especially in cases where the choice of nutritional support was deemed inappropriate.

*"We used to have a teacher who was on duty when the patient said that he could not eat, and he prescribed fat emulsion to the patient, and he was notified and criticized that it was irrational drug use. Situations like these make it more difficult for our doctors to handle."*(D1)

#### *Nutrition knowledge is lagging and training coverage is narrow*

Most of the respondents realized the importance of nutrition management. They expressed that their understanding of tumor nutrition was inadequate, citing a lack of scientific and systematic

training, as well as a deficit in professional confidence. However, some respondents still seemed to be unaware of the intricate relationship between chemotherapy and nutrition. Moreover, although some training sessions included nutrition-related content, the coverage was often too narrow and insufficient for comprehensive mastery.

*"Usually, the department's professional development sessions occasionally touch upon content related to tumor nutrition, but it is quite basic. To properly carry out nutrition management, we need to strengthen our knowledge in nutrition."*(N7); *"Because we have few palliative care patients here, the nutrition of chemotherapy patients should be adequate. Many patients with advanced lung cancer develop cachexia, and the nutritional support tends to be less effective for them."*(D5)

#### *Theme 3: inadequate support for nutritional management No mandatory requirement for department management*

The leadership provided by management plays a crucial role in guiding the behavior of team members. Most respondents reported that there are no mandatory requirements or standardized protocols in place for nutrition management within their departments.

*"There is no unified standard for nutrition management, and there is no record of implementation or supervision feedback. This is unlike the situation with catheter maintenance in our department, where the head nurse has set a unified standard, and everyone adheres to it more effectively."*(N14); *"I (the ward director) often emphasize to my team that patient nutrition is crucial. . . I've noticed that our ward seems to be performing a bit better in nutrition management than other wards."*(D4)

#### *Lack of nutrition management manpower allocation*

The increasing incidence of tumors and the burgeoning number of oncology patients mean that healthcare professionals often find themselves stretched thin, managing to complete only the mandatory tasks required at the management level to ensure clinical safety. In addition, the scarcity of hospital dietitians adds a layer of complexity to the already challenging task of nutrition management.

*"There are too many patients, it takes time to manage nutrition well, and honestly, we really can't manage it all. Ensuring that the patient's treatment is clear takes precedence, and nutrition can only be addressed in passing."*(D8); *"Staffing is critical, now we are not very staffed, and the energy is not up to the standard for doing this work. Besides, there are relatively few nutritionists in the hospital."*(N6)

#### *Nutrition facilities are not fully equipped*

Due to the hospital's infrastructure is not fully equipped to provide meals tailored to the nutritional needs of patients with specific diseases. This issue, compounded by the constraints imposed by the epidemic, results in numerous inconveniences for patients during hospitalization.

*"Our hospital provides meals from the nutritious canteen, but patients generally report that they are expensive and unpalatable. Sometimes they also complain about poor service. However, due to the epidemic management measures, they cannot go out and have no choice but to settle for what is available."*(N6); *"I know of some hospitals where patients can order meals tailored to their disease via a mobile app. The food is delivered to the ward on time, the prices are more reasonable, and it's much more convenient for the patients."*(N4)

#### *Theme 4: weak multidisciplinary awareness Unclear responsibilities*

Four of the interviewed nurses expressed the belief that nutrition management should fall under the purview of doctors or dietitians,



rather than being considered a part of nursing duties. Six nurses said that nutrition should indeed be regarded as an aspect of nursing work within the framework of holistic accountability nursing. However, their stance on this issue was not definitively clear. The four doctors interviewed were unanimous in their opinion that nutritional screening and assessment should be the responsibility of nurses, while nutrition management itself should be handled by dietitians. They emphasized that doctors' primary focus is on diagnosing and treating diseases.

*"It's a dietitian's job or a doctor's business. It's not a nurse's business."*(N1); *"Now it's a holistic accountability system, and it stands to reason that nutrition is also the jurisdiction of nurses, but we don't do it well."*(N8); *"The doctor can only be said to play a supportive role. Dietitians should carry out the detailed work."*(D5); *"Nurses must do the screening assessment, we mainly give medical advice. Our focus must be diagnosis and treatment, and we are not professional in nutrition."*(D6)

#### *Weak sense of teamwork*

There was a consensus among the respondents about the lack of teamwork in clinical practice when it comes to patient nutrition.

*"Nurses play a crucial role in nutrition management... Strictly speaking, we should evaluate the nutrition plan together during ward rounds, but that rarely happens, we all just do our own thing."*(D2)

#### *Theme 5: poor compliance from patients and their families*

The implementation of nutrition management programs is impacted by the low level of nutritional awareness among some patients and their families. At the same time, some patients have difficulty in nutritional management due to financial constraints.

*"Many patients and their families hold nutritional misunderstandings, believing certain foods should be avoided, and these misconceptions are often hard to correct."*(N9); *"Serve a population that is a mix of urban and rural areas, and many patients are in a precarious financial situation due to costs treatment. Discussing nutrition with them may not be very fruitful or practical."*(N10)

## **Discussion**

This is a qualitative study to describe the experiences and needs of lung cancer patients undergoing chemotherapy in nutrition management, and healthcare professionals' perspectives.

#### *The Experiences and Needs of Nutritional Management for Patients*

Consistent with previous research findings, a majority of patients in this study exhibited limited knowledge regarding nutrition management, primarily relying on personal experiences or advice from caregivers.<sup>22</sup> Notably, studies have emphasized the importance of good compliance as a crucial prerequisite for ensuring the effectiveness of nutritional support.<sup>23</sup> This study revealed that some patients and their families demonstrated poor compliance with nutrition management, leading to ineffective implementation of nutrition management programs. It is worth mentioning that addressing this issue requires transforming beliefs related to knowledge, attitude, and behavior.<sup>24</sup> The concept of self-efficacy was proposed by Bandura in 1977, which refers to an individual's confidence in their ability to achieve goals or tasks within a specific domain.<sup>25</sup> Strong self-efficacy can significantly influence the adoption of healthy behaviors.<sup>26</sup> Therefore, healthcare professionals can enhance patients' and their families' understanding of nutrition knowledge by distributing informative nutrition manuals, displaying educational posters within

healthcare facilities, and utilizing nutrition education videos. This approach follows the "knowledge-belief-action" behavior mode aimed at improving cognitive awareness and practical application of nutritional principles for better patient outcomes.

Robust external support can lessen disease burden, bolster psychological well-being, and enhance patients' quality of life.<sup>27</sup> During the interviews, most patients expressed that their families made significant efforts to optimize their nutritional status by offering them care and support. This not only fulfills patients' love and belonging needs but also promotes their adherence to nutritional intake. The World Health Organization highlights the need to view cancer patients' families as essential to their care, advocating for healthcare professionals to address patients and caregivers as a unified unit.<sup>28</sup> The decrease in malnutrition cases relies on the support of family members. Given that patients may have limited self-care ability during treatment, primary family caregivers play an essential role in facilitating recovery.<sup>29</sup> Consequently, healthcare professionals should provide thorough comprehensive nutrition guidance to both patients and families while involving them in the care process. Educating families about ways to improve nutrition and monitoring nutritional status is crucial.

Our interviews revealed that external factors such as family economic status, hospital infrastructure, and public health emergencies significantly impact patients' ability to maintain adequate nutrition. National medical insurance policies should consider socioeconomic factors, like the unequal distribution of medical resources. A retrospective cohort study highlighted that improving reimbursement policies for severe illnesses across different geographical areas can substantially alleviate the financial strain on families.<sup>30</sup> During public health emergencies, hospitals are faced with the critical task of delivering targeted, humanized care to cancer patients while rigorously enforcing epidemic prevention and control measures. Assisting cancer patients in nutritional management proves to be exceedingly crucial during these challenging times.

#### *The Current Status of Nutritional Management by Healthcare Professionals*

Kirbiyik's research has found that the beliefs and attitudes of healthcare professionals toward nutrition play a crucial role in providing nutrition care, affecting decision-making processes significantly.<sup>31</sup> Patients often view healthcare professionals as their most reliable source of nutritional information.<sup>29</sup> However, Crowley's focus group interview found that many healthcare professionals lack sufficient nutritional knowledge to meet the practical requirements in clinical settings, hindering their capacity to provide appropriate nutritional support to patients.<sup>32</sup> This study also identified deficiencies in nutrition management skills and limited exposure to relevant training among some healthcare professionals when it comes to meeting the nutritional needs of lung cancer patients, consistent with previous research.<sup>33,34</sup> Therefore, department managers should expand the coverage of training, provide training and learning opportunities, and leverage training as an opportunity to change the attitude of healthcare professionals toward nutrition management.

In China, busy schedules make it challenging for doctors and nurses to provide systematic and scientific nutrition education and management; multidisciplinary teams can offer standardized, personalized diagnosis and treatment options based on evidence-based medicine principles instead.<sup>35</sup> Facilitating information exchange through team meetings or electronic communication systems with clearly defined roles for each member is essential for successful multidisciplinary collaboration on nutrition issues among team members. Research shows that these strategies play a vital role in enhancing collaboration among team members.<sup>36,37</sup> However, this study identified a lack of interdisciplinary awareness in nutrition management and a deficiency in teamwork among healthcare professionals,

resulting in unclear responsibilities in nutrition management. Therefore, to enhance the nutrition management for lung cancer patients, establishing a nutrition support group or a clinical disease subspecialty could be highly beneficial. Having key individuals from diverse disciplines as members of this group can help in delineating work responsibilities, setting up effective information communication channels, and refining the nutrition management support system.

The current shortage of nursing personnel in China's medical industry has a significant impact on the quality of nursing care.<sup>38</sup> As the most direct and close healthcare providers for hospitalized patients, nurses play a pivotal role in screening, continuously assessment, implementation, and evaluation nutritional risks.<sup>39</sup> This study shows that insufficient nursing staff leads to an overwhelming workload and neglects proper nutrition management. Baggaley's research has found that nutrition specialist nurses can effectively improve the nutritional status of patients, and nutrition specialist nurses can manage the nutritional problems of patients throughout the process, playing the role of coordinator and manager.<sup>40</sup> However, the training of nutrition specialist nurses in China is still in its nascent stage, and the number of specialized nurses remains limited, with an even smaller proportion possessing knowledge pertaining to tumors. It is recommended that relevant researchers refer to the well-established training models abroad and the existing training experiences of specialist nurses in other mature specialties, in order to establish a comprehensive, scientifically grounded, and feasible training mode for nutrition specialist nurses. Additionally, the establishment of dedicated positions for nutrition specialist nurses can effectively alleviate ward workload pressures and enhance patient satisfaction.

## Limitations

The limitation of this study stems from the fact that all interviewees were sourced from three tertiary grade A hospitals in Western China, potentially introducing a geographical bias. This study solely focused on patients, doctors, and nurses as survey participants, omitting dietitians and other professional groups within the study population. Consequently, there is a possibility of biased findings. The research was conducted between July to October 2021 during the peak of the COVID-19 pandemic, which may have influenced the reported results in this article. Another constraint pertains to the applicability of these findings specifically within a Chinese cultural context, thereby affecting their generalizability. However, healthcare professionals worldwide caring for individuals from China can still benefit from insights derived from patient perspectives.

## Conclusion and Implications for Nursing Practice

The incidence of malnutrition in lung cancer patients undergoing chemotherapy is high, and the nutritional support of patients faces numerous challenges and obstacles. Guided by this clinical question, this study used qualitative descriptive research methods to interview patients, doctors, and nurses. The study aimed to identify the contributing factors and barriers hindering the implementation of nutrition management in lung cancer patients undergoing chemotherapy. Additionally, it focused on addressing the issues encountered by healthcare professionals during nutrition management implementation. The findings from this study emphasize the importance for nurses to prioritize patient's nutritional management process, comprehend their specific nutritional needs, and provide personalized guidance accordingly. Furthermore, these results will play a crucial role in developing targeted improvement programs for practical nursing initiatives while enhancing the scientific and practical aspects of nutrition guidance.

## Author Contributions

Huan Rong: Investigation, methodology, data curation, formal analysis, writing—original draft. Fangyi Li: Conceptualization, methodology, investigation, data curation, writing—original draft. Chunmei Liu: Resources, writing—review and editing, supervision, funding acquisition, project administration. Linyu Zhou, Hongyue Zhong: Data curation, recruitment, formal analysis, writing—review and editing. Li Li, Tian Xiao: Methodology, software. Ruihan Xiao: Visualization. Xiaoju Chen: Writing—original and revised draft preparation, supervision, project administration. All authors had full access to all the data in the study, and the corresponding author had final responsibility for the decision to submit for publication. The corresponding author attests that all listed authors meet authorship criteria and that no others meeting the criteria have been omitted.

## Ethical Approval

This project received ethics approval from the First Affiliated Hospital of Chengdu Medical College Ethics Committee (Project number: 2021CYFYIRB-BA-26-01). Written informed consent was obtained from all participants before their involvement in the study, along with the use of audio recordings.

## Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this article.

## CRediT authorship contribution statement

**Huan Rong:** Writing – original draft, Methodology, Investigation, Formal analysis, Data curation. **Fangyi Li:** Writing – original draft, Methodology, Investigation, Data curation, Conceptualization. **Chunmei Liu:** Writing – review & editing, Supervision, Resources, Project administration, Funding acquisition. **Linyu Zhou:** Writing – review & editing, Formal analysis, Data curation. **Hongyue Zhong:** Writing – review & editing, Formal analysis, Data curation. **Li Li:** Software, Methodology. **Tian Xiao:** Software, Methodology. **Ruihan Xiao:** Visualization. **Xiaoju Chen:** Writing – review & editing, Writing – original draft, Supervision, Project administration.

## Funding

This study was supported by Chengdu Medical College-Chengdu Seventh People's Hospital Joint Research Fund. (Grant numbers [2021LHJYPJ-02]). This study was supported by the Project of Nursing Research of Sichuan Province (Grant numbers [H22037]). The funders had no role in considering the study design or in the collection, analysis, interpretation of data, writing of the report, or decision to submit the article for publication.

## Acknowledgments

The authors thank Chengdu Medical College, Chengdu Seventh People's Hospital, and the Nursing Research of Sichuan Province for their fund support and all the participants involved in this study.

## References

- Bray F, Laversanne M, Sung H, et al. Global cancer statistics 2022: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *Ca Cancer J Clin.* 2024;74:229–263. <https://doi.org/10.3322/caac.21834>.
- Yang S, Zhang Z, Wang Q. Emerging therapies for small cell lung cancer. *J Hematol Oncol.* 2019;12(1):47. <https://doi.org/10.1186/s13045-019-0736-3>.

3. Bozzetti F. Chemotherapy-induced sarcopenia. *Curr Treat Options Oncol*. 2020;21(1):7. <https://doi.org/10.1007/s11864-019-0691-9>.
4. Campagna S, Gonella S, Sperlinga R, et al. Prevalence, severity, and self-reported characteristics of taste alterations in patients receiving chemotherapy. *Oncol Nurs Forum*. 2018;45(3):342–353. <https://doi.org/10.1188/18.ONF.342-353>.
5. Marshall KM, Loeliger J, Nolte L, Kelaart A, Kiss NK. Prevalence of malnutrition and impact on clinical outcomes in cancer services: a comparison of two time points. *Clin Nutr*. 2019;38(2):644–651. <https://doi.org/10.1016/j.clnu.2018.04.007>.
6. Na BG, Han SS, Cho YA, et al. Nutritional status of patients with cancer: a prospective cohort study of 1,588 hospitalized patients. *Nutr Cancer*. 2018;70(8):1228–1236. <https://doi.org/10.1080/01635581.2019.1578392>.
7. Polanski J, Jankowska-Polanska B, Uchmanowicz I, et al. Malnutrition and quality of life in patients with non-small-cell lung cancer. *Adv Exp Med Biol*. 2017;1021:15–26. [https://doi.org/10.1007/5584\\_2017\\_23](https://doi.org/10.1007/5584_2017_23).
8. Yin L, Lin X, Li N, et al. Evaluation of the global leadership initiative on malnutrition criteria using different muscle mass indices for diagnosing malnutrition and predicting survival in lung cancer patients. *Jpn J Parenter Enteral Nutr*. 2021;45(3):607–617. <https://doi.org/10.1002/jpen.1873>.
9. Polanski J, Chabowski M, Swiatonowska-Lonc N, et al. Relationship between nutritional status and clinical outcome in patients treated for lung cancer. *Nutrients*. 2021;13(10):3332. <https://doi.org/10.3390/nu13103332>.
10. Cederholm T, Barazzoni R, Austin P, et al. Espen guidelines on definitions and terminology of clinical nutrition. *Clin Nutr*. 2017;36(1):49–64. <https://doi.org/10.1016/j.clnu.2016.09.004>.
11. Kiss N, Isenring E, Gough K, et al. Early and intensive dietary counseling in lung cancer patients receiving (chemo)radiotherapy—a pilot randomized controlled trial. *Nutr Cancer*. 2016;68(6):958–967. <https://doi.org/10.1080/01635581.2016.1188972>.
12. Porro C, La Torre ME, Tartaglia N, et al. The potential role of nutrition in lung cancer establishment and progression. *Life (Basel)*. 2022;12(2):270. <https://doi.org/10.3390/12020270>.
13. Lu X, Xiaoming Z, Suyi L, Yang Y. Research progress in nutritional management of nasopharyngeal carcinoma patients in hospitals. *J Chin Oncol*. 2023;29(12):1049–1059. <https://doi.org/10.11735/j.issn.1671-170X.2023.12.B010>.
14. Kroner A, Stoll H, Spichiger E. [Malnutrition and weight loss – nurse assessment of nutritional status and counselling: experiences of patients with newly diagnosed or relapsed cancer]. *Pflege*. 2012;25(2):85–95. <https://doi.org/10.1024/1012-5302/a000184>.
15. Hopkinson JB. Nutritional support of the elderly cancer patient: the role of the nurse. *Nutrition*. 2015;31(4):598–602. <https://doi.org/10.1016/j.nut.2014.12.013>.
16. Gao B, Chen W, Liu Y, et al. Associations between nutrition risk scores and sarcopenia in gastrointestinal cancer patients: a cross-sectional study. *Support Care Cancer*. 2022;30(4):3269–3277. <https://doi.org/10.1007/s00520-021-06729-1>.
17. Guo ZQ, Yu JM, Li W, et al. Survey and analysis of the nutritional status in hospitalized patients with malignant gastric tumors and its influence on the quality of life. *Support Care Cancer*. 2020;28(1):373–380. <https://doi.org/10.1007/s00520-019-04803-3>.
18. Han S. Effect of integrated management model of health care-nutritionist on nutritional status of leukemia patients undergoing chemotherapy. *Modern Nurse*. 2022;29(02):108–111. <https://doi.org/10.19791/j.cnki.1006-6411.2022.04.033>.
19. Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *Int J Qual Health Care*. 2007;19(6):349–357. <https://doi.org/10.1093/intqhc/mzm042>.
20. Ming L. Using an example to illustrate Colaizzi's phenomenological data analysis method. *J Nurs Sci*. 2019;34(11):90–92. <https://doi.org/10.3870/j.issn.1001-4152.2019.11.090>.
21. Crowder SL, Douglas KG, Yanina PM, Sarma KP, Arthur AE. Nutrition impact symptoms and associated outcomes in post-chemoradiotherapy head and neck cancer survivors: a systematic review. *J Cancer Surviv*. 2018;12(4):479–494. <https://doi.org/10.1007/s11764-018-0687-7>.
22. Tingting J, Qian Z, Jingjing M, Guohua K. Analysis of nutritional knowledge and practice level and influencing factors in patients with hematologic tumor chemotherapy. *Modern Nurse*. 2023;30(09):91–95. <https://doi.org/10.19793/j.cnki.1006-6411.2023.27.022>.
23. Li Z, Chen W, Li H, Zhao B. Nutrition support in hospitalized cancer patients with malnutrition in China. *Asia Pac J Clin Nutr*. 2018;27(6):1216–1224. [https://doi.org/10.6133/apjcn.201811\\_27\(6\).0007](https://doi.org/10.6133/apjcn.201811_27(6).0007).
24. Wang J, Chen L, Yu M, He J. Impact of knowledge, attitude, and practice (KAP)-based rehabilitation education on the KAP of patients with intervertebral disc herniation. *Ann Palliat Med*. 2020;9(2):388–393. <https://doi.org/10.21037/apm.2020.03.01>.
25. Bandura A. Self-efficacy: toward a unifying theory of behavioral change. *Psychol Rev*. 1977;84(2):191–215. <https://doi.org/10.1037//0033-295x.84.2.191>.
26. Bektas I, Kudubes AA, Ayar D, Bektas M. Predicting the healthy lifestyle behaviors of Turkish adolescents based on their health literacy and self-efficacy levels. *J Pediatr Nurs*. 2021;59:e20–e25. <https://doi.org/10.1016/j.pedn.2021.01.016>.
27. Siyi P, Tao W, Yan T, Xuying L. Study on the correlation between quality of life and postoperative symptoms, resilience, social support in patients with gastrointestinal cancer. *Chin Evidence-Based Nurs*. 2023;9(08):1400–1405. <https://doi.org/10.12102/j.issn.2095-8668.2023.08.013>.
28. Kayser K, Acquati C. The influence of relational mutuality on dyadic coping among couples facing breast cancer. *J Psychosoc Oncol*. 2019;37(2):194–212. <https://doi.org/10.1080/07347332.2019.1566809>.
29. Taleghani F, Ehsani M, Farzi S, et al. Nutritional challenges of gastric cancer patients from the perspectives of patients, family caregivers, and health professionals: a qualitative study. *Support Care Cancer*. 2021;29(7):3943–3950. <https://doi.org/10.1007/s00520-020-05951-7>.
30. Sun CY, Shi JF, Fu WQ, et al. Catastrophic health expenditure and its determinants in households with lung cancer patients in China: a retrospective cohort study. *BMC Cancer*. 2021;21(1):1323. <https://doi.org/10.1186/s12885-021-09030-w>.
31. Kirbiyik F, Ozkan E. Knowledge and practices of medical oncologists concerning nutrition therapy: a survey study. *Clin Nutr Espen*. 2018;27:32–37. <https://doi.org/10.1016/j.clnesp.2018.07.004>.
32. Crowley J, Ball L, McGill AT, et al. General practitioners' views on providing nutrition care to patients with chronic disease: a focus group study. *J Prim Health Care*. 2016;8(4):357–364. <https://doi.org/10.1071/HC15048>.
33. Dumic A, Miskulin M, Pavlovic N, Orkic Z, Bilic-Kirin V, Miskulin I. The nutrition knowledge of Croatian general practitioners. *J Clin Med*. 2018;7(7):178. <https://doi.org/10.3390/jcm7070178>.
34. Cancer E, Orue I, Estornell MA, et al. [Opinions and experiences of healthcare professionals in the nutritional management of oncology patients: the ONA study]. *Nutr Hosp*. 2022;39(3):615–628. <https://doi.org/10.20960/nh.03914>.
35. Schuetz P, Fehr R, Baechli V, et al. Individualised nutritional support in medical inpatients at nutritional risk: a randomised clinical trial. *Lancet*. 2019;393(10188):2312–2321. [https://doi.org/10.1016/S0140-6736\(18\)32776-4](https://doi.org/10.1016/S0140-6736(18)32776-4).
36. Hazzard E, Walton K, McMahon AT, Milosavljevic M, Tapsell L. Collaborative, inter-professional nutritional care within head and neck cancer teams: an international multi-site qualitative study. *J Interprof Care*. 2021;35(6):813–820. <https://doi.org/10.1080/13561820.2020.1865290>.
37. Ou X, Chen H, Qiu T, Yuan Y, Gong X. The impact of multidisciplinary team nutrition management on nutritional and toxicity status in patients with nasopharyngeal carcinoma. *Asia Pac J Oncol Nurs*. 2023;10(7): 100237. <https://doi.org/10.1016/j.apjon.2023.100237>.
38. Juan X. Optimize the allocation of nursing human resources to improve nursing quality. *Electron J Pract Clin Nurs Sci*. 2018;3(15):195–198. <https://doi.org/10.3969/j.issn.2096-2479.2018.15.159>.
39. Li Y, Hailing Z, Xiaofei Q, Xiafei C. Research progress of nutrition management model led by nutrition specialist nurses. *J Nurses Train*. 2022;37(20):1853–1856. <https://doi.org/10.16821/j.cnki.hsxx.2022.20.008>.
40. Baggaley E, Whincup L, Ashman KE, et al. Lb022-sun effectiveness of implementing a nurse led policy for the management of malnutrition. *Clin Nutr*. 2013;32:S231. [https://doi.org/10.1016/S0261-5614\(13\)60600-7](https://doi.org/10.1016/S0261-5614(13)60600-7).