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Immunotherapy in Lung Cancer: A Qualitative Metasynthesis From Patient and Family Perspectives

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ABSTRACT

Background: Lung cancer is the leading cause of cancer-related mortality worldwide, with high incidence and low survival rate. Over the past decades, innovative treatment modalities like targeted drug therapy and immunotherapy have emerged, offering potential improvements in safety and effectiveness. Immunotherapy allows for a sustained therapeutic response by enhancing the immune response of the body to cancer cells, providing long-term survival benefits with a manageable safety profile. However, the experiences of patients receiving immunotherapy and their family caregivers remain insufficiently explored.

Objective: This study aimed to explore the requirements of healthcare professionals in immunotherapy of lung cancer patients by examining and synthesizing qualitative data about the experiences of lung cancer patients receiving immunotherapy and their family caregivers, focusing on the psychological, information, and support needs to improve the quality of life of patients.

Methods: Systematic review and qualitative metasynthesis were conducted following the PRISMA guidelines. Searches were performed in PubMed, Embase, CINAHL, Web of Science, Cochrane, and ClinicalTrials.gov. Inclusion criteria were qualitative studies featuring quotes from adult patients or family members about their experiences with immunotherapy for lung cancer. Data extraction and synthesis were conducted using meta-aggregation.

Results: Seven articles reporting on five studies were included, comprising 216 participants (96 patients, 70 healthcare professionals, and 50 family members). Four major themes emerged: (1) The quality of life of patients could be significantly influenced by their psychological state. (2) Anxiety and stress are common in patients and consequently cause their uncertainty about the treatment. (3) Although physical side effects may occur, they are generally less severe and have less impact on overall health and daily functioning compared with those associated with chemotherapy. (4) Family caregivers faced substantial stress due to financial burdens and the impact on family relations.

Conclusions: Patients with lung cancer receiving immunotherapy, along with their families, encounter a variety of challenges, including the management of side effects, psychological and financial stress, and uncertainty regarding treatment outcomes. Healthcare professionals should provide targeted psychological support, education about immunotherapy, and emotional stability. Patient-centered communication and family involvement are essential for reducing anxiety and enhancing the overall care experience. Future research should focus on strategies that address these psychosocial factors and alleviate financial burdens, particularly in regions with limited health insurance, to optimize care for patients undergoing long-term immunotherapy and improve treatment adherence.

1 | Introduction

Lung cancer is one of the most common cancers globally, with diagnosed new cases of 2,206,771 in 2020, accounting for 11.4% of all new cancer cases [1], remaining the deadliest cancer in men and the second deadliest in women [2]. Over the past decades, the landscape of lung cancer treatment has changed dramatically with the emergence of innovative treatment modalities. In addition to well-established therapies such as surgery, radiotherapy, and chemotherapy, new regimens, including targeted therapy, immunotherapy, and chemoimmunotherapy, have become available [3]. These new therapies may result in better therapeutic effects and fewer side effects.

Immunotherapy plays an important role in the treatment of lung cancer. Immunotherapy aims to enhance or suppress the immune function of the body, either by artificially increasing or decreasing it, to treat various diseases. Immunotherapy aims to activate the immune system to recognize and attack cancer cells. Studies have shown that immunotherapy can provide long-term survival benefits with a good safety profile [4]. The major advantage of cancer immunotherapy is the ability to harness the patient's immune system to mount an antitumor immune response and promote long-lasting immune memory [5].

Although immunotherapy has significantly developed in recent years, several challenges remain in treatment, including variability in patient response, immune-related adverse events, and the need for personalized care strategies [6, 7]. Regarding nursing care, there remain gaps in understanding how to effectively monitor and manage side effects, optimize treatment, and address the psychosocial needs of both patients and their families [8]. Moreover, patients face challenges such as limited understanding of immunotherapy, uncertainty about treatment outcomes, and a lack of confidence in its efficacy. These factors can adversely affect decision-making, compliance, and overall treatment experience.

Qualitative research delves into the subjective experiences and perspectives of participants and often employs methods such as interviews and surveys to explore complex issues and obtain detailed insights. In this study, we conducted a qualitative metasynthesis to integrate findings from existing studies on the experiences of patients with lung cancer and their families. The goal was to develop strategies for improving the quality of life and treatment outcomes in the context of immunotherapy. Therefore, the primary objective of this research was to synthesize qualitative data on patient and family experiences to inform care approaches that enhance the well-being and outcomes of patients with lung cancer receiving immunotherapy.

2 | Methods

2.1 | Study Design

We conducted a systematic review and qualitative metasynthesis (PROSPERO CRD42024588207) and reported our findings in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines [9]. The registration record is available in Supporting File 2, and the completed PRISMA 2020 checklist is provided in Supporting File 1. This approach was selected because qualitative metasynthesis offers advantages in developing theoretical and conceptual insights while informing clinical interventions and guiding future research programs [10].

2.2 | Search Strategy

Preplanned search terms were developed by the study team, focusing on the therapy (immunotherapy), condition (lung cancer), perspectives (patients and family members), and study type (qualitative). The search was executed in May 2024 across multiple databases, including PubMed, Embase, CINAHL, Web of Science, Cochrane, and ClinicalTrials.gov, using Boolean logic tailored to each database's syntax and subject headings. Filters applied included English language and publications from 1980 onwards. The comprehensive database search strategy is detailed in the Supporting File. In addition, a lateral search was conducted by examining the references of the included articles, relevant systematic reviews, and clinical practice guidelines.

Qualitative research published in peer-reviewed journals that included quotes from adult patients or family members regarding the experiences of lung cancer patients receiving immunotherapy was included. Qualitative studies were defined as those employing methods such as phenomenology, ethnography, grounded theory, hermeneutics, narratology, or thematic analysis, and/or those primarily analyzing textual data rather than numerical data [11]. Articles meeting all other inclusion criteria were required to report real-life experiences of lung cancer patients undergoing immunotherapy, including mixed methods and qualitative substudies from observational or interventional studies. Studies were excluded if the full text was unavailable, if data were incomplete, or if duplicates were identified.

2.3 | Data Extraction

The search results were imported into EndNote X9 and duplicates were removed. Two reviewers independently screened the titles and abstracts and conducted full-text reviews to identify eligible articles. Data from eligible articles, including (i) general study and sample characteristics, (ii) methods, (iii) participants' quotes, and (iv) themes and conclusions, were extracted into a Microsoft Excel spreadsheet. Themes and conclusions were recorded on a separate spreadsheet to ensure that the coders were blinded to the themes and interpretations of the authors. Disagreements were resolved through discussion and, if necessary, evaluation by a third reviewer.

2.4 | Methodological Quality

The quality of the included articles was assessed using the 10-item Joanna Briggs Institute Critical Appraisal Checklist for Qualitative Research [12]. Two researchers independently evaluated each article. Disagreements were resolved through discussion and, if necessary, through additional evaluations. A minimum of "yes" responses for six domains was predetermined as required for inclusion.

2.5 | Qualitative Synthesis

Meta-aggregation was employed to synthesize the outcomes of the qualitative studies. This systematic review approach involves the categorization and subsequent recrystallization of findings from two or more studies. The findings and textual data were examined for commonalities and disparities and the underlying

meanings of the data were classified. When necessary, subthemes were developed through a similar process for each identified theme. Ultimately, these categories underwent an iterative evaluation to discern similarities and reach synthesized conclusions.

3 | Results

A systematic search of the published qualitative literature identified 239 articles, of which seven articles reported five studies (Figure 1 and Table 1). The studies, conducted between 2017 and 2024, were situated in Europe ($n = 4$, 57%) [14, 15, 17], North America ($n = 1$, 14%) [13], Australia ($n = 1$, 14%) [16], and China ($n = 1$, 14%) [18]. The quality assessment revealed that most studies met the majority of the Joanna Briggs Institute criteria; however, the reporting of researcher positionality and reflexivity was limited (Figure 2).

Three articles (42.8%) detailed their interview methodologies, ranging from those without predefined questions to those that were highly structured. Four articles (57.2%) reported thematic analyses. A total of 216 participants (96 patients, 70 healthcare professionals, and 50 family members) were involved, most patients were female (70%), and the average age of patients was 55 years old when reported.

The seven articles focused on lung cancer, with three detailing nonsmall cell lung cancer and three discussing stage III-IV (advanced) lung cancer. All articles mentioned immunotherapy, including drugs such as ceritinib, immune checkpoint inhibitors (ICIs), pembrolizumab, carrelizumab, atezolizumab, durvalumab, tiislelizumab, and sintilimab. Two articles used the same data but analyzed the data from different perspectives.

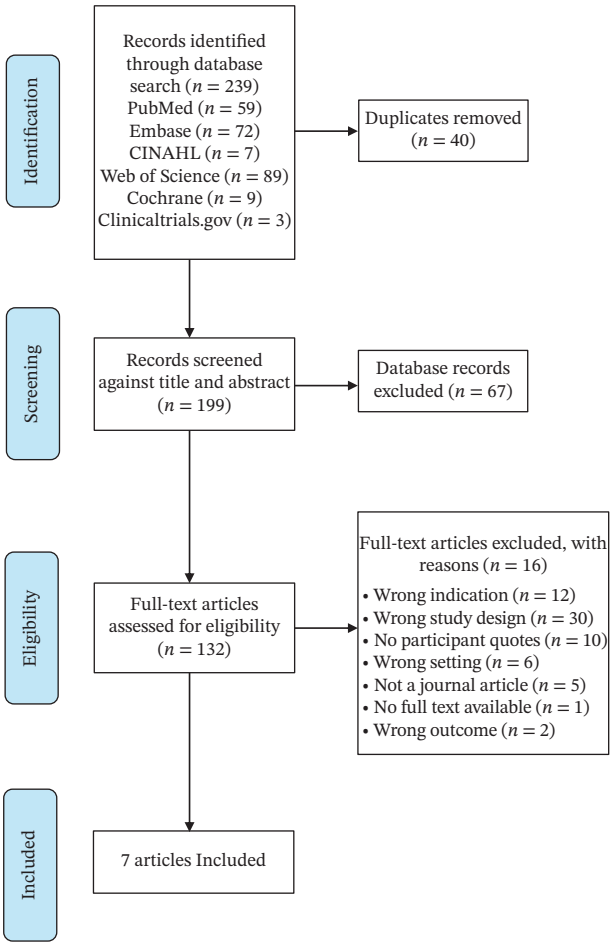

FIGURE 1 | PRISMA flowchart of initial searches and inclusion (1980–May 2024). This figure illustrates the process of systematic literature searching and study selection for the qualitative metasynthesis. It shows the numbers of records identified, screened, and assessed for eligibility and the final studies included in the review.

3.1 | Qualitative Metasynthesis

The synthesis results were based on the PRISMA guidelines. Four major themes emerged from the selected studies, reflecting the real experiences of patients with lung cancer receiving immunotherapy and their family caregivers. These themes included side effects, the point of view of patients/family, uncertainty, and psychological and financial stress. Key exemplary quotations for each theme are presented in the following and listed in Table 2.

3.1.1 | Lung Cancer Patients' Experiences With Immunotherapy

3.1.1.1 | Theme 1: Side Effects. In clinical practices, lung cancer patients usually experienced immunotherapy in combination with chemotherapy, dual immunotherapy regimens, or combined with other treatment within clinical trials. They typically experience a variety of side effects ranging in severity from mild to severe. These side effects include skin-related problems, nausea, and risk of infections, which are common concerns for patients with lung cancer.

Skin-related problems: "That's a side-effect of the immunotherapy, you start to itch, then I begin to scratch it, but you keep scratching till you get through it.—Till you get through everything, till you bleed." [14].

3.1.1.1.1 | Nausea. "A sense of nausea... iron, it was like I had iron inside me, rust." [14].

3.1.1.1.2 | Risk of Infections. "Your immune system is currently at its lowest. Do not stand near sick people in the shop, stay away from the bakery, because if there is someone there who has something, you will get it too." [14].

Despite these challenges, some patients find the side effects of immunotherapy to be more tolerable than those of treatments, such as chemotherapy.

"I'd rather die than go back to chemo. It's too painful. I did not want to eat anything at that time, even the smell of food made me sick. In my opinion, these two (treatments) are quite different. Although immunotherapy has some side effects, it is within the tolerable range." [18].

In summary, although immunotherapy produces many side effects, patients typically find side effects of immunotherapy that are easier to tolerate than other therapies, especially chemotherapy. A patient's ability to tolerate side effects is usually weighed against the potential benefits of disease control and the overall quality of life.

TABLE 1 | Summary of included studies.

Author (first), year	Country	Aims	Participants	Interest of phenomenon	Methods	Findings
Devlen J [13], 2017	America	The current study sought to describe healthcare providers' decisions to treat with ceritinib (immunotherapy) and to describe patient-reported side effects, perceived effectiveness, and attitudes toward ceritinib.	Healthcare professionals ($n = 10$) and patients receiving ceritinib for anaplastic lymphoma kinase nonsmall cell lung cancer (NSCLC) ($n = 18$), 9 female. Age range: 34–78	1. Explore treatment decision-making, adverse events (AEs) and their management. 2. Capture patients' experience.	One-on-one telephone interviews; semistructured interview	1. Patients believe that immunotherapy is an effective treatment for NSCLC and can control symptoms, thereby prolonging life and improving the quality of life. 2. AEs are manageable, and patients are willing to manage these AEs for therapeutic benefit.
Janssens R [14], 2021	Belgium and Italy	Investigate how lung cancer patients perceive their health-related quality of life (HRQL) and the factors that they consider to be most influential in determining their HRQL.	III and IV lung cancer patients ($n = 24$), 62% men. Age range: 42–78	How lung cancer patients perceive their HRQL and how it is affected by their illness and therapy	Focus group discussions; thematic analysis	1. Physical, psychological, and social aspects are key factors driving lung cancer patients' HRQL. 2. Gaining a better understanding of how lung cancer patients perceive their HRQL and how it is affected by their illness and therapy will aid patient-centric decision-making across the drug life cycle. 3. Underscores a need for individual treatment decision-making and ways to improve communication between healthcare providers and patients to do so.

(Continues)

TABLE 1 | (Continued)

Author (first), year	Country	Aims	Participants	Interest of phenomenon	Methods	Findings
Petrocchi S [15], 2021	Belgium and Italy	Identify patient-relevant lung cancer treatment characteristics.	III and IV lung cancer patients ($n = 24$), 62% men. Age range: 42–78	Patient preferences	Review; focus group discussions; thematic inductive analysis.	1. Positive effects or expected benefits from the treatment, such as increased life expectancy and maintenance of daily functioning. 2. Treatment-related adverse effects or adverse events negatively affect patients' daily life. 3. Uncertainty of duration and type of efficacy. 4. The effectiveness and safety of lung cancer treatment and the impact on patients' psychology are the common concerns of patients.
Kirby E [16], 2022	Australia	Explore how cancer chronicity is understood and experienced by both patients and healthcare professionals.	Health professionals ($n = 60$), female 45, male 15; patients ($n = 80$), including lung cancer patients ($n = 21$), female 34, male 46; family carers ($n = 50$), female 34, male 16; age range: 31–80	Sociological problem for cancer patients	Qualitative interviews (one-on-one interviews)	1. Cancer as a structure of chronic disease is always present. The chronicity of cancer is a "middle ground" between the threat of death and the hope of cure and recovery. 2. Patients should build a long-term good life and establish a mental preparation for long-term cancer treatment.
Zwanenburg L. C [17], 2022	Netherlands	Gain a deeper understanding of long-term responders' lived experiences with obtaining long-term responses to immunotherapy or targeted therapy.	Lung cancer patients ($n = 9$), melanoma patients ($n = 8$), female 11, male 6; mean age: 56.4	Psycho-oncology	An exploratory qualitative study using thematic data analysis.	1. Patients live in a twilight zone where they feel neither ill nor healthy. This affects their self-image, interaction with their social environment, and creates feelings of uncertainty. 2. Patients oscillated between hope and despair and had to adjust to the new normal.

(Continues)

TABLE 1 | (Continued)

Author (first), year	Country	Aims	Participants	Interest of phenomenon	Methods	Findings
Hou Y [18], 2023	China	Investigate the experiences of patients with advanced lung cancer who are receiving immune checkpoint inhibitors (ICIs), with a focus on perceptions and sentiments on ICIs, to inform future research and clinical care.	IV lung cancer patients ($n = 17$), female 4, male 13; age of 18 years or older	Perceptions and sentiments on ICIs.	Semistructured, face-to-face interviews; inductive analysis method	1. Adverse effects of immunotherapy are generally tolerable. 2. Patients focused on survival, hope and expectation. 3. The durability and uncertainty about the future of patients' responses to adverse effects of immunotherapy. 4. Patients have poor knowledge and attitudes toward immunotherapy. 5. Immunotherapy brings financial stress and family guilt.
Zwanenburg L. C [19], 2024	Netherlands	Gain a deeper understanding of what long-term response experience as helpful in navigating life with a long-term response.	Lung cancer patients ($n = 9$), melanoma patients ($n = 8$), female 11, male 6; mean age: 56.4	Psychosocial functioning	An exploratory qualitative study using thematic data analysis.	1. Patients are socially engaged, see treatment uncertainty as an opportunity, and live in the moment. 2. People get in touch with those close to them, get help from family and friends, and navigate life with a healthy balance between feeling ill and feeling well This helps them regain a sense of control, change their perspective, and reshape their lives according to their values.

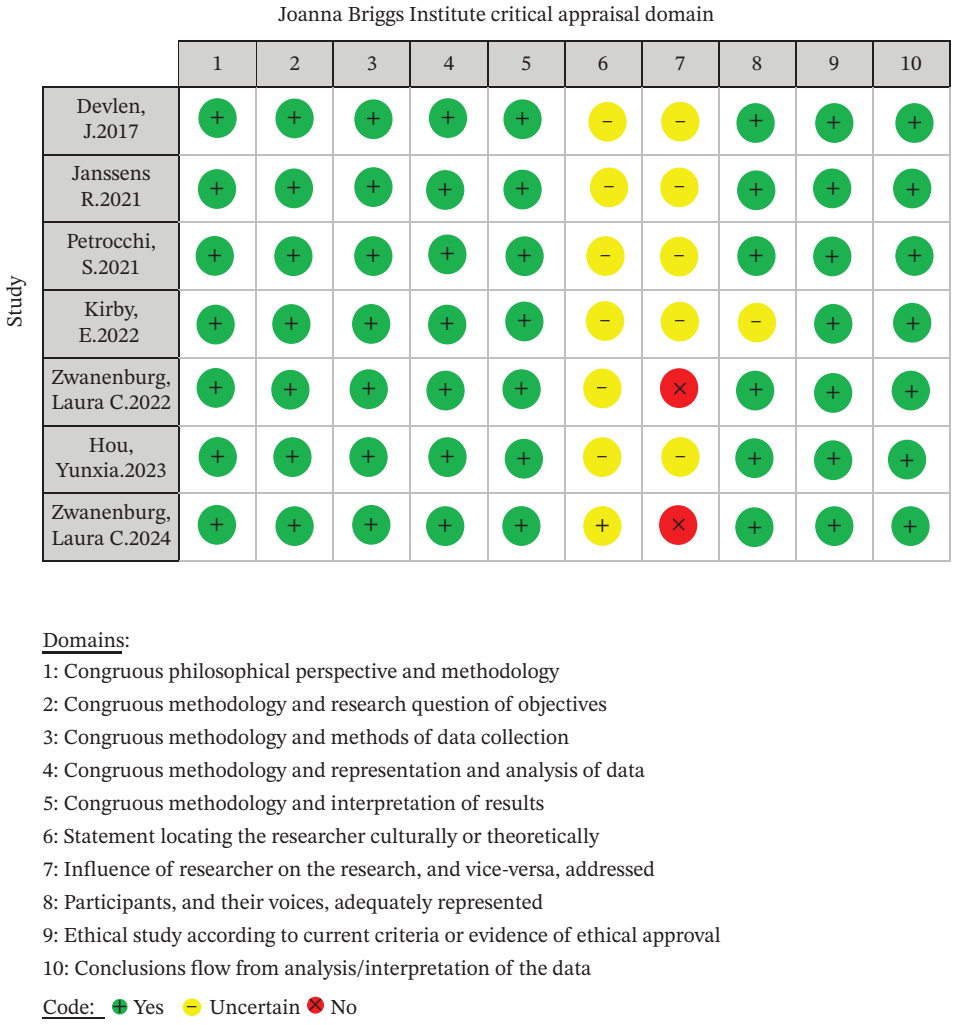

FIGURE 2 | Joanna Briggs Institute critical appraisal of included studies. This figure presents the quality assessment of the included studies using the Joanna Briggs Institute checklist. It indicates which quality criteria were met across the studies.

3.1.1.2 | Theme 2: The Viewpoint of Patients Toward Healing, Life, and Death. In living with lung cancer, patients and their families convey varied, yet interconnected perspectives on treatment, life, and death. Patients face the complexity of managing the progression of their disease, and some acknowledge that a complete cure may be impossible, shifting focus toward limiting disease progression and maintaining the quality of life. Patients and their families navigate complex emotions as they strive to balance treatment, quality of life, and the inability of death.

3.1.1.2.1 | Healing. Patients often express a desire to live as long as possible, although the concept of healing in cancer differs significantly from that of an acute injury or illness. One patient noted, "Live as long as possible! When they say you have cancer, it is not like when you break an arm and say, 'heal'." [15]. The focus is often on prolonging life rather than on achieving complete recovery. As another patient emphasized, "Healing will not be possible, so limiting progression is our goal." [15]. This shift from curative treatment to disease management is common, with families and patients striving to maintain their highest possible quality of life.

3.1.1.2.2 | Death and Life. Patients with a terminal diagnosis often experience profound psychological shifts. While death is inevitable, reality becomes more poignant when linked to terminal illness. As one patient movingly expressed, "You could get hit by a truck and you will be dead. However, when you hear that you will die, that is such a large difference. I just feel I'm dying. And that's the difference." [17]. This realization leads to a deeper reflection on life and death, with the quality of life becoming central to treatment decisions. For some, the prospect of declining the quality of life becomes the threshold for discontinuing active treatment. As one patient stated, "I would stop treatment if my quality of life fell so low that it made me say, 'Why keep going?'." [15]. Despite these challenges, patients find moments of emotional connection with family members coming together in new ways to provide support, care, and strengthen relationships. Discussions on death often extend to family considerations, as patients make practical arrangements for their loved ones to ease the burden of their passing.

3.1.1.2.3 | Focus. For many patients, the focus shifts from seeking a cure to maximizing the time they have, rather than dwelling on their illness. Medical advancements can extend life,

TABLE 2 | Key supporting quotes per theme.

Theme		Supporting quotes
Theme 1: Side effect	Skin	"That's a side-effect of the immunotherapy, you start to itch, then I begin to scratch it, but you keep scratching till you get through it—Till you get through everything, till you bleed." [14]
		"Essentially, the fact that I was losing my skin, my hands were bleeding... how can I live like that? Better to die..." [14]
		"10 toes are still numb, hands slightly numb, but does not affect the movement. The second one is itching. The skin gets very rough. Oh, yes, and there seems to be a memory loss" [18]
		"The skin itch has also been made a few times, is it the cause of immunotherapy? Is it why I take other medicine?" [18]
	Nausea	"I couldn't even manage to take (name of the drug), the side effect was fainting, or almost. It was continuing and continuing vomiting and nothing ever came up because I wasn't able to hydrate myself." [14]
		"A sense of nausea... iron, it was like I had iron inside me, rust." [14]
		"I had nausea and you're a different person." [14]
		"Yes, you have a lot of side effects, such as nausea, that remind you of it." [14]
		"When I need to prepare food, I feel sick. When I need to start preparing a meal for my husband and my daughter, not only am I not hungry but it actually disgusts me." [14]
	Risk of infections	"Your immune system is at its lowest now. Don't stand near sick people in the shop, stay away from the bakery, because if there's someone there who has something, you'll get it too." [14]
		"I also got two infections in my big toe, for which the doctor had actually sent me to the cosmetologist, they had to suspend use of the drug for 2 weeks because there was this infection in this big toe and then it got better and there was nothing more." [14]
		"I can still remember when my grandson had just learned to walk, he came over to me and they all said, 'no don't, don't, you have a cold, you have to stay away'." [14]

(Continues)

TABLE 2 | (Continued)

Theme		Supporting quotes
	Healing	"Live as long as possible! When they say you have cancer it is not like when you break an arm that you say 'heal'." [15]
		"The focus must always remain on the primary-on healing, and the rest is nice to have." [15]
		"Healing will not be possible, so limiting the progression is our goal." [15]
	Death and life	"Of course, we're all going to die. You could get hit by a truck and you'll be dead. But when you hear that you will die, that's such a big difference. It's really hard to comprehend. Even now people sometimes say to me, well maybe I'll be dead before you. Well, that's fine, I'm just saying: you don't know, but I do know. I just feel I'm dying. And that's the difference." [17]
		"When it seemed certain that I was going to die, it was super intense... You don't know what's hanging over your head and when resistance will occur." [17]
		"Which is also important that you realize that you're not the only one who dies. It helped me to think, oh, I'm not the only one who dies, but everyone has to say goodbye to me and I have to say goodbye to everyone, but a thing I also think, maybe they will die earlier than me. Yes, a kind of equality, also equalizing your situation to others." [19]
		"I would stop the treatment if my quality of life fell so low that it made me say: 'why keep going?'" [15]
		"I just go with it now. I used to be fiercely independent, not so much now, I go with the help, I've learned my limitations, I have a simple life..." [16]
		"I will undergo every treatment as long as my brain functions." [14]
Theme 2: the point of view of patients/family	Focus	"The disease has brought us closer together. It was my birthday last week and my kids came over. Then we talked about it. When I got sick a year ago, the kids really wanted to be with me and they were super sweet and caring and so was my husband. That was very beautiful." [19]
		"Well, I've always continued to move forward. I even started sorting out my funeral two months ago. Hoping, of course, that I can stay alive for a long time, and so that my wife does not have any problems later on. That everything is arranged and that she can be at ease. So that is how rational I am and yes, I just carry on with my life." [15]
		"I would accept being bed-bound, having nausea, pain in my legs, and maybe I would also accept that I may not completely recover, if I were sure that it (the cancer) would stop growing." [14]
		"I'm trying to keep in mind that the medical world is at the point where they can keep you alive for quite a couple of years. And that the focus should be on that, and not on being sick." [19]
		"What has been really helpful in recent years is contact with others. Fellows, online or in groups. Everyone deals with it differently, of course, but to be able to get something out of that contact could help me, that's very nice. 'Oh is that what you do? Is that how you approach it? Would that also be something for me?'" [19]
		"When everything is uncertain, anything is still possible... you have to be able to see the positive side..." [19]
		"I'm treated by the best medical team, who know immunotherapy best, and it doesn't matter how much I knew." [18]

(Continues)

TABLE 2 | (Continued)

Theme		Supporting quotes
Theme 3: Uncertainty	From patients' perspective	"It's so new and long term, will it keep working, will it stop?" [15] "I had to wait 5 months for the results of a scan. That's too long for me there's too much uncertainty" [14] "The scans and the conversations afterwards are the moments when it really comes to the forefront again. Very present. This creates tension and uncertainty. However, this became less, every time it went well." [17] "I can eat and drink right now, just like normal people. I am worried that I would stop taking the drug once drug resistance, what should I do? How long does this drug's effectiveness last? It feels like everything is pretty uncertain." [18] "I didn't understand it at first, and then I looked it up online..." [18] "I'm treated by the best medical team, who know immunotherapy best, and it doesn't matter how much I knew" [18] "Not knowing when, and I think that's even hard now, is not knowing when all this is going to finish." [16]
	From carers' perspective	"We're living and we have a reasonably good life. We do rent, which sometimes is very difficult...after owning your own home for such a long time, but we look at it as being if we didn't have that money we couldn't do other things...We can't afford to plan any further because we really don't know and I suppose that's the hardest part, the unknown, and it's been like that for 13 years...Just a very long time, hard, difficult, turmoil, I suppose you could call it...Some days can be really, really good and some days can be just awful. It's been hard." [16]
	Oncologist/consultant	"The oncologist said that it's quite a slow-growing cancer and that some of the treatment might just stop it from growing and he has got the symptoms under control and everybody always says that the medical advances are continuing to grow...I'm realistic in the fact that he probably won't be around. But I'm also hopeful that we've probably got more time than it sometimes sounds." [16] "It's something that we're walking with at all times. But you can actually push it into the background for a little while and get on with life." [16] "The drug has been doing wonders...I asked the oncologist how long I have to be on the drug, because it has got multiple side-effects...They don't know because it's a wait-and-see thing. So I might stay on the drug, let's say two years, three years. In the meantime what I thought, 'I need to do my part in trying to get better'..." [16] "When someone finishes treatment and the last time they see you...it's a really difficult time for the patient. You've become their normality for a while and then it's that change that they have and they're almost dumped back into the unknown, for a start, because they don't know what's going to happen with their cancer, no one can know because there's that uncertainty." [16] "My oncologist says 'oh go live'. Literally: 'go live'. But how? With what future? Can I trust that I still have years to come? Yeah nobody knows, and neither do I. Making plans for the future can be difficult then." [17] "They (the doctor) can't guarantee you how much the treatment will work. It did not like the past anti-inflammatory drugs, such as penicillin, it worked in a day or two. And the clinical trial isn't that long, and the doctor never promises you (sigh)." [18]

(Continues)

TABLE 2 | (Continued)

Theme		Supporting quotes
Theme 4: Psychological and financial stress	Patients	"So I say 'gosh, I've been in real pain here lately (points to belly). I probably have metastases again, the cancer has spread to the liver.' And... and that's what happens. And then my sister says 'your liver isn't there at all, it's in a completely different place.'" [17]
		"I can't do a lot of things anymore. For example, working in the garden. My great passion, I can't work in the garden anymore. I need help with it. I can sow, I can fertilize and I do that. Then they put that sack of manure in front of me with a shovel, like I'm half an invalid, but I think I'll do it anyway." [19]
		"At the very beginning I got the scans every other month and then over time every three months and then every six months. In the beginning when it was every other month, that was my life window, my outlook for life. I also told myself it is one month, then we'll see. That was manageable for me." [17]
		"It is an economic problem, which is the most important. This medicine is too expensive, I've been on it for 11 cycles. I don't know how much longer I can do this (sigh)." [18]
		"Now I cough and phlegm. I can't catch for breath. I said to no one that I didn't want to burden the children. If I say it, they have to ask their boss for leave, I am afraid to burden them." [18]
	Family/carer	"Not knowing when, and I think that's even hard now, is not knowing when all this is going to finish." [16]
		"We look at it as being if we didn't have that money we couldn't do other things...We can't afford to plan any further ... It's been hard." [16]
		"That's a lot of money for a year. I have two children and four elderly people to support. I'm guilty of my wife. The disease is stressful for almost every family." [18]

which instills hope. As one patient explained, "I'm trying to keep in mind that the medical world is at the point where they can keep you alive for quite a couple of years. And that the focus should be on that, and not on being sick." [19]. Many patients demonstrate resilience during treatment by maintaining their hope, focusing on social support, and engaging with others. Contact with peers, whether in support groups or online communities, proves beneficial and offers a sense of shared experience and solidarity. One patient explained, "What has been really helpful in recent years is contact with others. Everyone deals with it differently, but to be able to get something out of that contact could help me." [19].

3.1.1.3 | Theme 3: Uncertainty. Uncertainty is a shared experience between patients, caregivers, and oncologists. Whether it pertains to the unknown outcomes of treatment, delays in receiving results, or the inability to plan for the future, uncertainty presents a significant emotional and psychological burden from all perspectives.

3.1.1.3.1 | From Patients' Perspective. Patients undergoing immunotherapy frequently experience profound uncertainty regarding the efficacy and long-term outcomes of treatment. This anxiety is heightened by the unpredictability of the effectiveness of a drug and its potential side effects. One patient remarked, "It's so new and long-term; will it keep working, or will it stop?" [15]. This sentiment reflects an ongoing concern about the unknown trajectory of their health. Another patient highlighted the emotional toll of delayed medical updates: "I had to wait five months for the results of a scan. That's too long for me; there's too much uncertainty." [15].

Uncertainty often intensifies during medical appointments, particularly following scans and discussions with healthcare providers. One patient described this experience, noting, "The scans and conversations afterward are the moments when it really comes to the forefront again. Very present. This created tension and uncertainty. However, this became less every time it went well." [17]. A pervasive concern for many patients is the potential for drug resistance, as illustrated by another patient's concern: "I am worried that I would have to stop taking the drug once resistance develops. What should I do then? How long has the drug's effectiveness lasted? It feels like everything is uncertain." [18].

Patients also varied in their management of uncertainty. Some sought additional information on their own, as one patient stated: "I didn't understand it at first, and then I looked it up online." [18]. Others place their trust entirely in their healthcare team: "I'm treated by the best medical team, who know immunotherapy best, and it doesn't matter how much I knew." [18].

3.1.1.3.2 | From Carers' Perspective. For caregivers, uncertainty primarily manifests as an inability to plan for the future, creating ongoing emotional strain. One carer expressed this difficulty: "Not knowing when, and I think that's the hardest part now, is not knowing when all this is going to finish." [16]. The practical challenges of living with uncertainty were echoed by another carer: "We can't afford to plan any further because we really don't know, and I suppose that's the hardest part, the unknown. It's been like that for 13 years" [16].

Despite the persistent uncertainty, some carers manage to find moments of normalcy amidst the unpredictability: "It's something that we're walking with at all times. But you can actually push it into the background for a little while and get on with life." [16]. Another carer balanced realism with hope, recognizing the limitations of medical interventions while still hoping for more time with their loved one: "I'm realistic in the fact that he probably won't be around. But I am also hopeful that we have probably got more time than it sometimes sounds." [16].

3.1.1.3.3 | From Oncologists' Perspective. Oncologists also face the challenge of navigating and communicating inherent uncertainties associated with cancer treatment. One patient recounted their oncologist's transparency regarding the unpredictability of outcomes: "The drug has been doing wonders... They do not know because it's a wait-and-see thing." [16]. This reflects oncologists' efforts to manage expectations while acknowledging the limitations of medical knowledge.

The difficulty of posttreatment transitions further highlights the uncertainty faced by both patients and oncologists. As one oncologist explained, "When someone finishes treatment and the last time they see you... it is a really difficult time for the patient. They have become accustomed to you, and suddenly, they're left to navigate the unknown, unsure of what will happen with their cancer." [16].

This unpredictability can complicate future planning. One patient described their oncologist's advice to live fully despite the uncertainties: "My oncologist said, 'Oh, go live.' Literally: 'Go live.' But how? With what future? Can I trust that I still have years to come?" [17].

3.1.1.4 | Theme 4: Psychological and Financial Stress. The psychological and financial pressures of lung cancer patients and their families are intertwined, with pressure to balance life-saving treatment with financial restrictions and patients feeling guilty about being a financial burden on their families. These pressures are particularly challenging when social and family obligations are highly valued.

3.1.1.4.1 | Psychological Stress. Patients with lung cancer and their families often face overwhelming psychological stress, which is deeply connected to the emotional toll of diagnosis and ongoing treatment. Many patients struggle to adapt to the profound changes in their daily lives and sense of self-worth, as illustrated by one patient's experience of diminished physical capabilities: "I can't do a lot of things anymore. For example, they may work in gardens. My great passion, I cannot work in the garden anymore... like I am half invalid, but I think I will do it anyway." [19].

Similarly, the ongoing fear of disease progression adds to the psychological burden, with one participant comparing their life to a cycle of waiting for results: "In the beginning when it was every other month, that was my life window, my outlook for life... That was manageable for me." [17].

Carers are also affected by the emotional demands of caring for loved ones with cancer. The psychological stress experienced by caregivers frequently manifested as profound uncertainty about the future. As one caregiver expressed: "Not knowing when, and I think that's even hard now, is not knowing when all this is

going to finish." [16]. Patients may refrain from expressing their distress, trying to shield their families from the psychological impact: "Now I cough and phlegm. I cannot catch breaths. I said to no one that I did not want to burden the children... I am afraid to burden them." [18]. Such statements demonstrate a dual psychological strain, where patients and caregivers attempt to manage their emotional suffering independently, but in doing so, may further isolate themselves.

3.1.1.4.2 | Financial Stress. In addition to emotional weight, financial stress significantly affects patients with lung cancer, particularly in regions where healthcare costs are a major concern. For many, the prohibitive cost of treatment is a source of anxiety and helplessness, as described by one patient: "It is an economic problem, which is the most important. This medicine is too expensive, and I have been using it for 11 cycles. I do not know how much longer I can do this (sigh)." [18].

The economic burden is acutely felt by families, who often bear the responsibility of supporting both the patient and other dependents: "That's a lot of money for a year. I have two children and four elderly people for their support. I'm guilty of my wife. The disease is stressful for almost every family." [18] One patient's wife said: "We look at it as being if we didn't have that money we couldn't do other things...We can't afford to plan any further ... It's been hard." [16].

4 | Discussion

Immunotherapy has been more widely used in the clinic in recent years owing to its notable advantages over traditional chemotherapy, especially the more favorable side effect profile [20, 21]. Clinical data demonstrate that patients receiving immunotherapy experience better long-term outcomes and more manageable side effects [22, 23]. This relative tolerability makes immunotherapy an increasingly preferred treatment modality, particularly for patients prioritizing their quality of life during cancer treatment [24]. Our metasynthesis identified four major themes reflecting patients' and caregivers' lived experiences. These include (1) the profound influence of psychological state on quality of life, (2) anxiety and stress arising from treatment-related uncertainty, (3) mild but present physical side effects requiring management, and (4) considerable psychological and financial burdens among caregivers. These findings highlight that, despite the clinical advantages of immunotherapy, its broader impact on patients and families extends beyond physical outcomes and calls for holistic, psychosocially informed care strategies.

Patients often experience anxiety and stress due to uncertainty about treatment outcomes and a lack of comprehensive information about immunotherapy [25]. We found that caregivers and oncologists face uncertainty because cancer treatment is a wait-and-see approach. Prior studies have shown that providing tailored education and information about immunotherapy can alleviate some of this uncertainty and improve patients' mental well-being [26, 27]. Patients who understand their treatment process and potential outcomes are better equipped to manage their expectations and cope with the emotional challenges of cancer treatment [28]. Therefore, comprehensive patient education plays a crucial role in reducing stress caused by uncertainty, enhancing patients' knowledge and sense of control, which in turn promotes treatment adherence.

However, recent research has also indicated that excessive or overly detailed information may overwhelm some patients, leading to confusion or heightened anxiety. Although patients valued learning about immunotherapy and its potential toxicities, many felt emotionally burdened by the volume and complexity of the information provided [29]. Educational strategies should be personalized and paced according to patients' preferences and readiness to absorb information. In our findings, uncertainty and anxiety were among the most salient psychological experiences; thus, education tailored to individual needs, combined with empathetic communication, could help mitigate these effects. In this process, effective and empathetic communication from healthcare professionals serves as an essential complement to education, fostering trust and further reducing anxiety [30]. For example, healthcare professionals could provide some clinical outcomes in comprehensive education, which are related to survival and quality of life, help patients and their families reduce uncertainty about treatment, and build their confidence.

Family attitudes and support play a critical role in shaping cancer patients' perceptions of their illness and overall psychological well-being [31]. Patients with supportive family members tend to maintain a more positive outlook and experience less psychological burden [32, 33]. Optimistic patients, with adaptive coping mechanisms, tend to focus less on the negative aspects of their illness while prioritizing the quality of life. Conversely, patients with lower expectations regarding disease progression and more realistic goals often report higher levels of happiness. Our synthesis also showed that caregivers' stress and uncertainty directly affected patients' emotions and coping patterns, indicating that family dynamics are interlinked with psychological adjustment. Overall, patients' views on cancer are influenced by psychological resilience and family attitudes, underscoring the importance of family-centered interventions in promoting emotional well-being in cancer care.

The multifaceted stress faced by patients with lung cancer and their families stems from lifestyle changes and the need to adapt to a new normal. Family support is crucial in easing the emotional burden [34]. The financial strain associated with cancer treatment, including immunotherapy, can overwhelm many families. The literature suggests that financial stress can negatively affect caregivers' mental health and their ability to provide effective support to patients [35]. Consistent with our findings, family caregivers reported substantial stress due to financial burdens and their impact on family relationships, further intensifying psychological distress. Financial stress, particularly pronounced in Chinese patients due to the healthcare and insurance systems, adds to their challenges. In China, limited insurance coverage and high out-of-pocket costs exacerbate financial strain, with many patients facing potential loss of income [36]. This differs from countries with comprehensive insurance, where financial concerns may be less severe, underscoring the role of healthcare systems in shaping patient stress. Family caregivers experience significant stress due to financial burdens and their impact on family dynamics. Additionally, the dual role of managing family responsibilities and caregiving can lead to emotional and physical exhaustion [37]. Patients from countries

with more comprehensive insurance systems, such as those in Europe, North America, and Australia, may experience less financial anxiety and greater acceptance of immunotherapy compared with Chinese patients. These regional differences suggest that healthcare policies and social support systems play a vital role in shaping the psychosocial experiences of patients and caregivers. Support systems and resources tailored to caregivers' needs, such as financial assistance programs and counseling services, are essential to alleviate these pressures and enhance the caregiving experience [38, 39]. Therefore, caregivers in developing countries may need to pay particular attention to psychological problems caused by financial strain. Moreover, as most of the included studies were conducted in high-income countries, it is necessary to conduct further cross-cultural research to explore how different healthcare and insurance systems influence patient and caregiver stress, especially from a financial perspective.

4.1 | Implications for Practice and Future Research

The emotional and psychological stress experienced by patients and their families emphasizes the need for a more holistic approach to cancer care. Treatment should focus not only on clinical outcomes but also on the psychological and emotional needs of patients. Family support plays a key role in shaping patients' perspectives and coping mechanisms. Future research should explore family centered interventions to enhance the psychological resilience of patients and caregivers. Furthermore, incorporating mental health support such as counseling and psychoeducation into standard cancer care could reduce the emotional burden associated with lung cancer treatment.

Challenges faced by patients, caregivers, and oncologists highlight the need for improved communication strategies and timely medical updates. Developing structured communication protocols to provide up-to-date information on treatment effects, prognosis, and potential side effects could alleviate anxiety caused by uncertainty. Future research should also investigate interventions to help patients and their families cope with unpredictability, such as decision aids or psychosocial support programs.

The financial strain on lung cancer treatment underscores the need for policy reform, especially in regions with limited health insurance coverage, such as China. Enhancing access to affordable treatment and financial support programs should be prioritized to reduce the financial burden on patients and their families. Future research should examine the impact of financial stress on treatment adherence and patient outcomes by focusing on strategies to alleviate this burden. Comparative studies across healthcare systems may offer insights into how policy changes can improve both the economic and psychological outcomes of patients with lung cancer worldwide.

4.2 | Limitations

This study has several limitations. First, the heterogeneity of study methodologies, such as variations in interview techniques, thematic analysis approaches, and differences in patient populations and healthcare settings, may influence the synthesis of results and compromise the comparability of studies.

Another limitation is the relatively small number of included studies and participants, which may not fully capture the diversity of experiences among patients with lung cancer receiving immunotherapy and their caregivers. Furthermore, reliance on qualitative data, although valuable for providing in-depth insights into personal experiences, may lack the quantifiable measures typically required to generalize findings across larger populations.

Finally, although the literature search was comprehensive, a few recent studies published after the search cutoff date may not have been captured. Future reviews could incorporate these newer publications to provide an updated synthesis of evolving patient and caregiver perspectives.

5 | Conclusion

This study demonstrates that lung cancer patients receiving immunotherapy and their families face a complex array of challenges, such as coping with psychological and financial stress and understanding treatment outcomes. Uncertainty and financial stress increase psychological burden, highlighting the need for a comprehensive support system, including family engagement and clear communication from healthcare providers. While immunotherapy is generally more tolerable than chemotherapy, it still has significant side effects that patients often rate based on their impact on the quality of life. Future research should prioritize interventions that address these psychosocial factors and examine strategies to reduce financial stress, particularly in areas with limited health insurance coverage. These efforts aimed to improve patients' overall experience and promote better treatment adherence.

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Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

Data sharing is not applicable to this article as no data were created or analyzed in this study.

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Supporting Information

Additional supporting information can be found online in the Supporting Information section.

Supporting Information 1. Supporting File 1: PRISMA Checklist (PRISMA.pdf). This file contains the completed PRISMA 2020 checklist, detailing the reporting items for this meta-synthesis as outlined on the PRISMA Statement website. It indicates which items are reported in the main manuscript and where they can be located.

Supporting Information 2. Supporting File 2: PROSPERO Registration (PROSPERO.pdf). This file provides documentation of the pre-registered protocol for this systematic review on the PROSPERO international prospective register (Registration ID: CRD42024588207). It includes the prespecified review objectives, eligibility criteria, search strategy, and planned methods of analysis.