

Factors associated with quality of life among non-small cell lung cancer patients treated with first-line targeted therapy in Vietnam: A study using the EORTC QLQ-C30 scale

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Abstract:

A cross-sectional study was conducted using the European Organisation for Research and Treatment of Cancer Quality of Life Questionnaire-Core 30 (EORTC QLQ-C30) scale to measure the quality of life (QoL) of 310 non-small cell lung cancer (NSCLC) patients with EGFR mutations receiving first-line targeted therapy at the Vietnam National Cancer Hospital from October 2022 to December 2023. A Tobit regression model was employed to identify factors associated with the QoL of NSCLC patients. The global health status of NSCLC patients was rated at 62.88 points, with financial difficulties scoring 51.08 points. Among the functional scales, physical functioning scored the highest at 85.72 points, followed by role functioning (79.57), cognitive functioning (78.66), social functioning (71.72), and emotional functioning, which scored the lowest at 65.83 points. Regarding the symptom scales, insomnia scored the highest at 35.48 points, followed by fatigue (31.33), pain (25.11), diarrhoea (23.33), appetite loss (17.1), and dyspnoea, which scored the lowest at 4.62 points. Factors such as low income, residing in rural areas, and experiencing fatigue symptoms have a detrimental effect on the QoL of NSCLC patients. Improving fatigue symptoms, supporting income for low-income patients, and offering financial assistance, such as providing complimentary bus tickets and meals at the hospital, can alleviate financial strain and prolong the duration of support for NSCLC patients.

Keywords: non-small cell lung cancer, quality of life, targeted therapy.

Classification number: 3.2

1. Introduction

Lung cancer was responsible for 1.8 million deaths worldwide in 2020, making it one of the leading causes of cancer-related mortality [1]. In 2020, Vietnam recorded 23,797 deaths due to lung cancer [2]. The annual incidence of lung cancer is known to be age-related, with cases tending to increase with age. The age group of 50 to 69 years accounts for more than 50% of the total number of new lung cancer cases each year [2]. Approximately 80-90% of these cases are classified as non-small cell lung cancer (NSCLC) [3, 4], with EGFR gene mutations accounting for the highest rate at 10-35% [5]. Targeted therapy plays a crucial role in preventing the development of mutated genes, metastasis, and shrinking tumors [6, 7]. However, these targeted drugs can also lead to side effects such as dry skin, acne, hair loss, nail peeling, brittle nails, slow nail growth, diarrhoea, and more [8, 9]. These side effects have had a significant impact on the quality of life (QoL) of patients with NSCLC. Up to 72% of patients experience treatment-

related side effects, and 32% test positive for psychiatric disorders [10]. Evaluating the impact of treatment side effects on quality of life (QoL) in cancer patients will help explain why QoL worsens [10] and assist clinicians and policymakers in developing appropriate health policies and interventions for patients. This is particularly important for lung cancer patients undergoing targeted therapy. The EORTC QLQ-C30 scale is a specialised tool to assess QoL in lung cancer patients [11]. However, the question we aim to address in this study is whether improving symptoms for NSCLC patients should focus on specific symptoms or aim to improve all symptoms based on the symptom scores that patients experience in the EORTC QLQ-C30 scale.

In Vietnam, first-generation and second-generation targeted therapies such as Erlotinib, Gefitinib, and Afatinib are only covered 50% by health insurance. Third-generation targeted therapy, Osimertinib, requires patients to pay 100% out of pocket. Additionally, up to 89% of patients with NSCLC are diagnosed at late stages (IIIB and IV) [12], most

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of whom choose to remain at home [13]. This decision often results in unemployment, reduced income, or complete loss of income in the short or long term [13]. These individuals are likely to face significant financial burdens, leading to choices such as dose reduction, treatment discontinuation [14-18], and ultimately increased symptoms, reduced quality of life, and decreased survival [14, 19, 20]. A study conducted on patients with NSCLC treated with targeted therapy in Vietnam, using the EORTC QLQ-C30 scale, revealed that economic conditions, residence, and occupation were related to the quality of life of patients [21]. However, no studies have been conducted on NSCLC patients with EGFR mutations being treated with first-line targeted therapy. Additionally, the relationship between income and the quality of life of NSCLC patients in Vietnam has not been addressed. Therefore, we conducted this study with the following objectives: to assess the quality of life and factors related to the quality of life of NSCLC patients with EGFR mutations being treated with first-line targeted therapy. In particular, we aimed to further explore the relationship between patient income, the component scales/items, and the global health status/QoL of NSCLC patients using the EORTC QLQ-C30 scale.

2. Materials and methods

2.1. Study population

The population studied consisted of patients with NSCLC (ICD-10 code: C34) who had been diagnosed with an EGFR gene mutation and were receiving targeted therapy. The inclusion criteria were as follows: NSCLC patients aged 18 to 100, receiving first-line targeted therapy, able to understand and communicate in Vietnamese, and willing to participate in the study. The exclusion criteria included patients currently dealing with or receiving treatment for other acute diseases, patients undergoing second or third-line treatments, and patients in the progression stage of the disease. Additionally, patients who refused to sign the consent form to participate in the study or voluntarily withdrew from the study for any reason before completing all the research questions were excluded.

Study location: The study was conducted at the Department of Medical Oncology 1 and Medical Oncology 2 at the Vietnam National Cancer Hospital in Tan Trieu, Hanoi, Vietnam.

The interview period: The study was conducted from October 2022 to December 2023.

Study design: A cross-sectional descriptive study design was utilised.

Sampling method: We employed a convenience sampling approach to carry out the study, inviting patients who met the selection criteria to participate.

Sample size: The sample size was determined using the formula for an average value:

$$n = (Z_{1-\alpha/2}^2 \sigma^2) / \varepsilon^2 \mu^2$$

where n: Research sample size; $\alpha=0.05$, $Z_{1-\alpha/2}=1.96$; σ (standard deviation): $\sigma=12.6$ points [21]; ε (acceptable relative error): $\varepsilon=0.0265$; μ (mean): $\mu=55.8$ points [21]. Therefore, $n=279$ patients, with a 10% non-responses, resulting in $n=307$. The study ultimately collected data from 310 patients with NSCLC.

EORTC QLQ-C30 scale: The Vietnamese version of the EORTC QLQ-C30 questionnaire version 3, which has been standardised in Vietnam, included 30 questions that evaluate three aspects of QoL in lung cancer patients: function, symptoms, and general health status. The scales range from 0 to 100 points [11].

Data collection method: All NSCLC patients who met the selection criteria, including those undergoing examinations, tests, ultrasounds, X-rays, and awaiting results and prescriptions for home treatment, were invited to participate in the study. Patients were given the form to read, and all questions regarding the study's purpose and procedures were thoroughly explained. The researcher conducted face-to-face interviews with patients who agreed to participate in a private room, using the available questionnaire. The average interview duration was between 10 and 20 minutes.

How to calculate scores for the EORTC QLQ-C30 scale: The EORTC QLQ-C30 scale includes 30 questions. Questions 1 to 28 have 4 levels of response, while questions 29 and 30 have 7 levels. The scores of the answers are then converted to a 100-point scale. The Raw score (RS) is calculated as the average score of the component items [11]:

$$RS = (I_1 + I_2 + I_3 + \dots + I_n) / n$$

where I_n is the value of the answers in the component items.

Standardised score: Based on RS and calculated on a scale of 100 following the formula:

$$\text{Functional scales scores: Score} = \{1 - (RS - 1)/3\} \times 100$$

$$\text{Symptom scales scores/items: Score} = \{(RS - 1)/3\} \times 100$$

$$\text{Global health status score: Score} = \{(RS - 1)/6\} \times 100$$

Data analysis and processing: All data, after being entered, will be cleaned and encoded using Excel version 2019 software, and then analysed using STATA version 17.0 and SPSS version 26.0 software.

Numbers and percentages were used to report categorical variables such as age groups, gender, patients' household economic status, and patients facing problems with items/scales of the EORTC QLQ-C30 scale. Pearson's Chi-square test or Fisher's exact test was used to evaluate variances between categorical variables and the patients' residence. Mean, standard deviation, minimum, and maximum values were employed to report numeric variables such as patients' income and items/scales scores of the EORTC QLQ-C30 scale. The Kolmogorov-Smirnov test and histogram chart were used to evaluate the normal distribution of the numeric variable (patients' income). The findings indicated that patients' income did not follow a normal distribution. The Mann-Whitney U test was conducted to compare differences in patients' income and their residence.

The dependent variable in this study was the global health status/QoL measured on the EORTC QLQ-C30 scale. The variable was censored at 0 from the left and 100 from the right, representing the lowest (0 points) and highest (100 points) scores of the global health status/QoL that the patient was assessed on the EORTC QLQ-C30 scale [11]. Since using linear regression (OLS) models was not feasible, Tobit regression models were employed to identify factors associated with the global health status/QoL score of NSCLC patients based on previous studies [22-24]. Univariate and multivariate Tobit regression models were utilised to determine the relationships between independent variables (age groups, gender, patients' income, patients' household economic status, functional scale scores, symptom scale/item scores, and financial difficulties) and the dependent variable (global health status/QoL) of NSCLC patients. It was assumed that the dependent variable (global health status/QoL) of NSCLC patients follows a normal distribution. A p-value below 0.05 was considered statistically significant.

2.2. Ethical approval

The study was initially approved by the Ethics Council of Hanoi Medical University under Certificate No. 666/GCN-HĐĐĐNCYSH-ĐHYHN and 974/GCN-HĐĐĐNCYSH-ĐHYHN. Afterward, the research team sought permission to collect and use data for research purposes, which was granted by the leadership of the Vietnam National Cancer Hospital in Tan Trieu.

3. Results

3.1. General characteristics of research subjects

Among the total of 310 patients (Table 1), 71.3% (221/310) resided in rural areas, with 51.6% being over 60 years old. Females constituted a slightly higher percentage than males (51 compared to 49%). The average monthly income of the patients was 1,679,570 VND, with 8.4% of them living in poor or near-poor conditions. Patients living in urban areas had a monthly income of 5,372,933 VND, which was 3.2 times higher than that of patients in rural areas (1,679,570 VND, $p < 0.001$). The proportion of patients living in poor or near-poor conditions in rural areas was significantly higher than in urban areas ($p = 0.012$).

Table 1. Characteristics and residence of non-small cell lung cancer patients.

Characteristics	Total n (%)	Residence n (%)		p-value
		Urban area (n=89)	Rural area (n=221)	
Age groups (years old)	>60	160 (51.6%)	47 (15.2%) 113 (36.5%)	0.789 ^a
	≤60	150 (48.4%)	42 (13.5%) 108 (34.8%)	
Gender	Female	158 (51.0%)	50 (16.1%) 108 (34.8%)	0.244 ^a
	Male	152 (49.0%)	39 (12.6%) 113 (36.5%)	
Patients' income (VND/month)	Mean (SD)	2,739,923 (4,720,438)	5,372,933 (7,115,956) 1,679,570 (2,666,091)	<0.001 ^b ***
Household economic status ^b	Poor/near-poor	26 (8.4%)	2 (0.6%) 24 (7.7%)	0.012 ^a *
	Normal or above	284 (91.6%)	87 (28.1%) 197 (63.5%)	

^a: Pearson Chi-square test or Fisher's exact test; ^bMann-Whitney U test, * $p < 0.05$, *** $p < 0.001$; ^b: A household in rural areas is considered poor if it has a monthly per-capita income of VND 1,500,000 or lower and meets at least three indicators measuring deprivation of access to basic social services. A monthly per-capita income of VND 2,000,000 or lower and meets at least three indicators measuring deprivation of access to basic social services. A household will be considered near-poor for having the same monthly income as a poor household, but meeting less than three indicators measuring deprivation of access to basic social services [25].

3.2. The quality of life of non-small cell lung cancer patients based on the EORTC QLQ-C30 scale

According to this scale, higher scores on the global health status/QoL and functional scales indicate better outcomes, while lower scores on the symptoms scale/items and financial difficulties scales are preferable [11].

Table 2. The EORTC QLQ-C30 scores of non-small cell lung cancer patients.

EORTC QLQ-C30 scores	Mean	SD	Min	Max
Global health status/QoL	62.9	17.4	16.7	100.0
<i>Functional scales</i>				
Physical functioning	85.7	13.0	26.7	100.0
Role functioning	79.6	23.0	33.3	100.0
Emotional functioning	65.8	26.0	0	100.0
Cognitive functioning	78.7	19.1	33.3	100.0
Social functioning	71.7	22.8	33.3	100.0
<i>Symptoms scales/items</i>				
Fatigue	31.3	20.2	0	77.8
Nausea and vomiting	5.1	13.1	0	100.0
Pain	25.1	24.0	0	100.0
Dyspnoea	4.6	12.7	0	66.7
Insomnia	35.5	30.1	0	100.0
Appetite loss	17.1	22.6	0	100.0
Constipation	7.0	16.2	0	100.0
Diarrhea	23.3	25.4	0	100.0
Financial difficulties	51.1	28.7	0	100.0

The mean score for the global health status/QoL of NSCLC patients treated with targeted therapy was relatively high at 62.9 points, while the score for financial difficulties was 51.1 points. Among the functional scales, physical functioning had the highest score at 85.7 points, whereas emotional functioning had the lowest score at 65.8 points. In terms of symptom scales/items, insomnia was the most prevalent, with a score of 35.5 points, while dyspnoea was the least prevalent, scoring 4.6 points. The score for financial difficulties remained at 51.1 points (Table 2).

In the functional scales, a lower percentage of patients experiencing problems in these aspects indicates better outcomes [11]. The percentages are presented below (Table 3).

Table 3. Percentage of patients facing problems in the functional scales.

Functional scales (Item/scale numbers)	Patients facing problems			
	No		Yes	
	n	%	n	%
<i>Physical functioning (1 to 5)</i>				
Trouble doing strenuous activities	77	24.8	233	75.2
Trouble taking a long walk	134	43.2	176	56.8
Trouble taking a short walk	285	91.9	25	8.1
Need to stay in bed or a chair during the day	291	93.9	19	6.1
Need help with eating, dressing, washing or using the toilet	294	94.8	16	5.2
<i>Role functioning (6, 7)</i>				
Limited in doing either work or other daily activities	154	49.7	156	50.3
Limited in pursuing hobbies or other leisure time activities	170	54.8	140	45.2
<i>Emotional functioning (21 to 24)</i>				
Feel tense	90	29.0	220	71.0
Worry	83	26.8	227	73.2
Feel irritable	185	59.7	125	40.3
Feel depressed	80	25.8	230	74.2
<i>Cognitive functioning (20, 25)</i>				
Difficulty in concentrating on things	137	44.2	173	55.8
Difficulty remembering things	136	43.9	174	56.1
<i>Social functioning (26, 27)</i>				
Interfered with your family life	103	33.2	207	66.8
Interfered with your social activities	106	34.2	204	65.8

In the functional scales, most patients experienced problems at varying levels and rates. Among them, patients reported the most difficulty with strenuous activities (75.2%), followed by feelings of depression (74.2%), worry (73.2%), and tension (71%). In physical functioning, up to three out of five scales indicated that less than 10% of patients experienced problems, including needing help with daily activities (5.2%), needing to rest all day in bed (6.1%), and having difficulty walking a short distance (8.1%) (Table 3).

Based on the occurrence of problems in the symptom scales/items, higher rates indicate worse outcomes. The results are presented below (Table 4).

Table 4. Percentage of patients facing problems in the symptom scales/items.

Symptoms scales/ items (scale/item numbers)	Patients facing problems				
	No		Yes		
	<i>n</i>	%	<i>n</i>	%	
Fatigue (10, 12, 18) [11]	Need to rest	125	40.3	185	59.7
	Felt weak	58	18.7	252	81.3
	Tired	81	26.1	229	73.9
Nausea/vomiting (14, 15) [11]	Felt nauseated	262	84.5	48	15.5
	Vomited	273	88.1	37	11.9
Pain (9, 19) [11]	Pain	119	38.4	191	61.6
	Interfered with daily activities	155	50.0	155	50.0
Symptoms scales (8, 11, 13, 16, 17) [11]	Short of breath	271	87.4	39	12.6
	Trouble sleeping	106	34.2	204	65.8
	Lacked appetite	182	58.7	128	41.3
	Constipated	255	82.3	55	17.7
	Diarrhea	143	46.1	167	53.9
Financial difficulties (28) [11]		44	14.2	266	85.8

In the symptom scales/items, most patients experienced symptoms at varying levels and rates. Among these, patients who felt weak had the highest rate (81.3%), while those experiencing vomiting had the lowest rate (11.9%). Additionally, patients facing financial difficulties also reported a high rate (85.8%) (Table 4).

3.3. Factors related to the quality of life of non-small cell lung cancer patients

The dependent variable in this study was the global health status/QoL of NSCLC patients. This index ranged from 0 to 100, with values censored at both ends [26]. To assess the factors influencing the QoL of NSCLC patients, we used the Tobit regression model [27]. The results are displayed in Table 5.

Table 5. Factors related to global health status/QoL of non-small cell lung cancer patients using Tobit regression model.

Independent variables	Global health status/QoL (Tobit regression model)				
	Univariate		Multivariate		
	Beta	<i>p</i> -value	Beta	<i>p</i> -value	
Age groups (years old)	>60	1	-	1	-
	≤60	-3.635	0.065	-3.138	0.100
Gender	Female	1	-	1	-
	Male	4.102	0.037*	3.438	0.070
Residence	Urban area	1	-	1	-
	Rural area	-7.944	<0.001***	-5.331	0.017*
Patients' income (VND/ month)	Mean (SD)	0.008	<0.001***	0.006	0.004**
Household economic status	Poor/near-poor	1	-	1	-
	Normal or above	10.207	0.004**	5.728	0.102

*: $p < 0.05$, **: $p < 0.01$, ***: $p < 0.001$

According to the results of the univariate Tobit regression analysis (Table 5), factors such as gender, residence, patients' income, and household economic status were found to be related to the global health status/QoL score ($p < 0.05$). Following the multivariate Tobit regression analysis, it was determined that residence and patients' income were significantly related to the global health status/QoL score of NSCLC patients ($p < 0.05$).

According to the study results (Table 6), most of the functional scale scores (four out of five scales) had a positive impact on the QoL of NSCLC patients, with a significance level of $p < 0.05$. However, the symptom scale/item scores, specifically fatigue and financial difficulties, had a negative impact on the global health status/QoL of NSCLC patients, also with a significance level of $p < 0.05$.

Table 6. Association between QLQ-C30 scores and global health status/QoL of non-small cell lung cancer patients using a multivariate Tobit regression model.

Independent variables (QLQ-C30 scores)	Global health status/QoL (Multivariate Tobit regression model)				
	Beta	Std. err.	t	p-value	95% CI
<i>Functional scales scores</i>					
Physical functioning	0.207	0.070	2.95	0.003**	0.069 0.345
Role functioning	0.095	0.040	2.35	0.019*	0.016 0.175
Emotional functioning	0.084	0.029	2.84	0.005**	0.026 0.141
Cognitive functioning	0.034	0.040	0.84	0.403	-0.045 0.112
Social functioning	0.161	0.041	3.89	<0.001***	0.080 0.243
<i>Symptoms scales/items scores</i>					
Fatigue	-0.105	0.046	-2.3	0.022*	-0.195 -0.015
Nausea and vomiting	-0.040	0.055	-0.72	0.475	-0.149 0.069
Pain	-0.057	0.034	-1.67	0.096	-0.124 0.010
Dyspnoea	-0.004	0.049	-0.09	0.932	-0.101 0.093
Insomnia	-0.015	0.023	-0.68	0.498	-0.060 0.029
Appetite loss	0.020	0.031	0.64	0.522	-0.041 0.080
Constipation	-0.045	0.041	-1.09	0.276	-0.125 0.036
Diarrhea	-0.038	0.026	-1.47	0.142	-0.088 0.013
Financial difficulties	-0.094	0.028	-3.31	0.001**	-0.150 -0.038

*: p<0.05, **: p<0.01, ***: p<0.001

4. Discussion

Based on our study results, the global health status/QoL was 62.9±17.4 points, which was higher than the QoL scores of general cancer patients in the studies conducted by T.T. Kien, et al. (2023) [28] (55.6±23.9 points), N.Q. Tu, et al. (2022) [29] (45.8±23.7 points), and N.T.T. Vu (2021) [30] (54.0 points). This difference may be attributed to variations in the characteristics of the research subjects and treatment methods. In the study conducted by T.T. Kien, et al. (2023) [28] and N.Q. Tu, et al. (2022) [29], the research subjects were cancer patients at various stages (I to IV) undergoing different treatment regimens, both inpatient and outpatient. T.T. Kien, et al. (2023) [28]’s study also included cases of patients under 18 years old. In a previous study [30], the patients were in stage III and received outpatient radiotherapy, with a high male proportion (81%). In our study, the patients were mainly over 18 years old, initially treated with first-line targeted therapy, and managed as outpatients. This variation highlights how different treatment approaches can impact the quality of life for patients.

In terms of financial difficulties, our study found a score of 51.1±28.7 points, which was lower than the scores

reported by N.T.T. Vu (2021) [30] (63.8 points). Therefore, NSCLC patients who were treated with targeted therapy experienced fewer financial difficulties compared to those treated with radiotherapy.

In our study, the functional scale scores were as follows: physical functioning (85.7), role functioning (79.6), emotional functioning (65.8), cognitive functioning (78.7), and social functioning (71.7). These scores were higher than those of N.T.T. Vu (2021) [30]. It is worth noting that the social role score in our study was 79.6 points, which was 2.6 times higher than that of N.T.T. Vu (2021) [30] (31.2 points). This significant difference may be attributed to the fact that patients undergoing radiation therapy often require long hospital stays, limiting their daily activities (only 31.9/100 points), and are restricted in pursuing hobbies or other recreational activities (only 30.5/100 points) [30]. On the other hand, patients treated with outpatient targeted therapy can walk normally, explaining the appropriate difference in scores.

The symptom scale/item scores in our study, including fatigue (31.3), dyspnoea (4.6), appetite loss (17.1), and constipation (7.0), were lower than those in N.T.T. Vu

(2021) [30]'s study. In her study, patients treated with radiotherapy had higher scores for fatigue (65.8), dyspnoea (25.9), appetite loss (50.2), and constipation (13.0) [30]. Additionally, symptoms like insomnia (28.5), nausea (1.9), and diarrhoea (2.5) [30] were also lower in N.T.T. Vu (2021) [30]'s study compared to ours. These differences could be attributed to variations in treatment methods and the resulting side effects of targeted therapy versus radiotherapy [31, 32].

Our study results revealed a significant relationship between the income of NSCLC patients and their global health status/QoL score (Beta=6.28e-07, p=0.004). This finding suggests that higher incomes may contribute to an improved quality of life for NSCLC patients, which aligns with previous research findings [33-35]. Additionally, our study results indicate a correlation between the place of residence and the quality of life of NSCLC patients. Specifically, patients living in rural areas tended to have a lower quality of life than those living in urban areas (Beta=-5.331, p=0.017). This finding is consistent with previous studies that have shown patients in urban areas have a higher quality of life compared to those in rural areas [21, 36-39]. Targeted therapy is quite expensive, requires long-term treatment, and medical examination and treatment facilities are often concentrated in a few large hospitals located in major cities across the country. B.D. Ho, et al. (2022) [21]'s study results also show that NSCLC patients in urban areas have better living conditions and are closer to medical facilities than patients living in rural areas. On the contrary, people living in rural areas have less access to medical services; inconvenient travel and long distances generate more costs, increasing financial difficulties for patients. According to our research results (Table 1), patients living in urban areas have an average income of 5,372,933 VND per month, nearly 3.2 times higher than the income of NSCLC patients in rural areas (1,679,570 VND per month, p<0.001). Additionally, up to 85.8% of NSCLC patients have faced financial difficulties (Table 4), with 7.7% of patients living in poor/near-poor households in rural areas, compared to only 0.6% in urban areas (Table 1). To investigate the relationship between financial difficulties and the global health status/QoL of NSCLC patients, we

conducted a relationship analysis (Table 6), which revealed that financial difficulties had a negative impact on the quality of life of NSCLC patients (Beta=-0.094, p=0.001). Therefore, it is evident that patients living in rural areas have a lower quality of life than those living in urban areas.

Our study results have shown that functional scales can help improve QoL, while symptoms such as fatigue and financial difficulties can worsen QoL in patients with NSCLC. Several other studies have also shown that symptoms like shortness of breath, fatigue, pain, and insomnia have a negative impact on QoL, while social support and resilience are associated with improvements in QoL for NSCLC patients [40-42]. Therefore, to enhance QoL and extend the survival of NSCLC patients, it is essential to not only reduce symptoms but also increase resilience and social support for patients [43].

However, the difference in our study compared to previous studies is that our results (Table 6) showed that not all symptoms were associated with a negative impact on patients' quality of life. We found that some symptoms did not worsen patients' quality of life. In our study on NSCLC patients with EGFR mutations treated with first-line targeted therapy, the insomnia score (35.5 points) was the highest, followed by fatigue (31.3 points), pain (25.1 points), diarrhoea (23.3 points), and other symptoms. However, our study results (Table 6) indicated that only the fatigue score had a negative impact on the global health status/QoL of patients. This changes our perspective on the issue. Instead of addressing all the symptoms experienced by the patient population, we should prioritise improving fatigue symptoms to enhance the overall quality of life of the patients. This is a novel finding in our research on lung cancer, contributing to a longer life for cancer patients in general and NSCLC patients specifically.

Strengths and limitations of the study: The Vietnam National Cancer Hospital in Tan Trieu is the primary cancer treatment facility in Vietnam where most patients with NSCLC are examined and treated. Our study evaluated the quality of life of patients with stage IV NSCLC with EGFR mutations undergoing first-line treatment with targeted therapy using the EORTC QLQ-C30 scale. However, there are some limitations to consider. The study was conducted

using a cross-sectional method and was only carried out at the Vietnam National Cancer Hospital, which may not be fully representative of the entire country. To address this limitation, we made efforts to gather the largest possible sample within the research team's capacity, totalling 310 patients, and extended the data collection period from October 2022 to December 2023.

5. Conclusions

Scores on the EORTC QLQ-C30 scale for NSCLC patients range from 0 to 100 points. A higher score on the physical function scale is preferred, while a lower score on the symptom scale is more desirable. The overall health score of NSCLC patients treated with targeted therapy was quite high at 62.9 points. The highest score was for physical function at 85.7 points, while the lowest was for emotional function at 65.8 points. The highest symptom scale score was for insomnia at 35.5 points, followed by fatigue at 31.3 points, pain at 25.1 points, diarrhoea at 23.3 points, loss of appetite at 17.1 points, and financial difficulty at 51.1 points. Factors such as low income, living in rural areas, and experiencing fatigue symptoms have a detrimental effect on the quality of life of NSCLC patients. Priority should be placed on addressing and improving fatigue symptoms. Furthermore, the policy interventions may be considered enact policies to support income for low-income patients and offer financial assistance, such as providing complimentary bus tickets and meals at the hospital, to reduce the financial strain and prolong the duration of drug treatment for NSCLC patients.

CRedit author statement

Chinh Van Nguyen: Conceptualisation, Methodology, Data collection and investigation, Data entry and processing, Software and Analysis, Validation and Visualisation, Writing original draft, Reviewing and Editing; Nhat Huu Nguyen, Linh Dieu Hoang: Validation and Visualisation, Reviewing and Editing; Huong Thi Thanh Tran: Conceptualisation, Methodology, Validation and Visualisation, Reviewing and Editing, Supervision; Kiet Tuan Pham Huy: Conceptualisation, Methodology, Data entry and processing, Validation and Visualisation, Reviewing and Editing, Supervision.

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COMPETING INTERESTS

The authors declare that there is no conflict of interest regarding the publication of this article.

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