

Beyond Medical Bills: High Prevalence of Financial Toxicity and Diverse Management Strategies Among Vietnamese Patients With Cancer

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Objectives: This study was conducted to measure financial toxicity (FT) among patients with cancer in Vietnam using the COmprehensive Score for financial Toxicity (COST) and to describe the cost management strategies employed by these patients.

Methods: This comprehensive cross-sectional study enrolled 634 patients from 2 specialized oncology hospitals in Vietnam. Using COST cut-off scores, FT was classified as none/mild (≥ 26), moderate (14-25), or severe (≤ 13). Cost management strategies, or coping mechanisms, were classified into 4 groups: lifestyle changes, financial resource strategies, treatment modifications, and support seeking.

Results: The prevalence of FT was 91.8%, with 51.7% of participants demonstrating severe and 40.1% exhibiting moderate FT. Severe FT was significantly associated with female, low education level, unstable employment, low household economic status, and advanced cancer stage. The most common coping strategies were as follows: among lifestyle changes, reducing spending on basic items and leisure activities (78.7%) and cutting back on essential household expenses (66.4%); among financial resource strategies, borrowing money from relatives or friends (49.1%) and withdrawing funds from retirement or savings accounts (34.1%); within treatment modifications, switching treatment facilities or doctors due to cost concerns (9.3%); and within support seeking, obtaining help from welfare or community organizations (18.8%). All strategies were significantly more likely to be used by patients with severe FT.

Conclusions: FT was highly prevalent among patients with cancer. Most patients relied on lifestyle adjustments and coping strategies, underscoring the need for improved financial support systems to alleviate the economic burden associated with cancer care.

Key words: Neoplasms, COmprehensive Score for financial Toxicity (COST), Financial stress, Financial toxicity, Supportive care, Financial coping

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INTRODUCTION

Although universal health insurance plans cover most cancer treatment costs, patients worldwide still incur substantial out-of-pocket expenses. These include shared costs, such as co-payments and deductibles, as well as medications not covered by insurance [1]. This financial burden can lead patients to postpone or forgo necessary treatments and may result in

poverty or economic hardship [1-3].

To date, most research on the financial impact of cancer treatment has been focused on quantifying objective monetary metrics, such as out-of-pocket expenses [4]. However, the subjective effects of worry and stress related to the cost of treatment remain largely unexplored. Financial toxicity (FT), also known as financial burden or financial stress, includes both the objective financial burden and the subjective financial hardship experienced by patients [5]. In this study, we primarily examined the subjective aspect of financial hardship to evaluate the negative psychological responses caused by financial strain.

Studies have employed various methods to measure financial distress [6-8]. Some researchers have developed their own questionnaires, whereas others have opted for established instruments such as the COmprehensive Score for financial Toxicity (COST), the Socioeconomic Well-Being Scale, the Breast Cancer Finances Survey Inventory, the InCharge Financial Distress/Financial Well-Being Scale, and the Financial Well-Being Scale. Each of these tools has strengths and weaknesses, and each targets specific patient populations. The COST is among the most frequently used tools for assessing FT associated with cancer diagnosis and treatment [7].

Given the diversity of assessment methods, the reported rates of financial distress in the literature vary widely, ranging from 14.8% to 78.8% across studies and countries [7]. Within a recent meta-analysis of 30 studies conducted in China, 8 studies reported psychological FT, exhibiting prevalence rates ranging from 61% to 84% [9]. A 2015 prospective cohort study in Southeast Asian countries, including Vietnam, indicated that approximately one-third of families had difficulty affording basic necessities, with nearly half unable to cover medication costs for patients undergoing 1 year of cancer treatment [2]. Ngan et al. [3] recently reported that 41% of patients with breast cancer experienced financial hardship, with some unable to afford the cost of care. Furthermore, numerous studies have identified factors closely associated with the risk of financial distress, including late-stage diagnosis, cancer type, recurrence, chronic diseases, employment status, economic status, concerns about employment status after diagnosis [9,10], and health insurance co-payment rates [8,11].

Previous research on financial distress has often yielded clear findings; however, data from low-income and lower-middle-income countries are scarce. The majority of these studies originate from China and India [6,8,9], where patients with cancer

are likely to shoulder a greater financial burden [12].

Moreover, the mechanisms employed to manage financial distress can have health consequences. A study conducted in the United States, which included a large patient sample, investigated the impact of delaying or foregoing necessary medical care due to cost concerns. The results indicated a significant association between these factors and the probability of poor long-term health outcomes and diminished quality of life among patients with cancer [13]. It is essential to understand the patient coping strategies—including stress, debt, and non-compliance—that lead to adverse health effects. This understanding is key to alleviating the financial impact of cancer, benefiting not only the healthcare sector but also society at large [3,8,14].

This study provides insight into the financial burden experienced by patients with cancer, laying the groundwork for interventions aimed at alleviating their financial stress. Such measures have the potential to increase access to care, improve cancer outcomes, and reduce health disparities.

This study's objectives are: (1) to measure FT among patients with cancer in Vietnam using the COST tool; and (2) to describe these patients' coping strategies.

METHODS

Setting

Data were collected from the 2 largest oncology centers in central Vietnam, which serve approximately 20 million people. Most patients with cancer in Vietnam receive treatment at these 2 facilities; one is a tertiary-level oncology center, while the other is a specialized oncology hospital at the state level. The oncology center has 500 inpatient beds and is focused on cancer care. As part of a tertiary referral hospital, it predominantly treats patients with late-stage diagnoses [15]. The other site of data collection was the Provincial Oncology Hospital, a public institution with 650 planned beds that has since expanded to accommodate 960 beds. This hospital serves the local citizens as well as the populations of the surrounding provinces [16]. These hospitals are in the 2 largest cities of central Vietnam.

Study Population

In this study, patients with cancer were included regardless of cancer type. Cancers were classified according to codes from the International Classification of Diseases, 10th revision,

including stomach cancer (C16), colorectal cancer (C18-C20), liver cancer (C22), biliary/pancreatic cancer (C24, C25), lung cancer (C34), and breast cancer (C50).

Inclusion

Regarding inclusion criteria, participants were required to (1) have primary cancer, (2) have received ongoing cancer treatment for at least 12 months, and (3) be at least 18 years old and provide consent for study participation.

Exclusion

Patients were excluded if they either (1) had secondary cancer or (2) exhibited mental health problems.

Sample Size

We calculated the sample size required to estimate the prevalence of FT in Vietnam. Our calculations were predicated on the assumption of a high prevalence of FT (80%), which was informed by the findings from researchers in China, a country with a healthcare system similar to Vietnam's [11]. Furthermore, we anticipated a response rate of 90%. These parameters led us to determine a minimum sample size of 274 participants to achieve a 5% margin of error and a 95% confidence level. However, to ensure a more robust sample for the study locations, we aimed to include 548 participants from the 2 hospitals. This target was derived from hospital data on patient admissions during the study period. Ultimately, we invited 634 patients to participate in the study.

Main Outcomes and Covariates

FT

Originally developed to assess the financial distress experienced by patients with cancer, the 11-item COST has demonstrated good validity [17]. In the present study, FT was assessed using the COST. This instrument employs a 5-point Likert scale with the following responses: 0="not at all," 1="a little bit," 2="somewhat," 3="quite a bit," and 4="very much." Reverse scoring was applied to each question as per the scoring manual provided by the FACIT Department of Chicago. Specifically, the scores for items 2, 3, 4, 5, 8, 9, and 10 were reversed. The final score was determined by multiplying the sum of the item scores by 11 and dividing by the number of questions answered. In accordance with the scoring guidelines, participants who completed fewer than 6 items were excluded. The total score ranged from 0 to 44, with higher scores indicating better finan-

cial health. Based on these scores, FT was classified as none/mild (≥ 26), moderate (14-25), or severe (≤ 13) [18]. The Vietnamese version of the COST instrument was translated using a forward-backward translation process, and the Vietnamese COST scale displayed good reliability (as evidenced by a Cronbach alpha value greater than 0.7 [19]) in our sample data (Cronbach alpha=0.858) (Supplemental Materials 1 and 2).

FT coping strategies

In the context of this study, coping strategies include the methods patients employ to manage the financial stress associated with their care. However, standardized tools for effectively measuring these strategies are generally unavailable. As a result, the understanding of these behaviors is often heavily context-dependent. Drawing on a previous systematic review by Witte et al. [7], we adapted a classification of cost-management strategies for FT among patients with cancer. Similar to the categorization proposed by Witte et al. [7], we organized coping strategies into 4 categories: lifestyle changes, financial resource strategies, treatment modifications, and support seeking. Within each category, participants were asked questions relevant to the local context in Vietnam, to which they could respond "yes" or "no."

Lifestyle changes

This category included 2 coping strategies: cutting back on essential household expenses and reducing spending on basic items and leisure activities.

Financial resource strategies

This category contained 5 coping strategies: withdrawing funds from retirement or savings accounts, borrowing money from relatives or friends, obtaining loans from banks or credit institutions to cover treatment costs, continuing to work during treatment to fulfill financial obligations, and selling possessions or property.

Treatment modifications

This category encompassed 4 coping strategies: foregoing prescription medications or avoiding scheduling doctor appointments, opting out of healthcare services such as physical therapy, switching treatment facilities or doctors due to cost concerns, and discontinuing or not initiating recommended treatments because of cost.

Support seeking

This category included 2 coping strategies: obtaining assistance from welfare or community organizations and increasing insurance premiums.

Covariates

Data were collected through face-to-face interviews and from medical records. Patient characteristics encompassed demographic information (sex, age, religion, area of residence, and marital status) and socioeconomic factors (education, personal income, household economic status, and health insurance benefits), all of which were gathered during the interviews. Cancer-related details (type, stage, and treatment modality) were obtained from the participants' medical records.

Statistical Analysis

We used descriptive statistics to examine a variety of demographic and socioeconomic data, as well as FT. To evaluate the relationship between FT and related factors, we employed univariable analysis, using either the chi-square test or Fisher exact test as appropriate. Initially, we applied multivariable logistic regression analysis to identify factors associated with severe FT (COST ≤ 13), incorporating factors that demonstrated significance in the univariable analysis. Subsequently, we used multivariable logistic regression analysis to examine participants' coping behaviors, adjusting for additional variables including FT, cancer type, and cancer stage. All statistical analyses were carried out using Stata version 14.0 (StataCorp., Col-

lege Station, TX, USA), and *p*-values of less than 0.05 were considered to indicate statistical significance.

Ethics Statement

This study was approved by the Institutional Ethics Committee for Biomedical Research of the University of Medicine and Pharmacy, Hue University (H2022/485 and H2022/124). It was conducted in accordance with the principles of the Declaration of Helsinki. Patients who opted to participate provided their informed consent and retained the right to withdraw at any time, without affecting their medical care. All collected data were maintained with strict confidentiality and used solely for research purposes.

RESULTS

A total of 634 individuals participated in this study. The mean age of the participants was 59.5 ± 10.7 years. Table 1 presents their demographic, socioeconomic, and cancer-related data. In terms of demographics, 60.9% were males, 52.5% were over 60 years old, 69.7% lived in rural areas, and 91.6% were married. Regarding education, two-thirds of the participants had attained at least a middle school level. Among the study population, 72.6% had unstable employment or no income. Additionally, 20.0% of the patients belonged to households classified as poor or near-poor by the government.

Lung cancer was the predominant cancer type, accounting for 24.3% of cases, followed by colorectal cancer at 19.9% and

Table 1. Demographics, socioeconomic characteristics, and FT among the study population

Characteristics	Total	FT (COST)			<i>p</i> -value
		No/Mild (≥ 26)	Moderate (14-25)	Severev (≤ 13)	
Total		52 (8.2)	254 (40.1)	328 (51.7)	
Sex					
Male	386 (60.9)	42 (10.9)	161 (41.7)	183 (47.4)	0.002
Female	248 (39.1)	10 (4.0)	93 (37.5)	145 (58.5)	
Age, mean \pm SD (y)	59.5 ± 10.7	62.9 ± 9.1	60.2 ± 10.3	58.5 ± 11.0	0.009 ¹
<50	109 (17.2)	5 (4.6)	38 (34.9)	66 (60.5)	0.079
50-59	192 (30.3)	13 (6.8)	78 (40.6)	101 (52.6)	
60-69	240 (37.8)	20 (8.3)	100 (41.7)	120 (50.0)	
≥ 70	93 (14.7)	14 (15.0)	38 (40.9)	41 (44.1)	
Religion					0.141
None	528 (83.3)	48 (9.1)	206 (39.0)	274 (51.9)	
Other	106 (16.7)	4 (3.8)	48 (45.3)	54 (50.9)	

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Table 1. Continued from the previous page

Characteristics	Total	FT (COST)			p-value
		No/Mild (≥26)	Moderate (14-25)	Severev (≤13)	
Area of residence					0.004
Rural	442 (69.7)	28 (6.3)	169 (38.2)	245 (55.5)	
Urban	192 (30.3)	24 (12.5)	85 (44.3)	83 (43.2)	
Marital status					0.630
Single/divorced/widowed	53 (8.4)	3 (5.7)	24 (45.3)	26 (49.0)	
Married	581 (91.6)	49 (8.4)	230 (39.6)	302 (52.0)	
Education					<0.001
Less than elementary/elementary	191 (30.1)	10 (5.2)	55 (28.8)	126 (66.0)	
Middle school to high school	378 (59.6)	30 (7.9)	169 (44.7)	179 (47.4)	
College/undergraduate, postgraduate	65 (10.3)	12 (18.5)	30 (46.1)	23 (35.4)	
Employment					<0.001
Stable income (civil servant/officer, worker, pensioner)	174 (27.4)	27 (15.5)	88 (50.6)	59 (33.9)	
Unstable income (farming, trading, hired labor, self-employed, etc.)	324 (51.1)	13 (4.0)	110 (34.0)	201 (62.0)	
No income (housewife, unemployed)	136 (21.5)	12 (8.8)	56 (41.2)	68 (50.0)	
Household economic status					<0.001
Low (poor/near poor)	127 (20.0)	27 (15.5)	88 (50.6)	59 (33.9)	
High	507 (80.0)	13 (4.0)	110 (34.0)	201 (62.0)	
Health insurance coverage (%)					0.005
80	280 (44.2)	14 (5.0)	115 (41.1)	151 (53.9)	
95	64 (10.1)	10 (15.6)	32 (50.0)	22 (34.4)	
100	290 (45.7)	28 (9.7)	107 (36.9)	155 (53.4)	
Cancer type					0.046
Stomach	97 (15.3)	5 (5.1)	35 (36.1)	57 (58.8)	
Colorectal	126 (19.9)	11 (8.7)	50 (39.7)	65 (51.6)	
Liver	53 (8.4)	4 (7.5)	25 (47.2)	24 (45.3)	
Biliary/pancreatic	112 (17.6)	19 (17.0)	44 (39.3)	49 (43.7)	
Lung	154 (24.3)	7 (4.5)	63 (40.9)	84 (54.6)	
Breast	92 (14.5)	6 (6.5)	37 (40.2)	49 (53.3)	
Cancer stage					0.042
I	41 (6.5)	5 (12.2)	25 (61.0)	11 (26.8)	
II	130 (20.5)	10 (7.7)	54 (41.5)	66 (50.8)	
III	205 (32.3)	15 (7.3)	84 (41.0)	106 (51.7)	
IV	258 (40.7)	22 (8.5)	91 (35.3)	145 (56.2)	
Cancer treatment modality					0.450
Surgery	22 (3.5)	1 (4.5)	9 (40.9)	12 (54.6)	
Surgery and chemotherapy	231 (36.4)	27 (11.7)	89 (38.5)	115 (49.8)	
Chemotherapy	214 (33.8)	13 (6.0)	81 (37.9)	120 (56.1)	
Radiotherapy	20 (3.1)	1 (5.0)	10 (50.0)	9 (45.0)	
Palliative care	57 (9.0)	5 (8.8)	23 (40.3)	29 (50.9)	
Chemotherapy and palliative care	17 (2.7)	0 (0.0)	6 (35.3)	11 (64.7)	
Chemotherapy and radiotherapy	73 (11.5)	5 (6.9)	36 (49.2)	32 (43.9)	

Values are presented as number (%).

FT, financial toxicity; COST, COverprehensive Score for financial Toxicity; SD, standard deviation.

[†]One-way analysis of variance.

Table 2. Details of each item within the COST tool

Item code	Details ¹	n (%)
FT1	I know that I have enough money in savings, retirement, or assets to cover the costs of my treatment	225 (35.5)
FT2	My out-of-pocket medical expenses are more than I thought that they would be	564 (89.0)
FT3	I worry about the financial problems that I will have in the future as a result of my illness or treatment	559 (88.2)
FT4	I feel I have no choice about the amount of money I spend on care	569 (89.7)
FT5	I am frustrated that I cannot work or contribute as much as I usually do	542 (85.5)
FT6	I am satisfied with my current financial situation	205 (32.3)
FT7	I am able to meet my monthly expenses	310 (48.9)
FT8	I feel financially stressed	543 (85.6)
FT9	I am concerned about keeping my job and income, including paid work at home	542 (85.5)
FT10	My cancer or treatment has reduced my satisfaction with my present financial situation	586 (92.4)
FT11	I feel in control of my financial situation	247 (39.0)
FT12	My illness has been a financial hardship to my family and me	588 (92.7)
FT (COST)	No/Mild	52 (8.2)
	Moderate	254 (40.1)
	Severe	328 (51.7)
	Mean \pm SD	14.6 \pm 6.6
	Median (interquartile range, 25% and 75%)	13.0 (11.0-17.0)

COST, COmprehensive Score for financial Toxicity; FT, financial toxicity; SD, standard deviation.

¹Scored based on potential responses ranging from "not at all" to "very much."

biliary/pancreatic cancer at 17.6%. Most cancers were late-stage (III or IV), comprising 73.0% of cases. The most common treatment modalities were surgery combined with chemotherapy and chemotherapy alone (Table 1).

The mean and median FT scores were 14.6 (standard deviation, 6.6) and 13.0 (interquartile range, 11.0 to 17.0), respectively. Regarding COST classifications, 91.8% of participants exhibited FT, with 40.1% of the study sample experiencing moderate FT and 51.7% experiencing severe FT (Table 2). Detailed information regarding each COST item can be found in Table 2.

In the multivariable analysis, several factors were found to be significantly associated with an increased risk of severe FT. Presented with their respective odds ratios (OR) and 95% confidence intervals (CIs), these factors included female (OR, 1.61; 95% CI, 1.08 to 2.42); low education level (OR, 1.85; 95% CI, 1.25 to 2.78); unstable employment (OR, 2.61; 95% CI, 1.71 to 3.98); low household economic status (OR, 2.35; 95% CI, 1.50 to 3.69); and advanced cancer stage (stage II: OR, 2.42; 95% CI, 1.06 to 5.50; stage III: OR, 2.47; 95% CI, 1.11 to 5.48; stage IV: OR, 3.37; 95% CI, 1.54 to 7.39) (Supplemental Material 3).

Figure 1 illustrates the FT coping strategies employed by the study participants. The primary lifestyle-related coping strategies included reduced spending on basic items and leisure activities (78.7%) and cutting back on essential household ex-

penses (66.4%). Borrowing money from relatives or friends (49.1%) emerged as the most common strategy related to financial resources. Seeking assistance from welfare or community organizations was the foremost support-seeking strategy. Among treatment modifications, switching treatment facilities or doctors due to cost concerns (9.3%) was most common. The FT coping strategies are detailed in Table 3.

Table 4 presents the strategies used by respondents experiencing moderate or severe FT, in comparison to individuals with no to mild FT. Overall, moderate and severe FT were significantly linked to the adoption of cost-coping strategies. ORs by category of coping mechanism are detailed below.

- (1) Lifestyle changes: Regarding cutting back on essential household expenses, the moderate FT group displayed an OR of 5.39 relative to those with no/mild FT, while the severe FT group exhibited an OR of 9.19. For reducing spending on basic items and leisure activities, the ORs were 4.72 for moderate and 7.26 for severe FT.
- (2) Financial resource strategies: Similarly compared to the no/mild FT group, the moderate group was 2.10 times as likely to perceive the need to work during treatment to meet financial needs. The moderate group was 6.28 times as likely to borrow money from relatives or friends, while the severe group was 14.30 times as likely.
- (3) Support seeking: Compared to those with no or mild FT,

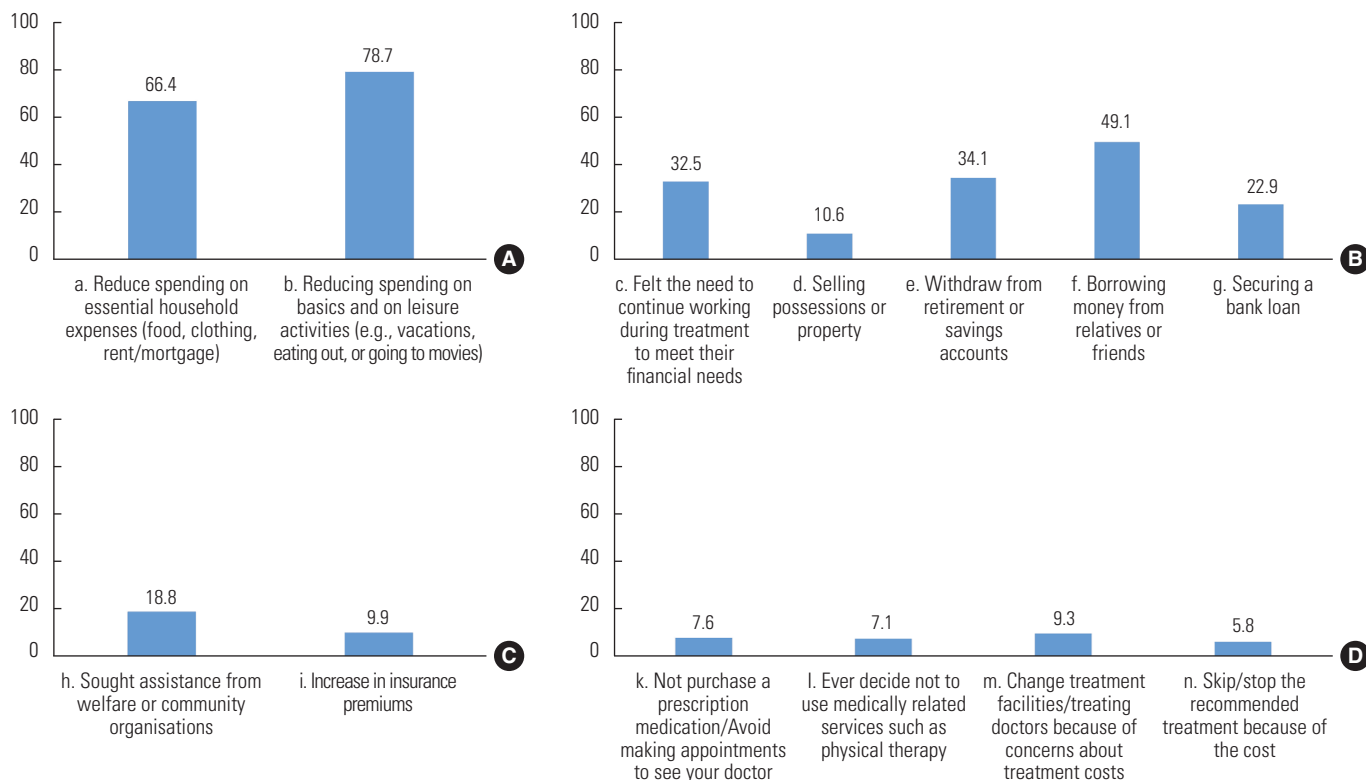


Figure 1. Coping strategies for financial toxicity among study participants. (A) Lifestyle change. (B) Financial resources. (C) Support seeking. (D) Treatment care alterations.

Table 3. Coping strategies for financial toxicity among study participants

Item code	Details of each item	Total (n=634)	Central hospital (n=300)	State hospital (n=334)	p-value
Lifestyle changes					
D1	a. Cutting back on essential household expenses (food, clothing, rent/mortgage)	421 (66.4)	172 (57.3)	249 (74.6)	<0.001
D2	b. Reducing spending on basic items and leisure activities (e.g., vacations, eating out, or seeing movies)	499 (78.7)	225 (75.0)	274 (82.0)	0.031
Financial resource strategies					
D3	c. Perceiving the need to continue working during treatment to meet financial needs	206 (32.5)	85 (28.3)	121 (36.2)	0.034
D4	d. Selling possessions or property	67 (10.6)	22 (7.3)	45 (13.5)	0.012
D5	e. Withdrawing funds from retirement or savings accounts	216 (34.1)	118 (39.3)	98 (29.3)	0.008
D6	f. Borrowing money from relatives or friends	311 (49.1)	171 (57.0)	140 (41.9)	<0.001
D7	g. Securing a bank loan	145 (22.9)	72 (24.0)	73 (21.9)	0.520
Support seeking					
D8	h. Seeking assistance from welfare or community organizations	119 (18.8)	14 (4.7)	105 (31.4)	<0.001
D9	i. Increasing insurance premiums	63 (9.9)	5 (1.7)	58 (17.4)	<0.001
Treatment modifications					
D10	k. Foregoing prescription medications or avoiding scheduling doctor appointments	48 (7.6)	34 (11.3)	14 (4.2)	<0.001
D11	l. Opting out of healthcare services such as physical therapy	45 (7.1)	35 (11.7)	10 (3.0)	<0.001
D12	m. Switching treatment facilities or doctors due to cost concerns	59 (9.3)	33 (11.0)	26 (7.8)	0.160
D13	n. Discontinuing or not initiating recommended treatments due to cost	37 (5.8)	32 (10.7)	5 (1.5)	<0.001

Table 4. Risk of cost-coping strategies among respondents with moderate or severe FT compared with those experiencing no or mild FT¹

Variables	FT			p-value ²
	No/Mild (n = 52)	Moderate (n = 254)	Severe (n = 328)	
Lifestyle changes				
a. Cutting back on essential household expenses (e.g., food, clothing, rent/mortgage)	1.00 (reference)	5.39 (2.63, 11.03)***	9.19 (4.49, 18.78)**	<0.001
No	40 (76.9)	92 (36.2)	81 (24.7)	
Yes	12 (23.1)	162 (63.8)	247 (75.3)	
b. Reducing spending on basic items and leisure activities (e.g., vacations, eating out, or seeing movies)	1.00 (reference)	4.72 (2.49, 8.95)***	7.26 (3.81, 13.82)***	<0.001
No	30 (57.7)	56 (22.0)	49 (14.9)	
Yes	22 (42.3)	198 (78.0)	279 (85.1)	
Financial resource strategies				
c. Perceiving the need to continue working during treatment to meet financial needs	1.00 (reference)	2.10 (1.02, 4.33)*	1.73 (0.84, 3.56)	0.089
No	41 (78.8)	162 (63.8)	225 (68.6)	
Yes	11 (21.2)	92 (36.2)	103 (31.4)	
d. Selling possessions or property	1.00 (reference)	0.98 (0.35, 2.75)	1.01 (0.36, 2.77)	0.930
No	47 (90.4)	228 (89.8)	292 (89.0)	
Yes	5 (9.6)	26 (10.2)	36 (11.0)	
e. Withdrawing funds from retirement or savings accounts	1.00 (reference)	0.72 (0.39, 1.34)	0.52 (0.28, 0.97)*	0.031
No	28 (53.8)	160 (63.0)	230 (70.1)	
Yes	24 (46.2)	94 (37.0)	98 (29.9)	
f. Borrowing money from relatives or friends	1.00 (reference)	6.28 (2.55, 15.44)***	14.30 (5.83, 35.09)***	<0.001
No	46 (88.5)	149 (58.7)	128 (39.0)	
Yes	6 (11.5)	105 (41.3)	200 (61.0)	
g. Securing a bank loan	N/A	N/A	N/A	<0.001
No	52 (100.0)	203 (79.9)	234 (71.3)	
Yes	0 (0.0)	51 (20.1)	94 (28.7)	
Support seeking				
h. Seeking assistance from welfare or community organizations	1.00 (reference)	3.17 (1.25, 8.04)*	3.24 (1.14, 9.21)*	0.043
No	49 (94.2)	204 (80.3)	262 (79.9)	
Yes	3 (5.8)	50 (19.7)	66 (20.1)	
i. Increasing insurance premiums	1.00 (reference)	3.30 (0.66, 8.03)	0.73 (0.19, 2.68)	<0.001
No	49 (94.2)	212 (83.5)	310 (94.5)	
Yes	3 (5.8)	42 (16.5)	18 (5.5)	
Treatment modifications				
k. Foregoing prescription medications or avoiding scheduling doctor appointments	1.00 (reference)	0.19 (0.07, 0.48)***	0.33 (0.14, 0.75)**	<0.001
No	41 (78.8)	242 (95.3)	303 (92.4)	
Yes	11 (21.2)	12 (4.7)	25 (7.6)	
l. Opting out of healthcare services such as physical therapy	1.00 (reference)	0.24 (0.09, 0.61)**	0.31 (0.13, 0.74)	0.001
No	42 (80.8)	241 (94.9)	306 (93.3)	
Yes	10 (19.2)	13 (5.1)	22 (6.7)	
m. Switching treatment facilities or doctors due to cost concerns	1.00 (reference)	0.37 (0.15, 0.89)*	0.46 (0.20, 1.07)	0.084
No	43 (82.7)	235 (92.5)	297 (90.5)	
Yes	9 (17.3)	19 (7.5)	31 (9.5)	

(Continued to the next page)

Table 4. Continued from the previous page

Variables	FT			p-value ²
	No/Mild (n = 52)	Moderate (n = 254)	Severe (n = 328)	
n. Discontinuing or not initiating recommended treatments due to cost	1.00 (reference)	0.23 (0.08, 0.63)**	0.28 (0.11, 0.72)**	0.001
No	43 (82.7)	243 (95.7)	311 (94.8)	
Yes	9 (17.3)	11 (4.3)	17 (5.2)	

Values are presented as number (%) of odds ratio (95% confidence interval).

FT, financial toxicity; N/A, not available.

¹A multivariable logistic model was applied that adjusted for FT, cancer stage, and cancer type.

²Using the chi-square or Fisher exact tests.

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

patients with moderate FT displayed an OR of 3.17 for seeking assistance from welfare or community organizations, while those with severe FT exhibited an OR of 3.24.

- (4) Treatment modifications: Unlike the above mechanisms, strategies related to treatment changes were less likely to be employed by participants with greater FT, as demonstrated by lower ORs ($p < 0.05$). Foregoing prescription medications or avoiding scheduling doctor appointments was associated with ORs of 0.19 for moderate FT and 0.33 for severe FT. Regarding opting out of healthcare services such as physical therapy, the moderate group displayed an OR of 0.37. The moderate and severe groups displayed ORs of 0.23 and 0.28, respectively, for discontinuing or not initiating recommended treatments due to cost.

DISCUSSION

To our knowledge, this is the first study to measure FT among patients with cancer in both state and central healthcare systems in Vietnam, a low-middle-income country. Most patients reported high FT, which was associated with low socioeconomic status and cancer at an advanced stage. Additionally, FT was linked to greater adoption of coping mechanisms, including lifestyle changes, financial resource strategies, and support seeking.

The prevalence of high FT in this study (91.8%) was markedly higher than that reported (49%) by Smith et al. [20] and another meta-analysis that utilized the COST tool (48%; 95% CI, 38 to 58) [21]. Although more consistent with studies conducted in China, our figure is still slightly higher than those reported in the Chinese studies, which revealed up to 61% to 84% prevalence among all patients with cancer and 77% among those with lung cancer [9]. Similarly, Liu et al. [10] recently reported

a prevalence of 77% in patients with lung cancer, while another study reported 82.6% in all patients with cancer [22], with both employing the COST tool. Our findings also resemble those of Nikte et al. [23], who reported an FT prevalence of approximately 92.6% among patients attending the palliative care department. In Vietnam, Ngan et al. [3] reported that approximately 41% of patients with breast cancer experienced FT; however, FT in this study was measured using different criteria, including patients who could not cover the costs of care with their liquid assets and were forced to sell illiquid assets, borrow money, or discontinue treatment.

For the COST tool, no well-established cut-off points for each setting are available. We elected to apply the same cut-off used in our initial analysis, which aligns with those used in other studies. However, future research should persist in assessing the clinical significance of various COST score ranges [14,24].

This study corroborates the findings of prior research concerning the factors associated with FT. Female patients were more likely to experience severe FT compared to male patients. This observation is consistent with previous research conducted in 8 Southeast Asian countries, which indicated that females may face 1.35 times higher odds of financial catastrophe than males 3 months following a cancer diagnosis [25].

Notably, we observed high FT among individuals with low socioeconomic status. A lower education level and annual family income were strong predictors of increased FT in this group. Previous studies have reported similar outcomes, regardless of treatment modality. Typically, families or individuals with lower incomes cannot afford the costs associated with serious diseases, such as stage II or III cancer. Furthermore, unstable employment and unemployment were linked to severe FT in the univariable analysis, suggesting that those without stable employment are particularly vulnerable to FT. Individuals with unstable or no employment had lower socioeconomic

status, savings, and income, coupled with poorer insurance coverage. Consequently, they tended to experience higher economic stress when ill, as shown in studies from China and Indonesia [1,26]. However, we found no significant differences in the association between insurance benefit rates and FT. These findings align with previous research from Vietnam [3] and China [11]. Despite the health insurance system in the country providing some financial protection to patients, personal liability for care costs remains substantial, at 20%, or even 100% for services not covered by health insurance. For instance, a study conducted at 2 sites in northern and southern Vietnam revealed that health insurance played a minimal role in mitigating the adverse financial impact of using high-level healthcare facilities on household finances [27]. In the context of cancer treatment, patient cost-sharing is high due to the exclusion of expensive medications from insurance coverage [12,28]. Therefore, the development of essential benefit packages for health insurance could alleviate the economic and psychological burdens on patients.

Regarding clinical factors, the prevalence of FT varied and appeared to be associated with an increase in FT by cancer stage; however, it was not influenced by the type of cancer or treatment modality. This manifestation of financial distress is common across all cancer types. These findings are consistent with recent studies indicating that patients with advanced-stage cancer experience a lower quality of life and incur higher treatment costs [29,30]. This may represent a key risk factor that should be incorporated into future research and considered when screening patients for FT.

In our study of coping behavior, we identified 4 groups of strategies for managing financial stress. The most common strategies involved lifestyle changes (with 66.4% cutting back on essential household expenses and 78.7% reducing other purchases and leisure activities). These findings align with those of Joyce et al. [31], who observed over a 3-month period that patients commonly curtailed spending on essentials and leisure and dipped into savings to finance their treatment. Regarding financial resources, common strategies included selling possessions or property, borrowing money from relatives, and securing a bank loan, with reported rates of 10% to 50%. Additionally, around 1 in 5 patients sought help from welfare or community organizations. These results underscore the necessity for interventions targeting patients with cancer and emphasize the importance of social welfare in alleviating their financial burden. Furthermore, the implementation of social

policies that provide assistance with basic needs such as food, housing, and transportation for treatment is vital in reducing the economic impact on these patients and their families. The cost of treatment may substantially impact adherence, with approximately 6% to 9% of patients discontinuing treatment, altering their treatment plans, or opting not to purchase medication or attend follow-up doctor visits. These findings contribute to the body of research on common cost-management behaviors, which includes studies from China, in which 21.5% of respondents borrowed money for cancer treatment and 5.7% discontinued treatment due to financial hardship [11]; the United States, which described rates of 8.8% for skipping doses, 9.9% for taking less medicine, and 13.2% for delaying filing a prescription [32]; and Japan, in which 10% to 20% of patients refused, discontinued, reduced, or skipped doses or medication due to cost [33].

Joint efforts across levels of the healthcare system are necessary to reduce FT in patients with cancer. Strategies implemented at multiple levels, such as incorporating the COST tool into screening processes, restructuring cost-sharing and insurance plans, and establishing financial counseling programs that connect patients with resources to manage their finances, may alleviate FT among this population [12,34,35]. By addressing these financial challenges, we can advance health equity by making healthcare more affordable and decreasing disparities in access to cancer treatment.

Despite offering valuable insights, this study has several limitations. Although it included both levels of Vietnam's cancer treatment system, the sample was exclusively composed of individuals from central Vietnam, which limits its generalizability. While the COST is a commonly used FT measure, its reliance on self-reported data necessitates cautious interpretation of prevalence estimates. The results of FT, based on a COST cut-off point, should be interpreted with care due to variations in cost categorization. Another limitation is the cross-sectional design of the study, which may not have accurately captured the true relationships between FT risk factors and coping behaviors. Nonetheless, these findings should raise awareness of the considerable financial burden faced by patients with cancer. Future research should further explore this topic through prospective studies and contribute to the development of policies that support patients with cancer experiencing FT. Reducing the negative financial impact of healthcare is essential for achieving universal health coverage and providing optimal care.

In conclusion, our study revealed a remarkably high preva-

lence of FT among Vietnamese patients with cancer. Low socioeconomic status and specific clinical factors were identified as predictors of FT. Patients across all levels of FT employed each of the examined cost-management strategies, with a strong dose-response relationship. These findings underscore the need for routine screening for FT risk in clinical settings and emphasize the importance of individual risk and resource assessments through social counseling.

NOTES

Supplemental Materials

Supplemental materials are available at <https://doi.org/10.3961/jpmph.24.090>.

Conflict of Interest

The authors have no conflicts of interest associated with the material presented in this paper.

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