Journal of Cancer Policy 48 (2026) 100730

Contents lists available at ScienceDirect

Journal of Cancer Policy

journal homepage: www.elsevier.com/locate/jcpo

Financial toxicity among gastric and pancreatic cancer survivors in India and its impact on quality of life

Abhishek Anand [a], T.R. Dilip [b], Manish Bhandare [c,*], Amit Chopde [c], Swara Patil [d], Shailesh V. Shrikhande [d]

[a] International Institute for Population Sciences, Mumbai, India
[b] Department of Family and Generations, International Institute for Population Sciences, Mumbai, India
[c] Department of Surgical Oncology, Tata Memorial Centre, ACTREC, Navi Mumbai, India
[d] Tata Memorial Hospital, Parel, Mumbai, India

ARTICLE INFO

Keywords:
Financial toxicity
Quality of life
Cross-sectional study
India

ABSTRACT

Background: Financial toxicity (FT) associated with cancer treatment has emerged as a critical issue impacting cancer patients globally. The absence of comprehensive research on FT among gastric and pancreatic cancer survivors in India leaves a gap in understanding the full spectrum of economic burdens and challenges faced by them. This study addresses this gap by examining the factors associated with FT and its impact on the quality of life for gastric and pancreatic cancer survivors.

Methods: Data for this study were collected from April to September 2024 at Tata Memorial Hospital (TMH), Mumbai. Participants with a history of gastric and pancreatic cancers were selected at their regular follow-up visits to the Gastrointestinal Outpatient Department at TMH. The FT was measured using the COST FACIT v2, and the EORTC-QLQ-C30 was used to measure QoL.

Results: Among the 190 survivors, 19.5%, 36.3% and 44.2% had low, moderate and high FT, respectively. The results further show that survivors aged 60 and above had significantly lower FT compared to younger survivors. The classification based on the paying capacity of patients showed that survivors with poor and very poor status had significantly higher FT than those from the non-poor category. High years of education and insurance coverage also reduced FT. The findings also show that as FT increases, QoL deteriorates, which is particularly evident across various functional and symptom scales.

Conclusion: The observation that approximately one-third of the survivors who completed treatment five years earlier were also experiencing severe financial toxicity illustrates the magnitude of the problem. The FT and its associated risk factors limit the ability of survivors and their families to integrate back into society and have a better QoL. It is evident that survivors need more than just medical treatment; they need a holistic support system that addresses their financial needs.

1. Introduction

The prevalence of gastric and pancreatic cancers in India is on the rise, attributed to factors including dietary habits, genetic predispositions, smoking, alcohol consumption, obesity, sedentary lifestyle, etc [1–4]. Pancreatic cancer, though less common, is projected to become the second leading cause of cancer-related deaths in the USA by 2030 [5]. The global incidence of pancreatic cancer has been steadily increasing, with the disease predicted to rise from current rates to significantly higher levels by 2040 [6]. Currently, it ranks as the twelfth most common cancer worldwide, but stands as the seventh leading cause of cancer death [7]. Gastric cancer, on the other hand, while having better outcomes when detected early, often remains asymptomatic until advanced stages, making timely and cost-effective treatment difficult.

Cancer treatment is known to place a significant financial strain on patients and their households, from direct medical and non-medical costs to indirect expenses [8,9]. Expenses for medications, hospital visits, surgeries, and follow-up treatments quickly add up, often

* Corresponding author.
E-mail addresses: anandabhishek361@gmail.com (A. Anand), diliptr@iipsindia.ac.in (T.R. Dilip), manishbhandare@gmail.com (M. Bhandare), amitchopde210@yahoo.co.in (A. Chopde), swarap150901@gmail.com (S. Patil).

https://doi.org/10.1016/j.jcpo.2026.100730
Received 17 September 2025; Received in revised form 26 December 2025; Accepted 1 March 2026
Available online 2 March 2026

depleting savings and increasing debt. This economic burden impacts patients' overall well-being, potentially affecting adherence to essential treatments [10,11]. Financial toxicity (FT), or the economic burden associated with cancer treatment, has emerged as a critical issue impacting cancer patients worldwide. As treatments become increasingly advanced and expensive, patients often face substantial out-of-pocket costs that strain personal finances, leading to psychological and social consequences [12,13]. This burden can result in reduced quality of life, medication non-adherence, and increasing psychological stress, leading them to forgo essential care or follow-up visits due to cost concerns and even adverse health outcomes as patients struggle to balance treatment expenses with everyday living costs [14,15]. FT is especially concerning in countries lacking comprehensive healthcare coverage, where patients may deplete their savings, incur debt, or delay essential care due to costs.

Several studies in India have reported high out-of-pocket expenditures (OOPE) and catastrophic health expenditures for patients and their families due to cancer treatment in India [16–18]. However, this economic burden incurred during treatment continues even after completion of treatment. Despite the growing recognition of FT in cancer care, limited studies have assessed the financial implications experienced by individuals post-treatment completion, i.e., among cancer survivors, particularly those treated with less common but severe types like gastric and pancreatic cancers.

As the incidence of these cancers continues to climb, advancements in treatment are simultaneously improving survival rates. This positive trend suggests that the number of cancer survivors will significantly increase in the near future [19]. This expected rise in survivorship emphasises the need for comprehensive post-treatment care plans and support systems to accommodate the growing population of survivors, addressing their long-term health and quality of life.

As the number of survivors increases, there is a pressing need for post-treatment care and support tailored to the specific economic challenges faced by individuals who have undergone extensive radical treatment for cancers such as gastric and pancreatic origin. The absence of comprehensive research on FT among these survivors in India leaves a gap in understanding the full spectrum of economic burdens and challenges they face, making it difficult to provide targeted support and interventions tailored to their needs. This study aims to address this gap by examining the factors associated with FT and its impact on the quality of life for gastric and pancreatic cancer survivors. By identifying survivors at high risk of FT and understanding their unique financial burdens, we intend to inform policy recommendations and enhance support systems to meet the long-term needs of this vulnerable group

2. Methods

2.1. Study design and Participants

Data for this cross-sectional study were collected between April 2024 and September 2024 from the Tata Memorial Hospital (TMH), Mumbai. Survivors aged at least 18 years old and having completed treatment at least 12 months prior to the interview date were eligible to participate in the study. A consecutive sampling strategy was employed, whereby all eligible survivors attending follow-up outpatient clinics at TMH during the study period were systematically invited to participate until the target sample size was achieved. Informed consent was obtained from all eligible participants before proceeding with the interview. Participants with an inability to provide consent, recurrence of cancer, more than one type of cancer, severe ill health or severe complications post-treatment were excluded during the screening stage. A total of 190 participants who met the inclusion criteria were included in the study.

2.2. Data collection

Survivors who provided informed consent to participate in this study were asked questions in a face-to-face interview by the researcher. The questionnaire for this interview included sections on the demographic and background characteristics of respondents, FT questions and a section on quality of life.

2.3. Measures

2.3.1. Sociodemographic features

The characteristics of the respondents included sex (male, female), age at interview (23–44 years, 45–59 years, and 60 + years), years of education (categorised as no education/less than 5 years, 6–9 years, and 10 + years), current marital status (in a union, not in union), living arrangements (living with spouse/spouse and children, others), current employment status (Not working/student, homemaker, currently working), insurance coverage (yes, no), number of earning members in the household (0–2, 3 or more), place of residence (urban, rural), social group (Schedule Caste (SC)/ Schedule Tribe (ST), Other Backward Castes (OBC), and others), time since treatment completion (1–2 years, 2–5 years, and 5 + years), type of cancer (Gastric, Pancreatic), whether taken adjuvant chemotherapy (no, yes), and type of patients category (private, Gen-C, and Gen-NC).

Based on the individual's paying capacity, patients are offered to register in different categories at TMH. In General-C, patients are partly charged, paying 20% for investigations and consultations, with other costs billed at actual rates. In General-NC, patients face minimal charges for some services, with no fees for investigations or consultations, while other charges are billed at actual rates. Patients in the private category pay the full cost of all services. The payment category is taken as a proxy indicator for poor and non-poor groups, i.e. Gen-NC (very poor), Gen-C (poor) and Private (Non-poor).

2.3.2. Financial toxicity

FT was measured using the Comprehensive Score for Financial Toxicity (COST), and the Functional Assessment of Chronic Illness Therapy (FACIT) version 2, developed and validated by de Souza et al. [20,21]. The COST measure (version 2) includes 12 items rated on a five-point Likert scale, where 0 indicates "Not at all" and 4 represents "Very much." This measure includes questions on financial services, savings, and the impact of cancer on the financial situation of patients. It is widely used and accepted as a measure of FT globally [15,22–24]. The original scale has reported high internal consistency with a Cronbach alpha of 0.92. Following the scoring guidelines, items 2, 3, 4, 5, 8, 9, and 10 were reverse-scored, and item 12, being a summary measure, was excluded. The total score of this measure ranges from 0 to 44, where higher scores indicate lower financial toxicity. This measure was also validated in the Indian setting by Joshi et al. and Dar et al. [25,26]. While there is no standard cut-off for COST scores, studies have adopted various methods to establish cut-off points. Many have followed the grading approach originally proposed by de Souza et al. [25–27], with some using median values [15,27,28], while a study from China set a cut-off at 18.5, defining high FT for scores below 18.5 and low FT for scores above it [29]. However, given the behavioural and financial differences across populations in the USA, China, and India, our study developed an alternative cut-off system tailored to the Indian context. We categorised FT into three levels "Low FT," "Moderate FT," and "High FT", based on decile distribution: the top four deciles were classified as "High FT," the next four as "Moderate FT," and the lowest two deciles as "Low FT."

2.3.3. Quality of Life (QoL)

The QoL of respondents was evaluated using a well-established measure, the European Organisation for Research and Treatment of Cancer Quality of Life Questionnaire Core 30 (EORTC QLQ-C30).

Developed by the EORTC, this 30-item questionnaire captures multiple dimensions, including physical, emotional, cognitive and social functioning, and symptom burdens, such as fatigue, pain, and nausea

[30]. It comprises five functional scales, three symptom scales, a global health status/QoL scale, and several single items. Scoring is standardised, enabling comparison across studies, and higher scores generally indicate better functioning or more severe symptoms, depending on the scale [31]. The EORTC QLQ-C30 is well-validated globally and suitable for diverse cancer populations, making it an essential instrument for both clinical trials and patient-centred care [32–34]. This scale has also been translated and validated for the Indian population with high reliability and internal consistency [35,36].

2.4. Statistical analysis

Cronbach's alpha, with values of 0.92 and 0.85, assessed the reliability of the COST and QoL scales in this study. Descriptive statistics were used to summarise selected survivor background characteristics, while the Mann-Whitney *U* test and Kruskal-Wallis test were used to evaluate the relationships between survivor characteristics and financial toxicity FT. The Spearman correlation assessed the relationship between FT and QoL. Age- and sex-adjusted means, along with mean differences, were calculated to analyse variations in functioning, global health status/QoL, and symptom scales based on FT status. Significant factors from the univariate analysis were included in a multiple linear regression to identify factors associated with FT.

3. Results

3.1. Sample characteristics

The sample's mean and median COST scores were 22.3 and 21, respectively. Among the 190 patients, males (65.3%) had a mean COST score of 22.47, and females (34.7%) had a score of 21.98. Younger participants aged 23–44 years had a lower mean COST score, i.e. higher FT of 19.89, while those aged 60 years and above had a higher mean score of 25.47 ($p < 0.01$). Urban residents (54.7%) reported a higher mean COST score, i.e. low FT (24.8), compared to rural residents (19.2). Survivors with health insurance coverage (7.9%) had a higher mean COST score (29.2) than those without insurance (21.7). Employment status also varied significantly, with individuals currently not working showing a lower mean COST score (17.9) compared to homemakers (23.6) and currently working individuals (22.3). Educational attainment appeared to impact financial toxicity, as those with ten or more years of education reported a mean score of 25.8, whereas individuals with no education or less than five years of schooling had a lower mean score of 19.7. Univariate analysis indicated significant differences in COST scores based on age, education, employment status, insurance coverage, number of earning members in the household, and place of residence ($\alpha = 0.05$) (Table 1).

Out of all cancer survivors, 19.5% experience low financial toxicity (FT), 36.3% have moderate FT and 44.2% face high FT (Fig. 1).

Table 2 shows the characteristics of survivors by levels of FT, categorised as low, moderate, or high. FT levels were noted to be lower in the elderly (32.9% for individuals aged 60 and above), those with 10 or more years of education (35.1%), those who are insured (66.7%), urban residents (32.7%), or those living in households with three or more earning members (24.6%). High FT was more common among younger survivors (60.5% for ages 23–45), those with little or no education (56.7%), uninsured individuals (46.9%), rural residents (62.8%), and those in households with fewer than three earning members (50.4%). Additionally, survivors classified as poor and very poor had high FT (76.5% and 62.1%, respectively), while survivors in the other categories had the lowest level of FT (5.5%). High FT levels were more prevalent in survivors without insurance and those from rural areas or with fewer financial resources.

The results of the multivariable-adjusted regression showed that age is associated with FT, where survivors aged 60 and above have significantly higher COST scores ($\beta = 3.06$, $p < 0.01$) compared to those aged

Table 1
Background Characteristics and COST Scores of Gastric and Pancreatic Cancer Survivors.

Patient Characteristic	Overall (N = 190)	COST score	Median	Univariable P
	Freq (%)	Mean ± SD		
Sex				0.76[a]
Male	124 (65.3%)	22.47 ± 7.09	21.0	
Female	66 (34.7%)	21.98 ± 7.17	21.0	
Age at interview				< 0.01[b]
23–44	43 (22.6%)	19.89 ± 6.50	20.0	
45–59	84 (44.2%)	20.52 ± 6.93	19.5	
60 +	63 (33.2%)	25.47 ± 6.47	24.0	
Age in years, Mean (SD)	*54.44 (11.72)*			
Years of education				< 0.01[b]
No education or less than 5 yrs.	67 (35.3%)	19.73 ± 6.22	19.0	
6–9 years	49 (25.8%)	20.51 ± 5.39	20.0	
10 + years	74 (38.9%)	25.81 ± 7.48	27.0	
Current marital status				0.053[a]
In union	167 (87.9%)	21.95 ± 6.97	21.0	
Not in union	23 (12.1%)	24.83 ± 7.72	23.0	
Living with				0.083[a]
Spouse / Spouse and children	164 (86.3%)	21.96 ± 7	21.0	
Others (Relatives, Daughter in Law)	26 (13.7%)	24.42 ± 7.52	22.5	
Current employment status				< 0.01[b]
Not working/Student	26 (13.7%)	17.96 ± 5.18	19.0	
Homemaker	84 (44.2%)	23.64 ± 7.29	22.0	
Currently working	80 (42.1%)	22.3 ± 6.95	22.0	
Insurance coverage				< 0.01[a]
No	175 (92.1%)	21.7 ± 6.76	21.0	
Yes	15 (7.9%)	29.27 ± 7.5	31.0	
Number of earning members in the household				< 0.01[a]
0–2	121 (63.7%)	21.28 ± 7.23	20.0	
3 or more	69 (36.3%)	24.09 ± 6.54	23.0	
Place of residence				< 0.01[a]
Urban	104 (54.7%)	24.87 ± 7.62	24.5	
Rural	86 (45.3%)	19.2 ± 4.91	19.0	
Social group (Caste)				0.025[b]
SC/ST	36 (18.9%)	19.17 ± 5.71	20.0	
OBC	34 (17.9%)	22.97 ± 8.02	21.0	

(*continued on next page*)

Table 1 (*continued*)

Patient Characteristic	Overall (N = 190)	COST score	Median	Univariable P
	Freq (%)	Mean ± SD		
Others	120 (63.2%)	23.05 ± 7	22.0	
Time since treatment completion				0.08[b]
1–2 years	87 (45.8%)	21.08 ± 6.89	20.0	
2–5 years	47 (24.7%)	22.6 ± 6.81	22.0	
5 + years	56 (29.5%)	23.95 ± 7.43	23.0	
Type of cancer				0.767[a]
Gastric	133 (70.0%)	22.25 ± 6.87	21.0	
Pancreatic	57 (30.0%)	22.42 ± 7.67	22.0	
Economic status				< 0.01[b]
Poor	66 (34.7%)	19.08 ± 4.87	19.0	
Very poor	51 (26.8%)	17.63 ± 5.18	17.0	
Non-poor	73 (38.4%)	28.48 ± 5.35	28.0	
Adjuvant chemotherapy				0.676[a]
No	64 (33.7%)	22.53 ± 7.53	22.0	
Yes	126 (66.3%)	22.18 ± 6.9	21.0	
Comorbidity				0.681[a]
No	59 (31.1%)	22.58 ± 7.44	22.0	
Yes	131 (68.9%)	22.18 ± 6.97	21.0	

a: Mann-Whitney U test, b: Kruskal Wallis test

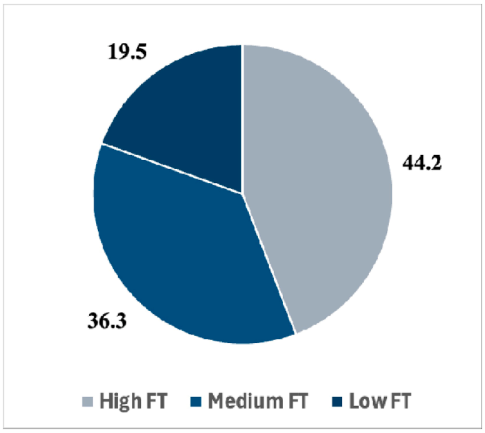

Fig. 1. Grades of FT among gastric and pancreatic cancer survivors.

23–44, indicating lower FT among older survivors. Similarly, education level played a role, with individuals having ten or more years of education showing a trend toward higher COST scores (β = 1.68, p = 0.08), which suggests they experience reduced FT compared to those with no or minimal education. Insurance coverage also shows a marginally positive association with COST scores (β = 2.63, p = 0.06), implying that having insurance results in lower FT (Table 3).

Place of residence is another factor, with survivors from rural areas having lower COST scores (β = −1.51, p = 0.06) than those from urban areas, indicating that survivors from urban areas experience somewhat lower FT. Social status (caste) also impacts FT, as individuals from OBC communities have lower FT (β = 2.53, p = 0.03) than SC/ST individuals. Time since treatment completion is also relevant; survivors who completed treatment more than 5 years ago have higher COST scores (β = 2.06, p = 0.02) compared to those within 1–2 years, indicating a reduction in financial toxicity over time. Finally, the economic status shows that survivors of poor and very poor categories have significantly lower COST scores, i.e. high FT (β = −7.04, p < 0.01 and β = −8.00, p < 0.01, respectively) compared to those in the non-poor category.

Table 2
Characteristics of survivors by levels of FT.

Patient Characteristic	Low FT	Moderate FT	High FT
	n (%)	n (%)	n (%)
Sex			
Male	24 (19.4)	45 (36.3)	55 (44.4)
Female	13 (19.7)	24 (36.4)	29 (43.9)
Age at interview			
23–44	4 (10.2)	10 (25.6)	25 (64.1)
45–59	9 (11.5)	25 (32.0)	44 (56.4)
60 +	24 (32.9)	34 (46.6)	15 (20.6)
Years of education			
0–5 years	6 (9)	23 (34.3)	38 (56.7)
6–9 years	5 (10.2)	18 (36.7)	26 (53)
10 + years	26 (35.1)	28 (37.8)	20 (27)
Living with			
Spouse / Spouse and children	31 (18.9)	57 (34.8)	76 (46.3)
Others (Relatives, Daughter in Law)	6 (23.1)	12 (46.2)	8 (30.8)
Current employment status			
Not working/Student	0 (0)	7 (26.9)	19 (73.1)
Homemaker	22 (26.2)	31 (36.9)	31 (36.9)
Currently working	15 (18.8)	31 (38.8)	34 (43)
Insurance coverage			
No	27 (15.4)	66 (37.7)	82 (46.9)
Yes	10 (66.7)	3 (20)	2 (13.3)
Number of earning members in house			
0–2	20 (16.5)	40 (33.1)	61 (50.4)
3 or more	17 (24.6)	29 (42)	23 (33.3)
Place of residence			
Urban	34 (32.7)	40 (38.5)	30 (28.8)
Rural	3 (3.5)	29 (33.7)	54 (62.8)
Social group			
SC/ST	2 (5.6)	12 (33.3)	22 (61.1)
OBC	9 (26.5)	9 (26.5)	16 (47.1)
Others	26 (21.7)	48 (40)	46 (38.3)
Economic status			
Poor	1 (1.5)	24 (36.4)	41 (62.1)
Very Poor	1 (2)	11 (21.6)	39 (76.5)
Non-Poor	35 (47.9)	34 (46.6)	4 (5.5)
Time since treatment completion			
1–2 years	12 (13.8)	28 (32.2)	47 (54)
2–5 years	11 (23.4)	17 (36.2)	19 (40.4)
5 + years	14 (25)	24 (42.9)	18 (32.1)
Type of cancer			
Gastric	26 (19.5)	49 (36.8)	58 (43.6)
Pancreatic	11 (19.3)	20 (35.1)	26 (45.6)
Adjuvant chemotherapy			
No	13 (20.3)	24 (37.5)	27 (42.2)
Yes	24 (19)	45 (35.7)	57 (45.2)
Comorbidity			
No	11 (18.6)	23 (39)	25 (42.4)
Yes	26 (19.8)	46 (35.1)	59 (45)
Total	**37 (19.5)**	**69 (36.3)**	**84 (44.2)**

3.2. Financial toxicity and quality of life

Table 4 shows positive correlations between FT and several QoL functioning scales, with significant associations seen in emotional functioning (r = 0.57, p < 0.01), social functioning (r = 0.44, p < 0.01), general health score (r = 0.47, p < 0.01), and the QoL summary score (r = 0.25, p < 0.01). Role functioning also has a significant, though weaker, positive correlation (r = 0.16, p < 0.05). Physical and

Table 3
Financial toxicity and its associated factors among gastric and pancreatic cancer survivors.

	β	95% CI	p
Age at interview			
23–44			
45–59	0.53	[-1.35,2.41]	0.58
60 +	3.06***	[1.01,5.11]	< 0.01
Years of education			
No education or less than 5 yrs.			
6–9 years	1.00	[-0.83,2.84]	0.28
10 + years	1.68*	[-0.21,3.58]	0.08
Current marital status			
In union			
Not in union	4.59	[-1.44,10.61]	0.13
Living with			
Spouse / Spouse and children			
Others (Relatives, Daughter in Law)	-2.36	[-8.15,3.43]	0.42
Current employment status			
Not working/Student			
Homemaker	0.998	[-1.36,3.35]	0.4
Currently working	1.02	[-1.35,3.40]	0.4
Insurance coverage			
No			
Yes	2.63*	[-0.14,5.41]	0.06
Number of earning members in house			
0–2			
3 or more	0.58	[-0.99,2.14]	0.47
Place of residence			
Urban			
Rural	-1.51*	[-3.11,0.09]	0.06
Social group			
SC/ST			
OBC	2.53**	[0.19,4.88]	0.03
Others	1.56	[-0.34,3.46]	0.11
Time since treatment completion			
1–2 years			
2–5 years	1.54*	[-0.26,3.35]	0.09
5 + years	2.06**	[0.32,3.79]	0.02
Economic status			
Non-poor			
Poor	-7.04***	[-8.95–5.13]	< 0.01
Very poor	-8.00***	[-10.18–5.82]	< 0.01

* p < 0.10, ** p < 0.05, *** p < 0.01; SC- Scheduled Caste; ST – Scheduled Tribe; OBC- Other Backward Caste

Table 4
Correlation between FT and QoL.

QOL Functioning scales	Correlation With FT	
	r	p
General health score	0.47***	< 0.01
Physical functioning	0.017	0.811
Role functioning	0.16**	0.023
Social functioning	0.44***	< 0.01
Emotional functioning	0.57***	< 0.01
Cognitive functioning	0.068	0.353
QoL summary score	0.25***	< 0.01

* p < 0.10, ** p < 0.05, *** p < 0.01

cognitive functioning show non-significant correlations, suggesting limited association with FT in these domains. As the COST score increased, i.e. with reducing FT, the scores of the functioning scales and overall QoL summary scale increased.

Table 5 highlights the role of FT on QoL and functioning in cancer survivors, showing that higher FT levels are associated with poorer health outcomes. Across functioning scales, those with high FT had significantly lower scores than those with low FT.GHS dropped from 73.95 in low FT to 45.59 in high FT, with a mean difference of −28.36, indicating a substantial decline in perceived health as financial stress increases. Physical, role, emotional, cognitive, and social functioning similarly declined with rising FT, reflecting that financial burden severely affects physical and mental well-being, role fulfilment, and social engagement. On symptom scales, fatigue and pain levels were significantly higher in the high FT group, with fatigue increasing by 20.83 points and pain by 17.41 points compared to the low FT group. Although symptoms like nausea, vomiting, dyspnea, and diarrhoea were higher in medium and high FT groups, these differences were not statistically significant. Constipation was notably higher in medium and high FT groups, with significant differences of 18.34 and 13.55, respectively. At the same time, appetite loss and insomnia were more common in higher FT groups, though not consistently significant.

4. Discussion

This study comprehensively assesses FT and its association with QoL among gastric and pancreatic cancer survivors in India. We found that approximately 4 out of 5 survivors had moderate to high FT. The findings of this study give us insight into the nature of FT among gastric and pancreatic cancer survivors, revealing variability by background characteristics of survivors. Factors such as age, social status, years of education, insurance coverage, place of residence, time since treatment completion, and categories of patients were significantly associated with FT. Several of these factors, particularly social status, insurance coverage, and place of residence, were approaching statistical significance.

Our findings of moderate to high financial burden in over 80% of gastric and pancreatic cancer survivors align with patterns observed across other cancers, though the intensity appears particularly acute in these aggressive gastrointestinal cancers due to their advanced presentation, prolonged treatment, and high non-medical costs. For instance, colorectal cancer survivors report a similar prevalence (~50%) using COST measures, driven by adjuvant chemotherapy and employment disruption, while hematologic malignancy patients face even higher toxicity from chronic inpatient regimens [37]. Breast cancer studies show lower rates (30–40%) in high-income insured settings but comparable burdens (75–80%) in LMICs such as Vietnam, China, Kenya, Nigeria, Egypt, etc., where survivors' characteristics mirror our Indian cohort [38,39].

Cross-country comparisons further contextualize our results. Survivors from the USA experience greater debt due to cost-sharing despite having insurance, whereas UK patients in tax-funded systems report persistent toxicity from income loss, paralleling the work disruptions and out-of-pocket non-medical expenses (transport, accommodation) that are prevalent in our subsidised Indian setting [40–42]. These comparisons show that while gastric/pancreatic survivors in India face amplified toxicity from late diagnosis and weak financial protection, the core mechanisms (socioeconomic vulnerability, treatment intensity) are universal.

Survivors of younger ages reported higher FT, whereas those of older ages generally experienced lower FT. This is in line with previous studies, which have reported similar findings [43–45]. Younger survivors may often face loss of jobs during cancer diagnoses or may face expenses such as loans, home purchases, etc [46]. Additionally, a cancer diagnosis can adversely impact their ability to work, affecting physical and cognitive capacities, which may limit their work opportunities [47]. In contrast to previous research, our results do not show differences in FT among men and women [45,48]. This could be because approximately 86% of the women survivors in our study were homemakers without any job or salary, even before the cancer treatment. Similar to previous research, educational attainment emerges as a protective factor against FT in our study, with individuals having more than ten years of education experiencing less financial strain [49]. This association likely reflects higher earning potentials and better financial literacy, which are crucial for managing the complex costs associated with ongoing cancer care.

Insurance coverage is pivotal in protecting survivors from FT, as evidenced by insured individuals reporting significantly lower FT. This

Table 5
Age-Sex adjusted mean and mean differences in functioning and global health status/quality of life scales and symptoms scales by status of financial toxicity.

EORTC QLQ-C30	Low FT (n = 69)	Medium FT (n = 79)	High FT (n = 42)	Mean difference (95% CI) (Medium FT vs Low FT)	p	Mean difference (95% CI) (High FT vs Low FT)	p
Functioning scales and GHS/QoL							
GHS	73.95	58.11	45.59	-15.84 (-22.45,-9.22)	0.00	-28.36 (-35.06,-21.67)	0.00
Physical functioning	79.28	67.55	64.22	-11.73 (-19.27,-4.18)	0.00	-15.06 (-22.69,-7.42)	0.00
Role functioning	75.94	64.31	50.33	-11.63 (-20.84,-2.41)	0.01	-25.6 (-34.93,-16.28)	0.00
Emotional functioning	72.42	59.72	48.34	-12.7 (-18.37,-7.03)	0.00	-24.08 (-29.82,-18.34)	0.00
Cognitive functioning	83.67	69.58	70.28	-14.09 (-24.08,-4.11)	0.01	-13.39 (-23.49,-3.29)	0.01
Social functioning	63.44	51.83	43.37	-11.61 (-17.39,-5.84)	0.00	-20.08 (-25.92,-14.23)	0.00
Symptoms							
Fatigue	37.09	48	57.93	10.9 (3.09,18.72)	0.01	20.83 (12.92,28.75)	0.00
Nausea/Vomiting	12.32	16.62	21	4.3 (-6.13,14.73)	0.42	8.68 (-1.88,19.24)	0.11
Pain	31.46	42.84	48.87	11.38 (2.78,19.99)	0.01	17.41 (8.7,26.12)	0.00
Dyspnea	5.65	9.74	11.54	4.09 (-4.46,12.64)	0.35	5.89 (-2.76,14.54)	0.18
Insomnia	43.14	55.04	50.67	11.89 (-0.87,24.65)	0.07	7.52 (-5.39,20.43)	0.25
Appetite loss	31.28	27.84	39.54	-3.44 (-14.44,7.56)	0.54	8.27 (-2.87,19.4)	0.15
Constipation	23.67	42.01	37.21	18.34 (5.57,31.11)	0.01	13.55 (0.62,26.47)	0.04
Diarrhoea	1.49	5.85	4.06	4.36 (-2.02,10.74)	0.18	2.58 (-3.88,9.03)	0.43
QoL summary score	76.05	66.54	61.98	-9.51 (-13.94,-5.08)	0.00	-14.07 (-18.56,-9.59)	0.00

finding aligns with other studies and points to the critical need for broadening insurance coverage and ensuring that policies adequately cover the long-term costs of cancer care [18,50,51]. However, the insurance results in our study are not conclusive due to a smaller sample size and a lower prevalence of insurance uptake. The low percentage of insured participants also highlights a gap in India's current healthcare system, where many remain without adequate insurance, thereby increasing their risk of a significant financial burden. The study reveals differences in FT between urban and rural residents, with survivors from rural areas facing higher FT. Despite the availability of government schemes, gaps in enrollment, coverage limits, and OOPE remain substantial. Broader inclusion under government-sponsored health insurance (such as Ayushman Bharat - Pradhan Mantri Jan Arogya Yojana (AB-PMJAY)) and stronger regulation and accessibility of private insurance are essential to provide comprehensive financial protection [18,52].

The time since treatment completion is also a significant factor affecting FT among our study participants. Survivors whose treatment was completed only 1–2 years before the interview had higher chances of being financially burdened than survivors whose treatment was completed at least five years before. Survivors with the recent completion of treatment already have an ongoing financial burden, and regular follow-up visits and costly medical tests add to the existing financial burden. Additionally, the treatment categories of survivors within TMH were also significantly associated with FT. Survivors in general categories, even with subsidised rates of treatment and medicines, report a higher financial burden. This can be attributed to non-medical expenditures such as transportation, accommodation, food and other expenses outside the hospital, which are not available at subsidised rates [53]. Additionally, it justifies the importance of treatment subsidies for poorer patients that are being implemented in this cancer hospital. Existing studies have reported a significant association between employment status and FT among cancer survivors. However, the multivariable regression results in our study did not show a significant association between employment status and FT [54].

The link between FT and QoL among gastric and pancreatic cancer survivors presents a clear narrative about the broader impacts of cancer beyond physical health. The findings show that as FT increases, QoL deteriorates, which is particularly evident across various functional and symptom scales [55]. The emotional and social functioning scores are significantly correlated with FT, illustrating that financial burdens can lead to considerable psychological distress and social isolation [56,57]. This could be due to the stress of managing the direct and indirect costs of cancer care, which strain personal relationships and limit social interactions. Emotional strain can also amplify feelings of uncertainty and fear about the future, further impacting mental health and overall well-being.

General health scores and QoL summary scores also showed a strong negative correlation with financial toxicity. As survivors struggle with the financial demands of treatment and associated costs, their perception of overall health seems to decline. This perceived deterioration can create a feedback loop where poor health perceptions lead to decreased mental health resilience, worsening FT's impact. The symptom scales indicate that individuals with higher FT report increased levels of fatigue and pain, which can be attributed to the added stress and possibly poorer symptom management due to financial constraints. This indicates that financial distress might not only stem from medical expenses but also from an inability to afford adequate management, which is crucial for maintaining life quality during and after cancer treatment. Previous studies have stressed the importance of studying FT among various cancer subtypes [15,45].

The findings have implications for strengthening the health system and modifying existing policies to reduce FT among cancer survivors in India. Public policies and laws that support cancer survivors in employment, such as flexible schedules and modified duties, may be particularly beneficial for younger survivors, who are often affected during their economically productive years. Policies supporting job retention, flexible return-to-work arrangements, and linkage to income-support or vocational rehabilitation schemes could help reduce long-term financial distress in this subgroup.

Even after five years of post-treatment, the FT remains, which stresses the fact that the survivors need continuous financial support or protection to overcome this burden. Recent studies have discussed that government-aided schemes cover only about 25–30% of total cancer treatment costs, with the remaining costs being OOPE, a major reason for FT [42]. Despite recent expansions in publicly funded health insurance (PFHI), coverage for cancer care and survivorship care remains capped and limited. Additionally, they do not cover follow-up visits, supportive care, non-medical expenses, and income loss. Expanding the PFHI scheme benefits beyond active treatment, integrating financial risk screening into routine oncology follow-up, and providing support for indirect non-medical costs could effectively mitigate post-treatment FT. Taking examples from recent trials on financial navigation interventions [58] and integrating them into the National Cancer Grid (NCG) protocols could reduce FT and improve QoL outcomes in vulnerable groups. Such reforms would transform our data from descriptive evidence to actionable levers for equitable survivorship care in resource-constrained settings.

One of the strengths of this study is its focus on gastric and pancreatic cancer survivors. However, this study also met with some limitations,

such as its cross-sectional design, which limits the ability to ascertain causality and track changes over time. Potential biases may arise from self-reported data, and the findings might only be generalisable for cancer survivors treated in this government-owned speciality hospital for cancer, with branches in other cities across India. FT levels for survivors who got treatment from other cancer care centres available in the country, especially in India's private sector, are likely to be higher than those observed in this study.

5. Conclusion

FT was significantly associated with factors such as age, time since treatment completion, and classification of patients among gastric and pancreatic cancer survivors. Its association with factors such as years of education, insurance coverage, number of earning household members, and place of residence was approaching significance. Results also reveal the complex and significant impact of FT on both emotional and social well-being. This connection highlights that financial stress affects not only the financial situation but also their mental health and social connections. The FT and its associated risk factors limit the ability of survivors and their families to integrate back into society and have a better QoL. It is evident that survivors need more than just medical treatment; they need a holistic support system that addresses their financial needs. As they work towards recovery, their care must include financial counselling and emotional support to truly enhance their QoL.

Ethics approval

This study was conducted in accordance with the principles of the Declaration of Helsinki and was approved by the Institutional Ethics Committee (IEC) of TMH, Mumbai (OIEC/4298/2024/00001) and was registered in the Clinical Trial Registry of India with registration number CTRI/2024/04/065051||http://ctri.nic.in/, dated 2 April 2024. All data collected was kept strictly confidential and used exclusively for research purposes.

Author contributions

Conception and design: Abhishek Anand, TR Dilip, Manish Bhandare, Amit Chopde, Shailesh V Shrikhande**, Collection and assembly of data:** Abhishek Anand, Manish Bhandare, Amit Chopde, Swara Patil**, Data analysis:** Abhishek Anand**, Interpretation of results and manuscript writing:** Abhishek Anand, TR Dilip**, Review and editing, and supervision** - TR Dilip, Manish Bhandare, Shailesh V Shrikhande**, Final approval of manuscript:** All authors

CRediT authorship contribution statement

Amit Chopde: Writing – review & editing, Data curation, Conceptualization. **Swara Patil:** Writing – review & editing, Data curation. **Shailesh V Shrikhande:** Writing – review & editing, Supervision, Conceptualization. **ANAND ABHISHEK:** Writing – review & editing, Writing – original draft, Visualization, Methodology, Formal analysis, Data curation, Conceptualization. **T.R. Dilip:** Writing – review & editing, Supervision, Methodology, Conceptualization. **Manish Bhandare:** Writing – review & editing, Supervision, Data curation, Conceptualization.

Consent to participate

Informed written consent was obtained from all study participants.

Consent to publish

The authors affirm that human research participants provided informed consent for publication.

Ethics Declarations

None

Funding

Not available

Declaration of Competing Interest

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

Appendix

Table A1
COST – FACIT version 2

		Not at all	A little bit	Somewhat	Quite a bit	Very much
FT1	I know that I have enough money in savings, retirement, or assets to cover the costs of my treatment	0	1	2	3	4
FT2	My out-of-pocket medical expenses are more than I thought they would be	0	1	2	3	4
FT3	I worry about the financial problems I will have in the future as a result of my illness or treatment	0	1	2	3	4
FT4	I feel I have no choice about the amount of money I spend on care	0	1	2	3	4
FT5	I am frustrated that I cannot work or contribute as much as I usually do	0	1	2	3	4
FT6	I am satisfied with my current financial situation	0	1	2	3	4
FT7	I am able to meet my monthly expenses	0	1	2	3	4
FT8	I feel financially stressed	0	1	2	3	4
FT9	I am concerned about keeping my job and income, including paid work at home	0	1	2	3	4
FT10	My cancer or treatment has reduced my satisfaction with my present financial situation	0	1	2	3	4
FT11	I feel in control of my financial situation	0	1	2	3	4
FT12	My illness has been a financial hardship to my family and me	0	1	2	3	4

Data availability

The data that support the findings of this study are not openly available due to reasons of sensitivity and are available from the corresponding author upon reasonable request.

References

[1] G. Collatuzzo, C. Pelucchi, E. Negri, L. López-Carrillo, S. Tsugane, A. Hidaka, G. Shigueaki Hamada, R.U. Hernández-Ramírez, M. López-Cervantes, R. Malekzadeh, F. Pourfarzi, L. Mu, Z.-F. Zhang, N. Lunet, C. La Vecchia, P. Boffetta, Exploring the interactions between Helicobacter pylori (Hp) infection and other risk factors of gastric cancer: a pooled analysis in the Stomach cancer Pooling (StoP) Project, Int. J. Cancer 149 (2021) 1228–1238, https://doi.org/10.1002/ijc.33678.

[2] W. Deng, L. Jin, H. Zhuo, V. Vasiliou, Y. Zhang, Alcohol consumption and risk of stomach cancer: a meta-analysis, Chem. Biol. Interact. 336 (2021) 109365, https://doi.org/10.1016/j.cbi.2021.109365.

[3] P. Karimi, F. Islami, S. Anandasabapathy, N.D. Freedman, F. Kamangar, Gastric cancer: descriptive epidemiology, risk factors, screening, and prevention, Cancer Epidemiol. Biomark. Prev. 23 (2014) 700–713, https://doi.org/10.1158/1055-9965.EPI-13-1057.

[4] Y. Xiong, H. Xing, L. Hu, J. Xie, Y. Liu, D. Hu, Effects of comfort care on symptoms, gastric motility, and mental state of patients with functional dyspepsia, Medicine 98 (2019) e16110, https://doi.org/10.1097/MD.0000000000016110.

[5] W. Park, A. Chawla, E.M. O'Reilly, Pancreatic cancer: a review, JAMA 326 (2021) 851–862, https://doi.org/10.1001/jama.2021.13027.

[6] P. Rawla, T. Sunkara, V. Gaduputi, Epidemiology of pancreatic cancer: global trends, etiology and risk factors, World J. Oncol. 10 (2019) 10, https://doi.org/10.14740/wjon1166.

[7] F. Bray, J. Ferlay, I. Soerjomataram, R.L. Siegel, L.A. Torre, A. Jemal, Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries, CA A Cancer J. Clin. 68 (2018) 394–424, https://doi.org/10.3322/caac.21492.

[8] J.M. Boby, S. Rajappa, A. Mathew, Financial toxicity in cancer care in India: a systematic review, Lancet Oncol. 22 (2021) e541–e549, https://doi.org/10.1016/S1470-2045(21)00468-X.

[9] M.J. Loscalzo, V. Blinder, F.M. Gany, Financial Toxicity in Cancer Treatment. in: Psycho-Oncology, Oxford University Press, 2021, https://doi.org/10.1093/med/9780190097653.003.0077.

[10] Z.K. Lu, X. Xiong, J. Brown, A. Horras, J. Yuan, M. Li, Impact of Cost-Related Medication Nonadherence on Economic Burdens, Productivity Loss, and Functional Abilities: Management of Cancer Survivors in Medicare, Front. Pharmacol. 12 (2021), https://doi.org/10.3389/fphar.2021.706289.

[11] F.R. Nedjat-Haiem, T. Cadet, H. Parada, T. Jones, E.E. Jimenez, B. Thompson, K. J. Wells, S.I. Mishra, Financial Hardship and Health Related Quality of Life Among Older Latinos With Chronic Diseases, Am. J. Hosp. Palliat. Care 38 (2021) 938–946, https://doi.org/10.1177/1049909120971829.

[12] H. Yu, H. Li, T. Zuo, L. Cao, X. Bi, H. Xing, L. Cai, J. Sun, Y. Liu, Financial toxicity and psychological distress in adults with cancer: A treatment-based analysis, Asia-Pacific, J. Oncol. Nurs. 9 (2022) 100069, https://doi.org/10.1016/j.apjon.2022.04.008.

[13] R.J. Chan, L.G. Gordon, C.J. Tan, A. Chan, N.K. Bradford, P. Yates, O.A. Agbejule, C. Miaskowski, Relationships Between Financial Toxicity and Symptom Burden in Cancer Survivors: A Systematic Review, J. Pain. Symptom Manag. 57 (2019) 646–660.e1, https://doi.org/10.1016/j.jpainsymman.2018.12.003.

[14] T.G. Knight, A.M. Deal, S.B. Dusetzina, H.B. Muss, S.K. Choi, J.T. Bensen, G. R. Williams, Financial Toxicity in Adults With Cancer: Adverse Outcomes and Noncompliance, JOP 14 (2018) e665–e673, https://doi.org/10.1200/JOP.18.00120.

[15] D. Ürek, Ö. Uğurluoğlu, Predictors of financial toxicity and its associations with health-related quality of life and treatment non-adherence in Turkish cancer patients, Support Care Cancer 30 (2022) 865–874, https://doi.org/10.1007/s00520-021-06491-4.

[16] A. Kastor, S.K. Mohanty, Disease-specific out-of-pocket and catastrophic health expenditure on hospitalization in India: Do Indian households face distress health financing? PLoS One 13 (2018) e0196106 https://doi.org/10.1371/journal.pone.0196106.

[17] S. Prinja, J. Dixit, N. Gupta, A. Dhankhar, A.C. Kataki, P.S. Roy, N. Mehra, L. Kumar, A. Singh, P. Malhotra, A. Goyal, K. Rajsekar, M.N. Krishnamurthy, S. Gupta, Financial toxicity of cancer treatment in India: towards closing the cancer care gap, Front Public Health 11 (2023) 1065737, https://doi.org/10.3389/fpubh.2023.1065737.

[18] G. Basavaiah, P.D. Rent, E.G. Rent, R. Sullivan, M. Towne, M. Bak, B. Sirohi, M. Goel, S.V. Shrikhande, Financial Impact of Complex Cancer Surgery in India: A Study of Pancreatic Cancer, JGO (2018) 1–9, https://doi.org/10.1200/JGO.17.00151.

[19] C. Parry, E.E. Kent, A.B. Mariotto, C.M. Alfano, J.H. Rowland, Cancer survivors: a booming population, cancer epidemiology, biomarkers & prevention: a publication of the American Association for Cancer Research, Cosponsored Am. Soc. Prev. Oncol. 20 (2011) 1996, https://doi.org/10.1158/1055-9965.EPI-11-0729.

[20] J.A. de Souza, B.J. Yap, F.J. Hlubocky, K. Wroblewski, M.J. Ratain, D. Cella, C. K. Daugherty, The development of a financial toxicity patient-reported outcome in cancer: The COST measure, Cancer 120 (2014) 3245–3253, https://doi.org/10.1002/cncr.28814.

[21] J.A. de Souza, B.J. Yap, K. Wroblewski, V. Blinder, F.S. Araújo, F.J. Hlubocky, L. H. Nicholas, J.M. O'Connor, B. Brockstein, M.J. Ratain, C.K. Daugherty, D. Cella, Measuring financial toxicity as a clinically relevant patient-reported outcome: The validation of the COmprehensive Score for financial Toxicity (COST), Cancer 123 (2016) 476, https://doi.org/10.1002/cncr.30369.

[22] K. Honda, B. Gyawali, M. Ando, R. Kumanishi, K. Kato, K. Sugiyama, S. Mitani, T. Masuishi, Y. Narita, H. Bando, H. Taniguchi, S. Kadowaki, T. Ura, K. Muro, Prospective survey of financial toxicity measured by the comprehensive score for financial toxicity in Japanese patients with cancer, JGO (2019) 1–8, https://doi.org/10.1200/JGO.19.00003.

[23] Z. Qiu, L. Yao, J. Jiang, Financial toxicity assessment and associated factors analysis of patients with cancer in China, Support Care Cancer 31 (2023) 264, https://doi.org/10.1007/s00520-023-07714-6.

[24] B.T. Tran, T.T. Tran, Q.A.N. Dac, H.L. Nguyen, T.X. Nguyen, N.P.T. Nguyen, T. G. Nguyen, D.D. Le, M.T. Nguyen, Financial toxicity in patients with cancer: a cross-sectional study at an oncology hospital in central Vietnam, Support Care Cancer 32 (2024) 581, https://doi.org/10.1007/s00520-024-08791-x.

[25] A. Joshi, D. Kalra, N. Menon, D. Gadgil, S. Pashilkar, S. Mokal, K. Prabhash, V. Noronha, Translation and Validation of COST - FACIT (Version 2) Questionnaire into Hindi and Marathi to Assess Financial Toxicity in Indian Cancer Patients, South Asian J. Cancer 11 (2022) 97, https://doi.org/10.1055/s-0041-1741074.

[26] M.A. Dar, R. Chauhan, K.K. Sharma, V. Trivedi, S. Dhingra, K. Murti, Assessing the reliability and validity of comprehensive score for financial toxicity (COST) among radiation oncology patients in India: a cross-sectional pilot study, (2021). https://doi.org/10.3332/ecancer.2021.1219.

[27] J. Jing, R. Feng, X. Zhang, M. Li, J. Gao, Financial toxicity and its associated patient and cancer factors among women with breast cancer: a single-center analysis of low-middle income region in China, Breast Cancer Res Treat. 181 (2020) 435–443, https://doi.org/10.1007/s10549-020-05632-3.

[28] S.F. Huntington, B.M. Weiss, D.T. Vogl, A.D. Cohen, A.L. Garfall, P.A. Mangan, J. A. Doshi, E.A. Stadtmauer, Financial toxicity in insured patients with multiple myeloma: a cross-sectional pilot study, Lancet Haematol. 2 (2015) e408–e416, https://doi.org/10.1016/S2352-3026(15)00151-9.

[29] B. Xu, W.K.W. So, K.C. Choi, Determination of a cut-off Comprehensive Score for financial Toxicity (COST) for identifying cost-related treatment nonadherence and impaired health-related quality of life among Chinese patients with cancer, Support Care Cancer 32 (2024) 136, https://doi.org/10.1007/s00520-024-08320-w.

[30] N.K. Aaronson, S. Ahmedzai, B. Bergman, M. Bullinger, A. Cull, N.J. Duez, A. Filiberti, H. Flechtner, S.B. Fleishman, J.C.J.M. de Haes, S. Kaasa, M. Klee, D. Osoba, D. Razavi, P.B. Rofe, S. Schraub, K. Sneeuw, M. Sullivan, F. Takeda, The European Organization for Research and Treatment of Cancer QLQ-C30: A Quality-of-Life Instrument for Use in International Clinical Trials in Oncology, JNCI Journal National Cancer Institute 85 (1993) 365–376, https://doi.org/10.1093/jnci/85.5.365.

[31] P. Fayers, N.K. Aaronson, K. Bjordal, M. Groenvold, D. Curran, A. Bottomley, EORTC QLQ-C30 Scoring Manual, European Organisation for Research and Treatment of Cancer, 2001. ⟨https://abdn.elsevierpure.com/en/publications/eortc-qlq-c30-scoring-manual⟩ (accessed November 8, 2024).

[32] M.L. Tan, D.B. Idris, L.W. Teo, S.Y. Loh, G.C. Seow, Y.Y. Chia, A.S. Tin, Validation of EORTC QLQ-C30 and QLQ-BR23 questionnaires in the measurement of quality of life of breast cancer patients in Singapore, Asia Pac. J. Oncol. Nurs. 1 (2014) 22–32, https://doi.org/10.4103/2347-5625.135817.

[33] M. Groenvold, M.C. Klee, M.A. Sprangers, N.K. Aaronson, Validation of the EORTC QLQ-C30 quality of life questionnaire through combined qualitative and quantitative assessment of patient-observer agreement, J. Clin. Epidemiol. 50 (1997) 441–450, https://doi.org/10.1016/s0895-4356(96)00428-3.

[34] D. Perwitasari, J. Atthobari, I. Dwiprahasto, M. Hakimi, H. Gelderblom, H. Putter, J. Nortier, H.-J. Guchelaar, A. Kaptein, Translation and Validation of EORTC QLQ-C30 into Indonesian version for cancer patients in Indonesia, Jpn. J. Clin. Oncol. 41 (2011) 519–529, https://doi.org/10.1093/jjco/hyq243.

[35] D.A. Chaukar, A.K. Das, M.S. Deshpande, P.S. Pai, K.A. Pathak, P. Chaturvedi, A. C. Kakade, R.W. Hawaldar, A.K. D'Cruz, Quality of life of head and neck cancer patient: validation of the European organization for research and treatment of cancer QLQ-C30 and European organization for research and treatment of cancer QLQ-H&N35 in Indian patients, Indian J. Cancer 42 (2005) 178.

[36] V. Parmar, R.A. Badwe, R. Hawaldar, S. Rayabhattanavar, A. Varghese, R. Sharma, I. Mittra, Validation of EORTC quality-of-life questionnaire in Indian women with operable breast cancer, Natl. Med J. India 18 (2005) 172–177.

[37] M. Mo, P. Jia, K. Zhu, W. Huang, L. Han, C. Liu, X. Huang, Financial toxicity following surgical treatment for colorectal cancer: a cross-sectional study, Support Care Cancer 31 (2023) 110, https://doi.org/10.1007/s00520-022-07572-8.

[38] T.T. Ngan, H. Van Minh, M. Donnelly, C. O'Neill, Financial toxicity due to breast cancer treatment in low- and middle-income countries: evidence from Vietnam, Support Care Cancer 29 (2021) 6325–6333, https://doi.org/10.1007/s00520-021-06210-z.

[39] A.N. Ehsan, C.A. Wu, A. Minasian, T. Singh, M. Bass, L. Pace, G.C. Ibbotson, N. Bempong-Ahun, A. Pusic, J.W. Scott, R.A. Mekary, K. Ranganathan, Financial Toxicity Among Patients With Breast Cancer Worldwide: A Systematic Review and Meta-analysis, JAMA Netw. Open 6 (2023) e2255388, https://doi.org/10.1001/jamanetworkopen.2022.55388.

[40] T.T. Ngan, E. Tonorezos, M. Donnelly, C. O'Neill, Financial toxicity amongst cancer patients and survivors: a comparative study of the United Kingdom and United

States, Support Care Cancer 33 (2025) 521, https://doi.org/10.1007/s00520-025-09568-6.
[41] T.T. Ngan, E. Tonorezos, M. Donnelly, C. O'Neill, Impact of financial toxicity on the health-related quality of life and financial well-being of cancer patients and survivors: a comparative study of the United Kingdom and United States, Cancer Med 14 (2025) e70606, https://doi.org/10.1002/cam4.70606.
[42] M. Pandey, T.R. Dilip, A. Chopade, S.V. Shrikhande, M. Bhandare, Financial burden due to distance traveled to access treatment from specialized cancer hospitals in public sector in India: a case study of patients treated for gastric and pancreatic cancer, J. Cancer Policy 45 (2025) 100632, https://doi.org/10.1016/j.jcpo.2025.100632.
[43] S. Kaul, J.C. Avila, H.B. Mehta, A.M. Rodriguez, Y.-F. Kuo, A.C. Kirchhoff, Cost-related medication nonadherence among adolescent and young adult cancer survivors, Cancer 123 (2017) 2726–2734, https://doi.org/10.1002/cncr.30648.
[44] M.C. Politi, R.W. Yen, G. Elwyn, A.J. O'Malley, C.H. Saunders, D. Schubbe, R. Forcino, M. Durand, Women Who Are Young, Non-White, and with Lower Socioeconomic Status Report Higher Financial Toxicity up to 1 Year After Breast Cancer Surgery: A Mixed-Effects Regression Analysis, Oncologist 26 (2021) e142–e152, https://doi.org/10.1002/onco.13544.
[45] K.B. Yücel, Z.I. Özay, O. Sütcüoğlu, O. Yazıcı, A. Üner, N. Günel, A. Özet, G. Savaş, N. Özdemir, Greater financial toxicity correlates with increased psychological distress and lower quality of life among Turkish cancer patients, Support Care Cancer 31 (2023) 137, https://doi.org/10.1007/s00520-023-07586-w.
[46] S. Ramsey, D. Blough, A. Kirchhoff, K. Kreizenbeck, C. Fedorenko, K. Snell, P. Newcomb, W. Hollingworth, K. Overstreet, Washington State Cancer Patients Found To Be At Greater Risk For Bankruptcy Than People Without A Cancer Diagnosis, Health Aff. 32 (2013) 1143–1152, https://doi.org/10.1377/hlthaff.2012.1263.
[47] G.P. Guy, D.U. Ekwueme, K.R. Yabroff, E.C. Dowling, C. Li, J.L. Rodriguez, J.S. de Moor, K.S. Virgo, Economic Burden of Cancer Survivorship Among Adults in the United States, JCO 31 (2013) 3749–3757, https://doi.org/10.1200/JCO.2013.49.1241.
[48] G. Di Giuseppe, L. Pagalan, A. Jetha, P. Pechlivanoglou, J.D. Pole, Financial toxicity among adolescent and young adult cancer survivors: A systematic review of educational attainment, employment, and income, Crit. Rev. Oncol. /Hematol. 183 (2023) 103914, https://doi.org/10.1016/j.critrevonc.2023.103914.
[49] S.-L. Yap, S.S.-L. Wong, K.-S. Chew, J.S.-H. Kueh, K.-L. Siew, Assessing the Relationship between Socio-demographic, Clinical Profile and Financial Toxicity: Evidence from Cancer Survivors in Sarawak, Asian Pac. J. Cancer Prev. 21 (2020) 3077–3083, https://doi.org/10.31557/APJCP.2020.21.10.3077.
[50] J.S. Edward, M.K. Rayens, X. Zheng, R.C. Vanderpool, The association of health insurance literacy and numeracy with financial toxicity and hardships among colorectal cancer survivors, Support Care Cancer 29 (2021) 5673–5680, https://doi.org/10.1007/s00520-021-06036-9.
[51] G.L. Smith, M.A. Lopez-Olivo, P.G. Advani, M.S. Ning, Y. Geng, S.H. Giordano, R. J. Volk, Financial Burdens of Cancer Treatment: A Systematic Review of Risk Factors and Outcomes, J. Natl. Compr. Canc Netw. 17 (2019) 1184–1192, https://doi.org/10.6004/jnccn.2019.7305.
[52] H. Thakur, Study of Awareness, Enrollment, and Utilization of Rashtriya Swasthya Bima Yojana (National Health Insurance Scheme) in Maharashtra, India, Front Public Health 3 (2015) 282, https://doi.org/10.3389/fpubh.2015.00282.
[53] M. Pandey, M. Bramhankar, A. Anand, Exploring the financial burden due to additional mobility among cancer patients: A cross-sectional study based on National Sample Survey, J. Cancer Policy 39 (2024) 100469, https://doi.org/10.1016/j.jcpo.2024.100469.
[54] F. Mols, B. Tomalin, A. Pearce, B. Kaambwa, B. Koczwara, Financial toxicity and employment status in cancer survivors. A systematic literature review, Support Care Cancer 28 (2020) 5693–5708, https://doi.org/10.1007/s00520-020-05719-z.
[55] S. Pangestu, F. Rencz, Comprehensive Score for Financial Toxicity and Health-Related Quality of Life in Patients With Cancer and Survivors: A Systematic Review and Meta-Analysis, Value Health 26 (2023) 300–316, https://doi.org/10.1016/j.jval.2022.07.017.
[56] P.M. Carrera, H.M. Kantarjian, V.S. Blinder, The financial burden and distress of patients with cancer: Understanding and stepping-up action on the financial toxicity of cancer treatment, CA A Cancer Journal Clinicians 68 (2018) 153–165, https://doi.org/10.3322/caac.21443.
[57] S. Moffatt, E. Noble, C. Exley, Done more for me in a fortnight than anybody done in all me life." How welfare rights advice can help people with cancer, BMC Health Serv. Res. 10 (2010) 259, https://doi.org/10.1186/1472-6963-10-259.
[58] N.B. Henrikson, M.L. Anderson, J. Dickerson, J.J. Ewing, R. Garcia, E. Keast, D. A. King, C. Lewis, B. Locher, C. McMullen, C.M. Norris, A.F. Petrik, A. Ramaprasan, J.S. Rivelli, J.L. Schneider, L. Shulman, L. Tuzzio, M.P. Banegas, The Cancer Financial Experience (CAFÉ) study: randomized controlled trial of a financial navigation intervention to address cancer-related financial hardship, Trials 23 (2022) 402, https://doi.org/10.1186/s13063-022-06344-3.