Financial Toxicity and Patterns of Severe Symptom Burden in Patients with Breast Cancer Informed by Digital Remote Symptom Monitoring (RSM) Deployed in Clinical Practice

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Background

- The negative effects of medical costs on patients, referred to as financial toxicity (FT), are associated with decreased quality of life, increased distress, and lower adherence to treatment[1].
- Patients with breast cancer (BC) are at risk of poor financial outcomes[2] as BC requires multimodal treatments.
- A recent *JCO: Oncology Practice* series underscored the need for highlighting patient experience and encouraged innovation to address FT across subgroups[3].
- Digital remote symptom monitoring (RSM) platforms, with electronic patient-reported outcomes (ePROs)-driven alerts and baseline FT screening, provide a unique means to explore FT and outcomes.
- This study evaluated baseline FT and its association with severe symptom burden in women with BC informed by RSM deployed in clinical practice.

Methods

- Patients with BC who enrolled in Carevive PROmpt®, a digital remote symptom monitoring platform, between 9/2020 and 5/2025 were included.
- Patients completed the Comprehensive Score of Financial Toxicity (COST) at baseline, a 12-item survey with five-point Likert scale (“Not at all” to “Very much”). High FT (HFT) was defined as scores ≤24 and low FT (LFT) as scores >24.
- Patients completed weekly symptom (SX) reports measured by PRO-CTCAE®. Composite scores rated the SXs as mild, moderate, and severe, where moderate and severe SXs generated “alert” notifications to the care team.
- Baseline characteristics were described and compared by FT status.
- Severe symptom burden, defined as number of alerts per week and time to first alert, was analyzed.
- Multivariate analyses to assess the correlation between FT and severe symptom burden were conducted, with covariates including age, race, and frailty status.

Results

- A total of 197 patients were included and stratified by HFT (n=101) and LFT (n=96).
- Overall median FT score was 24, median age was 54, 30.5% Non-white (57 Black, 3 Asian), and 49.2% late-stage disease. (See Table 1).
- Median age of HFT group was younger than LFT (50 vs. 61.5, p<0.001). More Non-white patients reported HFT than Whites (67% vs. 41.5%, p=0.00174), and more patients in the Intermediate Fit/Frail group experienced HFT than the Fit group (65.9% vs. 40.4%, p=0.00163). FT was not statistically different by biomarker or stage. Median follow-up was 22 weeks with no difference by FT. (See Table 1).
- A subset of 171 (86.8%) women reported moderate or severe symptoms that triggered an alert at least once. Median number of alerts per week was slightly higher in HFT compared to LFT (1.5 vs. 1.4, p=0.04). Patients with HFT showed directional triggering of initial alert earlier than LFT (median 35 vs. 49.5 days), but the result was not statistically significant (p=0.08). Median number of SXs per week was higher in HFT than LFT (7 vs. 4.8, p<0.001). (See Table 2).

Comprehensive Score for Financial Toxicity Scale (COST)

Below is a list of statements that other people with your illness have said are important. **Please circle or mark one number per line to indicate your response as it applies to the past 7 days.**

		Not at all	A little bit	Some-what	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-packet 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 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 burden on my family and me.	0	1	2	3	4

Figure 1. Comprehensive Score for Financial Toxicity Scale (COST)

Financial Toxicity	
Comprehensive Score for Financial Toxicity Score <26 Indicates financial distress	**21**
I know that I have enough money in savings, retirement, or assets to cover the costs of my treatment.	Somewhat
My out-of-pocket medical expenses are more than I thought they would be.	Somewhat
I worry about the financial problems I will have in the future as a result of my illness or treatment.	Quite a bit
I feel I have no choice about the amount of money I spend on care.	Not at all
I am frustrated that I cannot work or contribute as much as I usually do.	Somewhat
I am satisfied with my current financial situation.	Somewhat
I am able to meet my monthly expenses.	Quite a bit
I feel financially stressed.	Somewhat
I am concerned about keeping my job and income, including working at home.	Very Much
My cancer or treatment has reduced my satisfaction with my present financial situation.	Somewhat
I feel in control of my financial situation.	A little bit
My illness has been a financial burden on my family and me.	Somewhat

Discussion

- We demonstrated the use of digital RSM with an ePROs-driven alert and FT screening in a multicenter BC practice setting.
- Results showed half of patients reported HFT at baseline, with younger, non-white, and intermediate fit/frail at higher risk.
- HFT and frailty were associated with higher volume of overall SXs.
- Results also raise the question of underreporting severe SX in HFT patients and avoidance of additional financial burden. Future studies exploring this topic are warranted.

Table 1. Demographics by Financial Toxicity Scores

	FT score ≤24 (n=101)	FT score >24 (n=96)	All (n=197)	p-value
Mean age (SD), years	49.6 (12.2)	59.3 (13.5)	54.3 (13.7)	<0.001
Median	50	61.5	54	
Race, n (%)				
Non-white	40 (39.6)	20 (20.8)	60 (30.5)	0.00174
White	51 (50.5)	72 (75)	123 (62.4)	
Unknown	10 (9.9)	4 (4.2)	14 (7.1)	
Stage, n (%)				
Stage IIIB-IV	32 (31.7)	31 (32.3)	63 (32.0)	0.311
Stage I-IIIA	46 (45.5)	51 (53.1)	97 (49.2)	
Unknown	23 (22.8)	14 (14.6)	37 (18.8)	
Biomarker, n (%)				
HR+/HER2-	43 (42.6)	41 (42.7)	84 (42.6)	0.743
HER2+	15 (14.9)	19 (19.8)	34 (17.3)	
HER2 Low	3 (3.0)	3 (3.1)	6 (3.0)	
TNBC	25 (24.8)	19 (19.8)	44 (22.3)	
Frailty, n (%)				
Intermediate or Frail	56 (55.4)	29 (30.2)	85 (43.1)	0.00163
Fit	44 (43.6)	65 (67.7)	109 (55.3)	
Unknown	1 (1.0)	2 (2.1)	3 (1.5)	
Mean follow-up (SD), weeks	23.7 (23.9)	23.9 (19.5)	23.8 (21.8)	0.429
Median	20.6	23	22	

Table 2. Symptoms and Alerts

	FT score ≤24 (n=89)	FT score >24 (n=82)	All (n=171)	p-value
Median no. of SX per week	7.0	4.8	6.1	<0.001
Median time to first alert, days	35	49.5	41	0.0761
Median no. of alerts per week	1.5	1.4	1.5	0.044

Results: Multivariate Modeling

- In multivariate modeling, HFT (β=1.9, p=0.01) and frail status (β=2.6, p=0.0003) increased the number of SXs per week.
- When examining the number of alerts per week, however, neither frail status nor HFT was significantly associated in the multivariate model.
- Similar results were observed when measuring time to first alert. Sensitivity analysis assessing a correlation between frailty and number of alerts showed that frail status increased the number of alerts (β=0.23, p=0.01), yet this effect was attenuated when FT status was added to the model.

References

1. **Lee KL, Eniu A, Booth CM, MacDonald M, Chino F.** Financial Toxicity and Breast Cancer: Why Does It Matter, Who Is at Risk, and How Do We Intervene? *American Society of Clinical Oncology Educational Book*. 2025;45(3):e473450.
2. **Huang H, Yang Z, Dong Y, Wang YQ, Wang AP.** Cancer cost-related subjective financial distress among breast cancer: a scoping review. *Support Care Cancer*. 2024;32(7):484. Published 2024 Jul 3. doi:10.1007/s00520-024-08698-7.
3. **Chino F, Nipp R.** Financial Toxicity in Cancer Care: Where Are We, and How Did We Get Here? Introduction to a Special Series. *JCO Oncology Practice*. 2025;21(1):1-3. doi:10.1200/OP-24-00793.