

Financial Toxicity and Life Satisfaction in Working-Age Cancer Survivors: A National Study of Pathways and Buffers

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Abstract

Purpose.

Financial hardship predicts mortality among cancer survivors, yet how it reaches global well-being, and which survivors are protected, is largely untested. We examined pathways from financial well-being through depressive symptoms and community participation to life satisfaction, and tested psychological resources and social support as buffers.

Methods.

Working-age US cancer survivors (N = 3,028; median 5 years post-diagnosis) completed a national survey including the officially scored Consumer Financial Protection Bureau (CFPB) Financial Well-Being Scale, ten symptom and functional outcomes, six psychological resources, and three social support types. Serial path models with bootstrapped indirect associations were adjusted for household income, education, employment, and clinical factors; 18 moderation tests included prespecified curvilinearity checks, with false discovery rate correction.

Results.

Mean financial well-being (50.7) fell below the US adult benchmark of 54; 20.4% of survivors scored in the range indicating very significant financial insecurity. Lower financial well-being was associated with all ten outcomes (perceived stress strongest, $\beta = -.51$; pain weakest, $-.23$). Its adjusted association with life satisfaction ($\beta = .51$) was 39% indirect, with the participation channel 2.7 times the depressive-symptom channel, and was concave, concentrating harm at low financial well-being. Coping flexibility and trait hope buffered the associations robustly; no social support type did. Associations did not differ by insurance, benefits, employment, or time since diagnosis.

Conclusion.

Financial toxicity operated through distress and restricted participation, beyond income, uniformly across coverage and survivorship phase. Screening should be universal and repeated, with low scores treated as action thresholds and navigation paired with coping-focused and participation-restoring support.

Introduction

Cancer imposes a financial injury that behaves like a toxicity of treatment. Working-age US survivors average roughly \$1,000 per year in out-of-pocket costs, with one quarter reporting material hardship and one third psychological hardship [1]; across the material, psychological, and behavioral domains of

hardship [3], the burden is documented in population-based samples [4] and is most prevalent at ages 18 to 49 [2]. The consequences are not confined to discomfort: cancer patients are 2.65 times more likely to declare bankruptcy [5], bankruptcy predicts early mortality [6], and in national data linked to death records even self-reported hardship carries a 17% higher adjusted mortality risk among working-age survivors [7]. This treatment-side-effect character led the field to name the phenomenon financial toxicity [8].

What financial toxicity accompanies is well documented. Meta-analysis places its correlation with overall health-related quality of life at .49 [9]; financial burden has been called the strongest independent predictor of poor survivor quality of life [10], with clinically meaningful physical and mental health decrements in national samples [11]; and links to depression and anxiety are the field's most consistent outcome findings [12–14], mirrored in general-population hardship research [15]. Employment sits on both sides of the ledger: work loss elevates toxicity risk [16], toxicity persists among long-term [17, 18] and insured [19] survivors. Yet two blind spots persist. Measurement is dominated by cancer-specific instruments without population norms [20–22], and although the field distinguishes objective burden from subjective financial distress [23, 11, 24], studies rarely test whether subjective financial well-being predicts outcomes beyond household income. The CFPB Financial Well-Being Scale [25] - developed through item response theory and normed on US adults - measures precisely this construct but has seen essentially no oncology use.

The deeper blind spot is mechanism. The evidence base consists almost entirely of bivariate associations. The first prominent mediation test found that, among 519 patients within a year of diagnosis, financial toxicity related to lower satisfaction with life partly through eroded hope and social support [26] - but it measured no functioning. Nationally representative data show hardship co-occurring with social-functioning and work limitations [27], but as single items in separate regressions. The International Classification of Functioning, Disability and Health (ICF) [28] supplies the missing architecture: economic context should propagate through distress and restricted participation - the proximal determinant of subjective well-being - yet no study has modeled financial toxicity within this pathway. A parallel question, who is protected, has become urgent because interventions underperform: pooled trial effects are null, with navigation helping only patients with high baseline financial worry [29, 30]. Psychological resources have been cast as mediators that toxicity erodes [26], but almost never tested as moderators that buffer its impact - despite suggestive evidence that low self-efficacy predicts failure to recover from financial burden [31] and qualitative accounts of tangible, informational, and emotional support as distinct buffers [32]. Expert consensus now recommends routine financial toxicity screening [33], but without mechanism and moderation evidence, programs cannot know what a positive screen should trigger, whom to prioritize, or what to pair navigation with [34].

We addressed these gaps in 3,028 working-age, community-dwelling US survivors a median of five years past diagnosis. Research question (RQ) 1 examined income-adjusted associations of financial well-being with ten symptom and functional domains, hypothesizing the strongest associations in psychological domains [12]. RQ2 tested whether financial well-being related to life satisfaction serially

through depressive symptoms, disability, and participation, beyond income [26, 28]. RQ3 tested six psychological resources and three social support types as buffers, hypothesizing that instrumental support - the tangible type most responsive to material strain - would buffer most strongly [31, 32]. RQ4 tested whether pathways were stronger for survivors who were uninsured or publicly insured, receiving disability benefits, not working, or closer to diagnosis [2, 19].

Methods

Study design and participants

This cross-sectional study analyzed data from Cancer Survivors in the Workforce: A Comprehensive National Study, a national online survey conducted at Kessler Foundation with institutional review board approval; recruitment and data-quality procedures have been described previously [35]. Participants were recruited through CloudResearch Managed Research, an academic panel platform validated against probability-based national samples, and completed the Qualtrics-hosted survey (25–45 minutes) after informed consent. Eligibility required a self-reported healthcare-professional-confirmed cancer diagnosis, age 18 or older, US residence, and being employed or actively seeking employment.

Of 3,852 initial records, exclusion of incomplete submissions, metadata rows, and 224 respondents failing two or more of five attention checks left 3,628 participants; 3,235 completed the financial well-being measure, and 3,028 additionally provided complete data on the four pathway variables, constituting the analytic sample (covariate-adjusted models, $N = 2,996$). No survey weights were applied. Excluded respondents reported somewhat lower income and education than the analytic sample but similar age and gender composition.

Measures

Financial well-being was measured with the 10-item CFPB Financial Well-Being Scale [25], which defines financial well-being as meeting financial obligations, feeling secure about the financial future, and having freedom of financial choice (e.g., "I could handle a major unexpected expense"; "I am just getting by financially"; 5-point scales; negative items reverse scored). Raw totals (0–40) were converted to the official 0–100 score using the CFPB self-administration worksheet with age-specific tables (18–61; 62+). Higher scores indicate greater financial well-being; financial toxicity was operationalized as low financial well-being ($\alpha = .90$; official score correlated .99 with the item mean). Because the scale is normed on US adults, scores can be benchmarked nationally - unavailable with cancer-specific measures.

Pathway variables were depressive symptoms (Patient Health Questionnaire-9; 0–27; $\alpha = .93$) [36], disability (12-item World Health Organization Disability Assessment Schedule 2.0 [WHODAS 2.0]; 1–5; $\alpha = .95$) [37], community participation (five Wisconsin Community Participation Scale items assessing social, vocational, and recreational engagement relative to desired levels; 1–5; $\alpha = .82$) [38], and life satisfaction (Satisfaction with Life Scale; 5–35; $\alpha = .92$) [39]. Six additional domains

completed the RQ1 outcome set: PROMIS short forms for fatigue, sleep disturbance, and cognitive function (reflected so higher scores indicate greater cognitive concerns) [40], a PROMIS pain intensity rating (0–10), the Generalized Anxiety Disorder-7 (alpha = .95) [41], and the 10-item Perceived Stress Scale (alpha = .80) [42].

Moderators comprised six intrapersonal resources - core self-evaluations (12 items; alpha = .89) [43], trait hope (8 scored items; alpha = .93) [44], optimism (Life Orientation Test-Revised, 6 scored items; alpha = .82) [45], resilience (Brief Resilience Scale; alpha = .81) [46], social self-efficacy (5 items; alpha = .89) [47], and coping flexibility (Coping Flexibility Scale, 10 items; alpha = .76) [48] - and three 4-item PROMIS social support subscales: instrumental (alpha = .92), informational (alpha = .93), and emotional (alpha = .94) [49]. Equity moderators were insurance (employer/private; public; none/other), receipt of disability-related income benefits, current employment, and time since diagnosis (current age minus age at diagnosis).

Covariates, specified a priori to hold constant objective socioeconomic and clinical circumstances, were age, gender, education, household income, employment, comorbidity count, metastatic status (yes; unknown or undisclosed), and time since diagnosis (with missingness indicator). Insurance was examined as a moderator (RQ4), with a sensitivity analysis adding it as a covariate.

Statistical analysis

All continuous variables were standardized within the estimation sample. For RQ1, each outcome was regressed on financial well-being with covariates, with Benjamini-Hochberg false discovery rate (FDR) correction across the ten tests. For RQ2, an a priori serial model (financial well-being to depressive symptoms to disability to participation to life satisfaction) was estimated as a saturated system of ordinary least squares equations - identical to maximum likelihood path analysis for fully observed variables - with product-of-coefficients indirect associations and percentile bootstrap confidence intervals (5,000 seed-controlled resamples), unadjusted and covariate adjusted. Because depressive symptoms and WHODAS scores were strongly correlated, suppression diagnostics were prespecified: conditional paths whose sign reversed relative to bivariate correlations were treated as statistical suppression, probed with item-reduced WHODAS specifications (excluding the emotional-impact item; retaining only the five physical-function items), and the model re-specified accordingly. Curvilinearity was evaluated with a quadratic financial well-being term. Given the cross-sectional design, indirect associations quantify statistical pathways, not causal mediation.

For RQ3, each of nine moderators was tested on two focal paths - financial well-being to depressive symptoms (first stage) and to life satisfaction (direct path, within the full outcome equation) - with covariates and FDR correction across the 18 tests. Significant interactions were characterized with conditional effects at plus and minus one standard deviation, conditional indirect associations, and indices of moderated mediation (5,000 resamples). Because interactions can reflect unmodeled curvilinearity when predictor and moderator are correlated [50, 51], prespecified sensitivity models added

quadratic terms for both; interactions were interpreted as robust only if they persisted. A follow-up model entered all significant interactions simultaneously. For RQ4, interactions of financial well-being with insurance, benefits, employment, and time since diagnosis were tested on the same paths (10 tests, family-wise FDR).

Missing data were handled with listwise deletion (moderator missingness at most 0.8%). The sample provided greater than .80 power for effects of f -squared = .005 and standardized interactions of approximately .03 at α = .05. Analyses used Python 3.12 (pandas, NumPy, statsmodels). Nine sensitivity analyses were prespecified or diagnostic: anxiety and perceived stress substituted as first-stage variables; the officially scored exposure; insurance-adjusted models; household income modeled categorically; cancer type and cancer-free status added as covariates; exclusion of survivors who left work after diagnosis without returning; reversed variable ordering; alternative covariate-missingness handling; and the item-reduced WHODAS specifications.

Results

Sample characteristics and financial well-being

Table 1 describes the analytic sample (N = 3,028; mean age 42.75 years; 46.6% female; 89.8% employed; median 5 years since diagnosis; 75.6% cancer-free). The mean officially scored financial well-being score was 50.7 (SD = 13.9), below the US adult benchmark of 54 from the CFPB National Financial Well-Being Survey [25] and near the working-age (18–61) benchmark of 49 derived from the 2018 National Financial Capability Study [52]. The distribution carried a substantial lower tail: 20.4% of survivors scored at or below 40, a range the CFPB characterizes as very significant financial insecurity. Financial well-being correlated .38 with household income - less than 15% shared variance - and .74 linked depressive symptoms with WHODAS disability, the correlation that motivated the prespecified suppression diagnostics.

Table 1
Characteristics of the analytic sample (N = 3,028)

Characteristic	n (%) or M (SD)
Age, years, M (SD)	42.75 (12.15)
Female / Male / Other or non-binary	1,412 (46.6%) / 1,607 (53.1%) / 9 (0.3%)
Race and ethnicity: White / Black / Hispanic-Latino / Asian / AIAN / NHPI / Other	2,143 (70.8%) / 474 (15.7%) / 252 (8.3%) / 68 (2.2%) / 56 (1.8%) / 7 (0.2%) / 28 (0.9%)
Education: <= high school / some college or associate / bachelor's or higher	582 (19.2%) / 1,003 (33.1%) / 1,443 (47.7%)
Household income: <=\$30K / \$30-58K / \$58-94K / \$94-153K / >\$153K	377 (12.5%) / 744 (24.6%) / 796 (26.3%) / 765 (25.3%) / 346 (11.4%)
Married or living with partner	1,843 (60.9%)
Currently employed	2,718 (89.8%)
Insurance: employer/private / public / none-other	2,058 (68.0%) / 873 (28.8%) / 97 (3.2%)
Disability-related income benefits	436 (14.4%)
Cancer type: breast / prostate / cervical / lung / melanoma / other	597 (19.7%) / 487 (16.1%) / 320 (10.6%) / 215 (7.1%) / 202 (6.7%) / 1,207 (39.9%)
Cancer-free at survey / metastatic disease (yes / unknown)	2,289 (75.6%) / 669 (22.1%) / 105 (3.5%)
Received cancer rehabilitation	1,243 (41.1%)
Time since diagnosis, years, median (IQR)	5 (2–9)
CFPB financial well-being score, M (SD); % <= 40	50.7 (13.9); 618 (20.4%)
Depressive symptoms (PHQ-9), M (SD)	9.35 (7.02)
Disability (WHODAS 2.0), M (SD)	2.26 (0.90)
Community participation, M (SD)	3.10 (0.88)
Life satisfaction (SWLS), M (SD)	22.29 (7.86)
<i>Note. CFPB = Consumer Financial Protection Bureau; AIAN = American Indian/Alaska Native; NHPI = Native Hawaiian/Pacific Islander. Race and ethnicity were self-reported as a single item. A CFPB score of 40 or below reflects very significant financial insecurity. Financial well-being correlated .38 with household income; depressive symptoms correlated .74 with WHODAS disability.</i>	

RQ1: associations across ten domains

All ten covariate-adjusted associations survived FDR correction (Fig. 2a). A gradient emerged: psychological domains were largest (perceived stress beta = – .51, anxiety – .46, depressive symptoms – .44), fatigue (– .43), sleep disturbance (– .41), cognitive concerns (– .40), and disability (– .35)

intermediate, and pain smallest ($-.23$); participation (.30) and life satisfaction (.51) were positive. Because income, education, and employment were held constant throughout, these associations index subjective financial strain beyond objective economic position.

RQ2: the pathway to life satisfaction

The prespecified diagnostics indicated the four-step model was not interpretable: conditional on depressive symptoms, paths from disability to participation ($\beta = +.105$ [.046, .160]) and to life satisfaction ($+.159$ [.120, .199]) reversed sign relative to their bivariate correlations ($-.14$ and $-.20$) - the signature of suppression - and the conditional financial well-being-disability path was near zero ($-.020$ [$-.046$, .005]). The pattern persisted with the emotional-impact item removed and with only the five physical-function items retained (disability-to-participation $+.079$, $p < .001$; disability-to-life-satisfaction $+.164$, $p < .001$), indicating construct-level overlap between distress and self-reported disability. The three-step model (Fig. 1) was therefore adopted as primary; the four-step system's substantive yield was that the financial well-being-disability association was transmitted almost entirely through depressive symptoms (adjusted conditional association $-.069$, $p < .001$).

In the unadjusted system (Fig. 1), the total financial well-being-life satisfaction association was $\beta = .564$ [.534, .592], 39% indirect: via participation .147 [.129, .165] - approximately 2.7 times the depressive-symptom channel (.055 [.040, .070]) - plus a serial component (.016 [.008, .025]). Covariate adjustment reduced the total association by one tenth (.507 [.474, .539]), with all indirect components significant (via depressive symptoms .079; via participation .088; serial .030) and a substantial direct association (.310 [.276, .344]). The quadratic term was significant for life satisfaction ($\beta = -.064$, $p < .001$; Fig. 2b) but not depressive symptoms ($p = .161$): local slopes were .64 one standard deviation below the mean, .51 at the mean, and .38 one standard deviation above - harm concentrated among the financially insecure.

RQ3: buffering

Seven of 18 interaction tests survived FDR (Table 2): core self-evaluations, resilience, and coping flexibility on the first-stage path; core self-evaluations, trait hope, coping flexibility, and optimism on the direct path. Interaction signs uniformly indicated buffering - weaker financial-strain associations at higher resources. Conditional direct associations quantify it (Fig. 2c): .23 [.18, .27] at low versus .13 [.09, .16] at high core self-evaluations (45% attenuation), with comparable attenuation for hope (.26 to .17), coping flexibility (.31 to .24), and optimism (.22 to .16). In the prespecified quadratic sensitivity models, coping flexibility (both paths) and trait hope remained significant; core self-evaluations and resilience attenuated to nonsignificance and optimism reversed sign, indicating those estimates could not be distinguished from curvilinearity (Table 2). A model entering the four direct-path interactions simultaneously found none individually significant (moderator intercorrelations $r = .48-.79$). Interaction increments were small in absolute terms ($\Delta R^2 = .001-.003$), as expected for distal trait moderators of a strong first-order gradient. Indices of moderated mediation via depressive symptoms were significant for

resilience ($-.003 [-.005, -.001]$) and coping flexibility ($-.005 [-.009, -.001]$). None of the six social-support interactions approached significance (all $q \geq .24$; magnitudes .002-.017) - instrumental, informational, and emotional alike - despite positive zero-order associations of all three with life satisfaction.

Table 2

Moderation of the first-stage and direct paths by psychological resources and social support

Moderator	Path	b	FDR q	b with quadratics	Verdict
Core self-evaluations	FWB -> depression	+ .046	< .001	+ .018 (ns)	Ambiguous
Resilience (BRS)	FWB -> depression	+ .038	.006	+ .003 (ns)	Ambiguous
Coping flexibility	FWB -> depression	+ .032	.039	+ .041 (p=.005)	Robust
Trait hope	FWB -> depression	+ .020	.235	—	—
Optimism (LOT-R)	FWB -> depression	+ .021	.162	—	—
Social self-efficacy	FWB -> depression	+ .019	.264	—	—
Instrumental support	FWB -> depression	+ .011	.482	—	—
Informational support	FWB -> depression	+ .014	.382	—	—
Emotional support	FWB -> depression	+ .016	.353	—	—
Core self-evaluations	FWB -> life satisfaction	- .051	< .001	- .005 (ns)	Ambiguous
Trait hope	FWB -> life satisfaction	- .043	< .001	- .037 (p=.022)	Robust
Coping flexibility	FWB -> life satisfaction	- .035	.007	- .027 (p=.030)	Robust
Optimism (LOT-R)	FWB -> life satisfaction	- .030	.009	+ .037 (p=.017)	Unstable
Resilience (BRS)	FWB -> life satisfaction	- .019	.162	—	—

Note. FWB = financial well-being; ns = nonsignificant. Separate covariate-adjusted models; false discovery rate (FDR) correction across the 18 tests. Quadratic sensitivity adds FWB-squared and moderator-squared terms; "Ambiguous" = significant in primary models but indistinguishable from curvilinearity; "Unstable" = sign reversal.

1. Insert funding statement in Declarations. 2. Display items: 2 tables + 2 figures, no supplementary material; main text ~ 4,100 words. 3. Figure files: Fig. 1_path_model and Fig. 2_fingerprint_gradient_buffers (PNG/PDF, 300 dpi). 4. Confirm the coping flexibility instrument is Kato (2012).

Moderator	Path	b	FDR q	b with quadratics	Verdict
Instrumental support	FWB -> life satisfaction	- .017	.244	—	—
Informational support	FWB -> life satisfaction	- .013	.363	—	—
Social self-efficacy	FWB -> life satisfaction	+ .003	.843	—	—
Emotional support	FWB -> life satisfaction	+ .002	.884	—	—
<i>Note. FWB = financial well-being; ns = nonsignificant. Separate covariate-adjusted models; false discovery rate (FDR) correction across the 18 tests. Quadratic sensitivity adds FWB-squared and moderator-squared terms; "Ambiguous" = significant in primary models but indistinguishable from curvilinearity; "Unstable" = sign reversal.</i>					
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RQ4: equity moderators

None of the ten equity tests survived FDR (all $q \geq .23$). The largest raw effect - benefit receipt on the direct path ($b = -.088$, $p = .023$) - is a trend only. Time-since-diagnosis interactions were near zero ($b = .012$, $p = .414$; $b = -.001$, $p = .958$): associations did not attenuate across the survivorship trajectory. The no-insurance interaction was imprecise ($n = 97$), and equivalence should not be inferred for that contrast.

Sensitivity analyses

Results were materially unchanged throughout. Anxiety substitution reproduced all adjusted indirect components (via GAD-7 .099; via participation .083; serial .032); perceived stress strengthened the first stage (via PSS .155 [.137, .174]; total .504, 52% indirect). The officially scored exposure (total .501), insurance adjustment (.501), categorical income (.506), addition of cancer type and cancer-free status ($N = 2,839$; .503), alternative covariate handling ($N = 3,010$; .505), and exclusion of the 67 survivors with complete post-diagnosis work loss (.505) yielded near-identical estimates. In the reversed-ordering specification - which fits identically because the system is saturated - the reverse serial component was one fifth the forward component (.003 vs. .016); this characterizes, but cannot adjudicate, direction.

Discussion

In 3,028 working-age US survivors a median of five years past diagnosis, subjective financial well-being was associated with all ten symptom and functional domains beyond household income; its association with life satisfaction ran chiefly through restricted community participation and depressive symptoms; that association was concave, concentrating harm among the insecure fifth of the sample; it was

buffered by intrapersonal resources - most robustly coping flexibility and trait hope - but by no type of social support; and it was uniform across insurance, benefits, employment, and survivorship phase. Together these findings recast financial toxicity as a contextual disablement process with direct consequences for how screening and intervention should be organized.

The ten-domain gradient extends a literature built one outcome at a time [9, 12]. The somatic cluster of fatigue, sleep disturbance, and cognitive concerns - previously examined mainly in small or single-domain studies [12, 53] - showed income-adjusted associations in the $-.40$ range at twenty times prior sample sizes: financial toxicity is not merely distress. Because objective resources were held constant, the gradient locates the action in the appraisal of insecurity, consistent with the burden-distress distinction [23, 11, 24] and with general-population evidence on appraisal and perceived control [15]. Practically, a positive financial screen should trigger assessment of mood, fatigue, sleep, and cognition - not only a billing referral.

The central mechanistic finding is that the participation channel carried roughly 2.7 times the indirect association of the depressive-symptom channel: financial strain related to lower life satisfaction less because it saddens than because it shrinks life, narrowing the social, vocational, and recreational roles from which satisfaction is drawn. This complements the one prior mediational account, in which toxicity traveled with eroded hope and support in patients near active treatment [26]: in longer-term survivors it also travels the disablement route the ICF specifies [28], with a substantial direct association remaining in both studies. It likewise formalizes, with validated instruments and a quantified pathway, what appeared in national data as co-occurring single-item limitations [27]. The near-total transmission of the disability association through depressive symptoms - and the suppression produced by their $.74$ correlation, persisting even in physical-function-only specifications - indicates that self-reported disability and distress are deeply entangled in community samples, a measurement reality pathway modelers should diagnose rather than average over. The channel asymmetry carries the key implication: financial navigation confined to material assistance [30], already showing weak pooled effects [29], is structurally incomplete; pairing it with participation-restoring supports (transportation, activity re-engagement, vocational and community reintegration) targets the mechanism the data indicate. The same asymmetry offers a hypothesis - only a hypothesis in cross-sectional data - for how self-reported hardship comes to predict mortality [7]: progressive withdrawal from health-sustaining roles rather than mood alone.

The concave gradient - a life satisfaction slope two thirds larger one standard deviation below the mean than above it - indicates disproportionate damage among the insecure, one in five of whom scored in the CFPB's very-significant-insecurity range. The trial literature's one consistent signal is that navigation helps patients with high baseline worry [29]; the present curvature supplies the corresponding epidemiology. Programs implementing consensus screening [33] should treat the scale's lower range as an action threshold rather than reading scores linearly - a use the national norms make straightforward [25].

The moderation results are the most theoretically pointed. Coping flexibility buffered both paths and trait hope the direct path, robustly across curvilinearity checks; core self-evaluations and resilience showed the same pattern but could not be distinguished from nonlinearity; and no support type moderated anything, refuting our instrumental-support hypothesis despite positive main effects of all three types. Three points follow. First, the mediator-moderator distinction matters: prior work cast resources as conduits toxicity erodes [26] and qualitative accounts describe support as experienced protection [32]; quantitatively, protection against a given level of strain resided in how survivors appraise and flexibly respond to it, while perceived support related to well-being additively without blunting the toxicity of strain. Second, the pattern converges with prospective evidence that low self-efficacy predicts failure to recover from financial burden [31]: self-regulatory capacities appear to govern how financial adversity is metabolized. Third, the ambiguity affecting core self-evaluations and resilience is itself methodologically instructive - interaction estimates for moderators highly correlated with the exposure can masquerade as buffering under curvilinearity [50, 51], and quadratic checks should become standard in this literature. Whether strengthening coping flexibility and hope protects well-being under financial strain is now a testable trial question; the present results argue for embedding such components alongside, not instead of, material navigation.

Finally, none of the policy-relevant circumstances moderated the pathway. The time-since-diagnosis null indicates persistence, aligning with registry and national evidence that toxicity marks long-term survivorship [17, 18]. The coverage and benefit nulls should not be read as showing insurance does not matter - insurance patterns who becomes insecure [2, 34], and the uninsured contrast was underpowered - but at a given level of strain, damage to well-being was much the same whoever bore it, echoing toxicity among the insured [19]. The screening implication is universality: consensus-based screening [33] cannot safely be confined to the uninsured, the unemployed, or the newly diagnosed; financial toxicity assessment belongs in long-term survivorship care.

Strengths include the largest mechanistic test of financial toxicity to date, a diagnostically diverse national working-age sample years past diagnosis, the first US survivorship application of the officially scored, nationally benchmarked CFPB scale, income-adjusted estimation, and a prespecified robustness program. Limitations temper interpretation in specific directions. The design is cross-sectional: work loss and functional decline also produce toxicity [16], and although the reverse serial component was one fifth the forward one and results survived excluding survivors with complete work loss, temporal ordering cannot be established; causal language has been avoided. Single-source self-report may inflate absolute magnitudes, although the 2.2-fold spread of adjusted associations across domains is difficult to reconcile with uniform method bias. Listwise deletion excluded somewhat lower-income respondents; because this truncates the insecure range where associations are steepest, bias likely runs toward underestimation. The panel was labor-force-attached and relatively young - the near-benchmark mean partly reflects that selection, and prevalence should not be generalized. Support-type interactions smaller than the detectable threshold of approximately .03 cannot be excluded. The participation measure is anchored to desired engagement (an engagement judgment conceptually distinct from the global evaluation the SWLS captures), and WHODAS-distress overlap constrains self-reported disability

in such models, cancer stage was not collected, and the financial well-being scale, while nationally benchmarkable, does not capture cancer-specific cost events; pairing it with cancer-specific instruments [20] would strengthen future designs, as would longitudinal tracking of well-being, distress, and participation [54, 31], trials pairing navigation with coping-focused and participation-restoring components in the insecure range [29], and person-centered profiling to sharpen triage [33].

In conclusion, financial toxicity behaved as a contextual disablement process among working-age US cancer survivors: subjective financial strain, beyond income, was associated with worse outcomes across ten domains and with lower life satisfaction chiefly through depressive symptoms and restricted participation, with harm concentrated among the financially insecure and buffering located in coping flexibility and hope rather than social support. Screening should be universal and repeated across survivorship, low scores should function as action thresholds, and intervention should couple material navigation with coping-focused and participation-restoring support.

Declarations

Competing interests:

The authors declare no competing interests.

Ethics approval:

The study was approved by the Kessler Foundation Institutional Review Board and performed in accordance with the ethical standards of the 1964 Declaration of Helsinki and its later amendments.

Consent to participate:

Informed consent was obtained from all individual participants included in the study.

Funding:

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Author Contribution

Ada Chen [first/corresponding]: Conceptualization, Methodology, Formal analysis, Writing - original draft, Project administration; Jing Tao: Methodology, Writing - review and editing; Lidian Chen: Conceptualization, Writing - review and editing.

Data Availability

The datasets generated and analysed during the current study are not publicly available because the institutional review board–approved informed consent restricts use of participant data to this study. Summary-level data underlying the findings – including complete code-level frequencies for the full barrier and facilitator taxonomy and the complete code–measure association battery – are provided in the supplementary files. The coding codebook and the statistical analysis code are available from the corresponding author on reasonable request.

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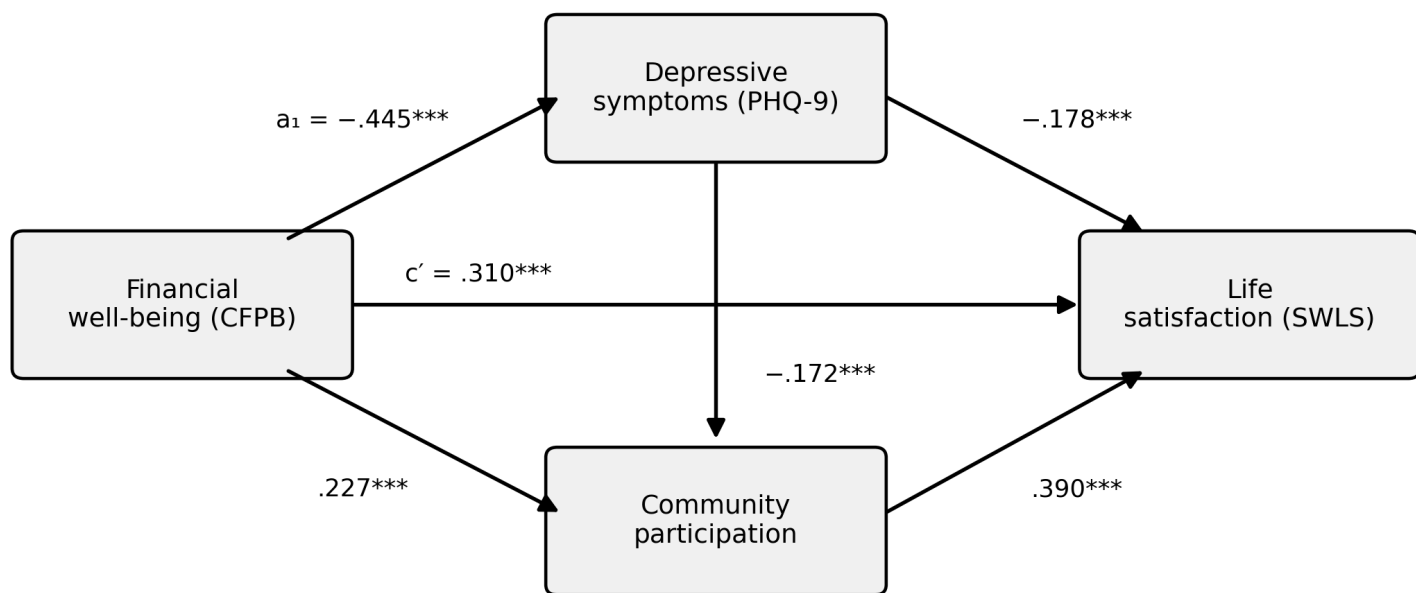
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Figures



Adjusted total association = .507 [.474, .539]; direct $c' = .310$ [.276, .344]. Indirect: via participation .088 [.072, .105]; via depressive symptoms .079 [.064, .095]; serial .030 [.022, .038]. Unadjusted total = .564 [.534, .592]. $N = 2,996$.

Figure 1

Primary path model: standardized coefficients for the pathway from financial well-being through depressive symptoms and community participation to life satisfaction, adjusted for age, gender, education, household income, employment, comorbidity count, metastatic status, and time since diagnosis, with the full decomposition of total, direct, and indirect associations (percentile bootstrap 95% CIs, 5,000 resamples). $***p < .001$.

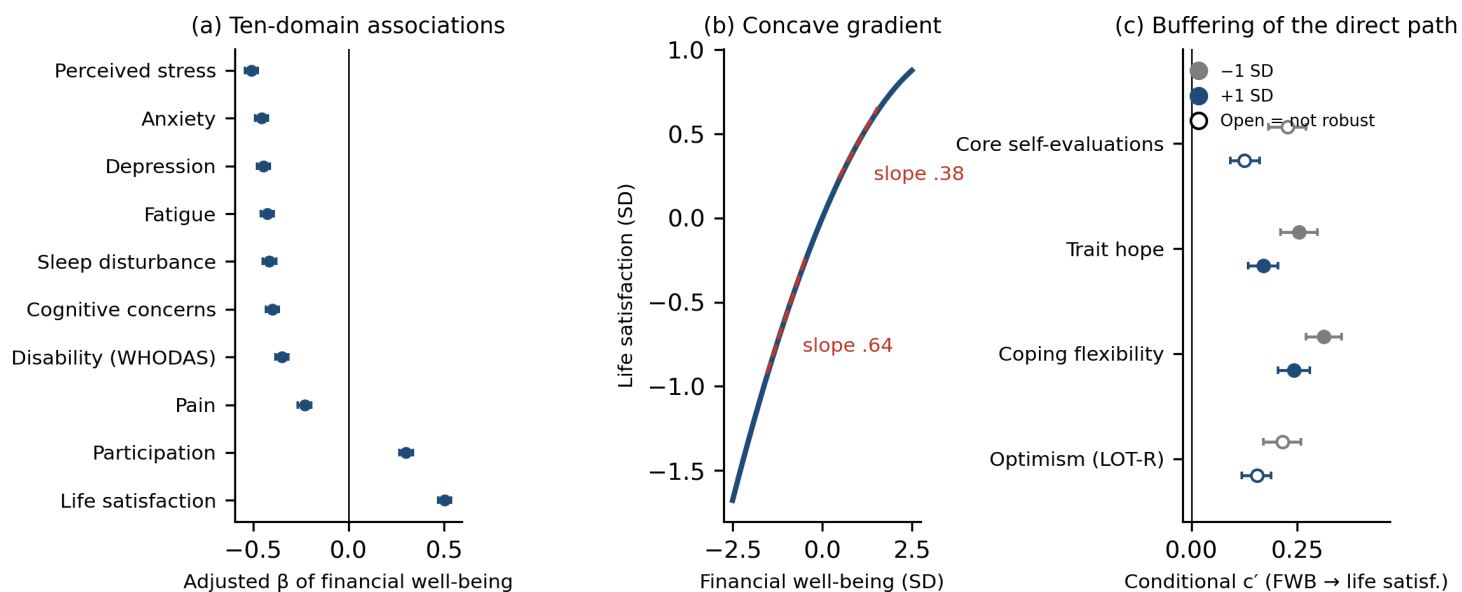


Figure 2

(a) Covariate-adjusted standardized associations (95% CIs) between financial well-being and ten health outcomes; all false-discovery-rate $q < .001$; cognitive concerns = reflected PROMIS cognitive function. (b) Fitted quadratic association between financial well-being and life satisfaction (standardized, covariate-adjusted), with local slopes at one standard deviation below and above the mean. (c) Conditional direct associations (c' , 95% bootstrap CIs) at low (-1 SD) and high ($+1$ SD) moderator levels; open markers denote interactions not robust to the quadratic sensitivity check.