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RESEARCH ARTICLE

High Prevalence and Multidomain Predictors of Clinically Significant Distress in a Tertiary Oncology Center in Iraq: A Cross-Sectional Study Using the NCCN Distress Thermometer

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Abstract

Background: Cancer-related distress is a multidimensional construct that may compromise coping and engagement with care. Routine screening using the NCCN Distress Thermometer (DT) and Problem List is recommended to identify patients requiring timely supportive interventions. This study quantified distress burden and its predictors in Al Anbar Cancer Center, Iraq. **Materials and Methods:** We conducted a cross-sectional analysis of consecutively screened oncology patients using the NCCN DT (0–10) and Problem List. The primary endpoint was the prevalence of clinically significant distress (DT ≥4). DT was additionally analyzed as a continuous outcome. Domain-burden variables (physical, emotional, practical, spiritual/religious, family) were computed as counts of endorsed items. Associations were examined using Spearman correlation and Kruskal–Wallis testing. Multivariable linear regression modeled DT intensity, and logistic regression identified predictors of DT ≥4. **Results:** A total of 264 patients were analyzed (mean age 53.54 ± 13.45 years; range 17–91) of whom 84.47% were female. Breast cancer was the most frequent diagnosis (47.73%), followed by gastrointestinal/hepatobiliary (15.15%) and hematologic malignancies (13.64%). Median DT score was 6.00 (IQR 3.00–8.00), and 73.48% (n=194) screened positive for DT ≥4. Problem domains were commonly endorsed: physical 79.55%, emotional 74.24%, practical 60.61%, spiritual/religious 30.30%, and family 9.85%. DT score was not associated with age in bivariate analysis ($p = 0.403$) and did not differ significantly by gender ($p = 0.394$), but it varied significantly across tumor types ($p = 0.002$). DT intensity correlated most strongly with physical-domain burden ($p < 0.001$). In logistic regression for DT ≥4, higher physical-domain burden markedly increased the likelihood of clinically significant distress (95% CI 4.81–25.64, $p < 0.001$), with additional contributions from emotional burden (95% CI 1.23–3.30, $p = 0.005$) and spiritual/religious burden (95% CI 1.57–39.79, $p = 0.012$). **Conclusion:** Distress burden was high in cancer patients in Iraq, with nearly three-quarters screening positive at DT ≥4. Physical symptoms emerged as the primary driver of both distress intensity and screening positivity, supporting an integrated distress management approach that links symptom control with psychosocial, practical, and spiritual support.

Keywords: Distress Thermometer; psychosocial distress; cancer

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Introduction

Cancer-related distress is increasingly seen as a multifactorial phenomenon that covers psychological, social, spiritual, and physical domains and can meaningfully interfere with patients' ability to cope with the disease and its treatment [1]. The NCCN defines distress as an unpleasant, multifactorial experience of psychological (cognitive, behavioral, emotional), social, spiritual, and/or physical nature that may hinder effective coping and engagement with cancer care [1]. Clinically significant distress is common across the cancer journey from diagnosis through treatment and survivorship and a substantial subset of patients require targeted psychosocial

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or supportive interventions [2]. Importantly, distress is not only a patient-reported symptom but also a care-quality and outcomes issue: higher distress has been associated with poorer patient experience and disruptions in care processes, and broader literature links distress-related constructs (e.g., depression/anxiety) to lower treatment adherence and poorer clinical outcomes in cancer populations [3].

In response to this burden, distress screening has been promoted as a hallmark of quality cancer care and is often described as the 'sixth vital sign,' meaning that patients' emotional health should be tracked just as regularly as their physical health [2]. International and national initiatives including psycho-oncology standards and NCCN guidance support embedding distress screening into routine oncology workflows to enable early identification and timely triage to appropriate supportive services [4, 5]. Consistent with this approach, NCCN distress management guidance has historically recommended screening at the initial visit and at appropriate intervals or clinically indicated transitions (e.g., change in disease status), framing distress management as integral to comprehensive cancer care [5].

Among available screening approaches, the NCCN Distress Thermometer (DT) is widely used because it is brief, patient-acceptable, and it works well in busy clinical settings [1]. The DT is a single 0–10 scale (measuring distress 'in the past week, including today') paired with a structured Problem List that helps identify sources of distress that can be addressed across areas such as practical issues, family, emotions, spiritual/religious concerns, and physical symptoms [1]. Foundational validation studies demonstrated that the DT performs favorably compared with longer symptom measures and can function as a practical screening tool when embedded into routine practice [6]. For operationalizing "clinically significant distress," the cut-off DT ≥4 is among the most commonly adopted thresholds, supported by evidence syntheses demonstrating a favorable balance of sensitivity and specificity in oncology settings, while recognizing that optimal thresholds may vary by population and reference standard [7]. The Problem List further enhances clinical utility by informing targeted referrals (e.g., social work for practical stressors, mental health professionals for prominent emotional concerns, chaplaincy for spiritual concerns) [1,8].

Despite broad endorsement, real-world implementation of distress screening varies, particularly in newer centers where supportive care pathways and staffing models are still evolving [9]. Establishing an empirical baseline of distress prevalence and its correlates in a newly established cancer center can serve two complementary functions[1]: documenting psychosocial burden as a quality-of-care indicator, and [2] guiding service development by identifying the most prevalent problem domains driving distress and the patient subgroups most likely to require escalation[1,9]. Accordingly, the present cross-sectional analysis uses routinely collected DT and Problem List data to quantify the prevalence of clinically significant distress (DT ≥4), characterize distress severity on the continuous scale, and evaluate the pattern and predictive contribution of problem domains to distress intensity and screening positivity during the early period after this center began screening [1].

Study objectives

Primary objective

1.To estimate the prevalence of clinically significant distress among patients attending at Anbar cancer center, Iraq, using the Distress Thermometer (DT) cut-off ≥4.

Secondary objectives

2.To describe distress burden as a continuous construct by summarizing DT score distribution (mean/SD and median/IQR) and visualizing the distribution.

3.To characterize the pattern of problems contributing to distress by reporting the prevalence of endorsed concerns on the NCCN Problem List, both at domain level (physical, emotional, practical, spiritual/religious, family) and at item level (ranked "top problems").

4.To examine the relationship between DT score and patient characteristics (such as age) and clinical setting (such as diagnostic group), and to measure how DT score relates to how many problems patients report across different domains.

5.To identify independent predictors of (a) distress intensity (continuous DT score) and (b) clinically significant distress (DT ≥4) using multivariable regression models.

Materials and Methods

Study design and patient population

This was a cross-sectional observational study conducted at the Al Anbar Cancer Center, Iraq. Patients receiving active treatment or follow-up were eligible for enrollment in the study.

All consecutively screened patients who completed the distress screening tool during the study period February 2022 to February 2026 were eligible. Inclusion criteria comprised a confirmed cancer diagnosis and completion of the DT score. Patients with missing DT scores were excluded from DT-dependent analyses (resulting analytic sample: n = 264). The dataset reflects a real-world service population; therefore, the analytic plan prioritizes clinical interpretability and robust, assumption-aware inference.

Measurement instrument: Distress Thermometer and Problem List

Distress was assessed using the NCCN Distress Thermometer (DT) and accompanying Problem List [1]. The DT is a single-item numeric rating scale from 0 (no distress) to 10 (extreme distress) anchored to distress experienced "in the past week, including today." The Problem List captures the presence/absence of commonly encountered stressors and symptoms across major domains (practical, family, emotional, spiritual/religious, physical), supporting triage and service referral.

Statistical Analysis

Statistical analysis was performed using IBM SPSS Statistics for Windows, Version 20.0 (IBM Corp., Armonk, NY). The normality of continuous variables was assessed using the Shapiro–Wilk test and visual inspection of Q–Q plots. Age was normally distributed and is presented as mean ± standard deviation (SD). Distress Thermometer (DT) scores showed a non-normal distribution ($p < 0.001$) and are therefore presented as median and interquartile range (IQR), although mean ± SD is also reported for descriptive completeness.

Descriptive statistics were used to summarize demographic and clinical characteristics, including age, gender, tumor type, DT score, and the prevalence of endorsed NCCN Problem List domains. Bivariate associations between continuous DT score and age or problem-domain counts were assessed using Spearman's rank correlation coefficient (rho). Differences in DT score by gender were examined using the Mann–Whitney U test, while differences across tumor types were assessed using the Kruskal–Wallis H test. The association between gender and clinically significant distress status (DT ≥4 vs. DT <4) was examined using the chi-square test.

To identify independent predictors of distress, two multivariable models were constructed. First, a multivariable linear regression model was used to evaluate factors independently associated with DT score as a continuous outcome. Second, binary logistic regression was used to identify predictors of clinically significant distress, defined using the established cutoff of DT ≥4. Variables entered into the multivariable models included age, gender, and the counts of endorsed problems across the physical, emotional, practical, family, and spiritual/religious domains. For the logistic regression model, odds ratios (ORs) and 95% confidence intervals (CIs) were calculated. For all analyses, a two-tailed p-value < 0.05 was considered statistically significant.

Results

A total of 264 patients with complete Distress Thermometer (DT) data were included in the final analysis. The mean age of the cohort was 53.54 ± 13.45 years (range, 17–91 years), with a median age of 53.50 years (IQR, 45.75–63.00). The cohort was predominantly female (n = 223, 84.47%), while males accounted for 41 patients (15.53%). Regarding tumor distribution, breast cancer was the most frequent diagnostic group (n = 126, 47.73%), followed by gastrointestinal/hepatobiliary malignancies (n = 40, 15.15%), hematologic malignancies (n = 36, 13.64%), and gynecologic cancers (n = 24, 9.09%) (Table 1).

Spearman correlation analysis showed no significant relationship between age and DT score ($p = 0.403$). In contrast, DT scores differed significantly across tumor types ($p = 0.002$), indicating that the primary disease site was associated with variation in distress intensity. The numerically highest median DT scores were observed in the very small Skin and Other/Unspecified groups (median 9.00 each, n = 2 per group), which should be interpreted cautiously because of the extremely limited sample size. Among the more represented tumor categories, sarcoma showed the highest median DT score (median 8.50, IQR 6.75–10.00), followed by gynecologic malignancies (median 8.00, IQR 6.50–9.25) and thoracic cancers (median 7.00, IQR 3.75–8.75). Genitourinary cancers showed the lowest distress burden (median 2.00, IQR 1.00–5.00). Figure 1 illustrates the distribution of DT scores across tumor groups

Table 1. Participant Characteristics (n = 264)

Characteristic	Statistic
Age (years), mean ± SD	53.54 ± 13.45
Age (years), median (IQR)	53.50 (45.75–63.00)
Gender, n (%)	
Female	223 (84.47)
Male	41 (15.53)
Cancer group, n (%)	
Breast	126 (47.73)
Gastrointestinal & hepatobiliary	40 (15.15)
Hematologic	36 (13.64)
Gynecologic	24 (9.09)
Thoracic	14 (5.30)
Genitourinary	10 (3.79)
Sarcoma	8 (3.03)
CNS	2 (0.76)
Skin	2 (0.76)
Other/Unspecified	2 (0.76)

When distress was analyzed as a continuous variable, the mean DT score was 5.64 ± 3.09, and the median DT score was 6.00 (IQR, 3.00–8.00). Utilizing the internationally validated clinical cutoff of >= 4, the prevalence of clinically significant distress was 73.48% (n = 194). Regarding the NCCN Problem List, physical concerns were the most frequently endorsed domain (79.55%), followed closely by emotional concerns (74.24%). Practical concerns (e.g., finances, insurance, and transportation) were reported by 60.61% of the participants, while spiritual/religious concerns were endorsed by 30.30% (Table 2). Figure 2 displays the frequency of endorsed problem domains and visually confirms the predominance of physical and emotional burden in this cohort.

In gender-stratified descriptive analysis, females had a median DT score of 6.00 (IQR, 3.50–8.00), whereas males had a median DT score of 7.00 (IQR, 2.00–9.00).

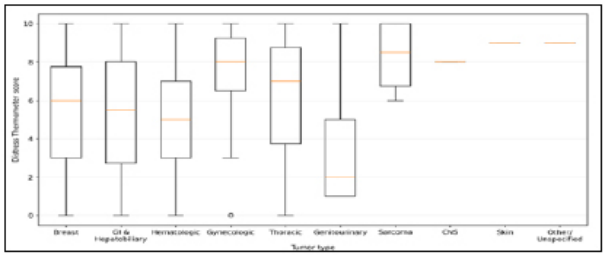

Figure 1. DT Score by Tumor Type

Table 2. Distress Prevalence and Endorsed Problem Domains

Parameter	Value
Distress Thermometer (DT) score, mean ± SD	5.64 ± 3.09
Distress Thermometer (DT) score, median (IQR)	6.00 (3.00–8.00)
Distress category, n (%)	
Clinically distressed (DT ≥4)	194 (73.48)
Non-distressed (DT <4)	70 (26.52)
Endorsement of problem domains, n (%)	
Physical domain	210 (79.55)
Emotional domain	196 (74.24)
Practical domain	160 (60.61)
Spiritual/Religious domain	80 (30.30)
Family domain	26 (9.85)

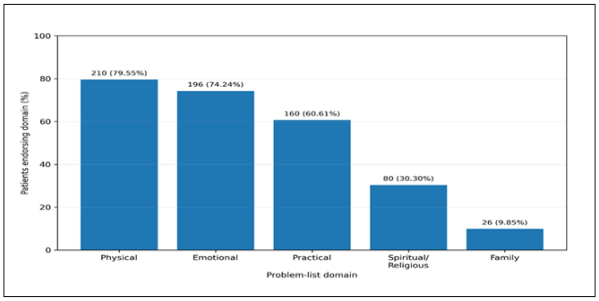

Figure 2. Problem-Domain Endorsement Frequencies

Clinically significant distress (DT ≥4) was present in 167 of 223 females (74.89%) and 27 of 41 males (65.85%). However, distress intensity did not differ significantly by gender (p = 0.394), and the proportion of patients with clinically significant distress was also not significantly different between females and males (p = 0.312).

Problem Domains

Strong to moderate positive correlations were observed between the total DT score and the number of endorsed problems across all domains (all p < 0.005). The strongest correlation was found with the Physical Domain (p < 0.001), followed by Practical (p < 0.001), Emotional (p < 0.001), and Spiritual (p < 0.001) domains. A statistically significant but weaker correlation was noted for the Family Domain (rho = 0.195, p = 0.001).

Predictors of Clinically Significant Distress (Logistic Regression).

When looking at what makes a patient's distress reach the clinical cutoff of 4, the model was a strong fit (Pseudo R-squared = 0.629). The biggest finding was the impact of physical symptoms. For each additional physical problem reported, patients were more than 12 times as likely to have clinically significant distress (95% CI: 4.81–25.64, p < 0.001). Emotional burden (OR = 2.05, 95% CI 1.26–3.36, p = 0.004) and spiritual/religious burden (OR = 8.64, 95% CI 1.62–46.06, p = 0.012) were also significant independent predictors, whereas age, gender, family burden, and practical burden were not statistically significant after adjustment (Table 3).

Table 3. Logistic Regression for Clinically Significant Distress (DT >= 4)

Predictor	Odds ratio (OR)	95% CI	p-value
Age	1.03	1.00–1.07	0.062
Female gender (vs male)	0.53	0.15–1.82	0.312
Physical domain count	11.87	5.00–28.15	< 0.001
Emotional domain count	2.05	1.26–3.36	0.004
Family domain count	0.55	0.11–2.63	0.451
Practical domain count	1.49	0.82–2.71	0.195
Spiritual domain count	8.64	1.62–46.06	0.012

Discussion

Principal findings

In this real-world cohort from Al Anbar Cancer Center, Iraq, the burden of psychosocial distress was high: nearly three-quarters of patients met the commonly used DT threshold for clinically significant distress (DT ≥4), with a median DT score of 6.00. This finding is clinically important because the DT screening is intended to help guide patients toward supportive care services, not to diagnose mental health conditions [1, 7, 10]. Supporting the view that distress stems from many sources, patients frequently endorsed problems across the Problem Listparticularly physical and emotional concernsindicating that distress in this population is closely connected to symptom burden and the daily challenges of illness

In the revised analysis, distress also varied significantly by tumor type, with higher median DT scores observed in sarcoma, gynecologic, and thoracic malignancies, and lower scores in genitourinary cancers. Although some site-specific categories in our cohort were small and should therefore be interpreted cautiously, this pattern still suggests that psychosocial burden is not evenly distributed across diagnoses. Recent multicenter evidence supports this interpretation, showing that supportive care needs differ by cancer entity, with gynecologic cancers in particular demonstrating higher psychological and physical needs than several other tumor groups. This strengthens the argument for tumor-informed triage rather than a uniform psychosocial pathway for all oncology patients [11].

A second variance introduced by the revised analysis is gender. While distress did not differ significantly by gender in our comparison, recent survivorship evidence indicates that sex differences in psychological distress are context-dependent and may vary according to tumor type, comparator group, and the point along the Cancer disease natural history rather than following a single uniform direction [12].

The observed prevalence (73.5%) exceeds some benchmarks reported in literatures when DT ≥4 is used, although distress rates vary substantially by setting, timing across the cancer path, and types of the treated patients [7, 10]. For context within Egypt, a large multicenter study among newly diagnosed Egyptian patients (n≈550) reported that 46% had significant distress at

DT ≥4, with distress related to tumor site and stage and commonly associated with worry, fears, and treatment decision difficulties [10]. The prevalence in this study is therefore materially higher, which may plausibly reflect differences in (i) the types of patients seen (e.g., those in active treatment vs. those newly diagnosed), (ii) cutoffs and distress prevalence can differ across cultural and clinical contexts and that the maturity of a program and its ability to provide supportive care can influence observed outcomes [13, 14].

Because nearly half of the cohort consists of breast cancer patients, comparison with breast- specific evidence is also relevant. A breast-cancer systematic review/meta-analysis reported a pooled prevalence of ~62% for DT ≥4 across studies (with a wide range across settings) [15]. Our overall prevalence remains higher than that pooled estimate, again suggesting either a higher-burden case mix or a greater concentration of distress-amplifying stressors (symptom load, practical constraints, or limited psychosocial resources) in this care environment.

Why physical burden "dominates" distress in this dataset

A key signal in this analyses is the strong relationship between DT score and the physical domain count. This is consistent with psycho-oncology evidence that physical symptom clusters (pain, fatigue, sleep problems, dyspnea, appetite/eating difficulties) often co-occur with and amplify emotional distress, and that physical symptom burden measured via the DT Problem List is highly prevalent in advanced cancer contexts [16] In metastatic lung cancer, for example, physical problems on the DT physical problem list are frequent and associated with higher distress and depressive symptoms, reinforcing the view that DT distress in many oncology settings is inseparable from symptom management quality and palliative/supportive care integration [17, 18] The Egyptian multicenter DT study similarly found that a broad set of practical/emotional/physical items correlated with DT ≥4, underlining that distress arises from "stacked" burdens rather than a single domain in isolation [10].

Emotional, practical, and spiritual concerns: implications for triage design

The very high prevalence of emotional domain endorsement is consistent with the role of worry, fears, sadness, and related symptoms as proximate distress drivers in cancer populations and in Arab settings [10, 19, 20]. Notably, Arabic DT validation work in Saudi cancer patients supported the DT's feasibility and proposed DT ≥4 as an indicator of clinically significant distress, while showing that emotional symptoms and multiple problem list items including religious concerns and several physical symptoms were associated with higher DT scores [13]. This cultural-linguistic validation is important for our setting because it supports the interpretability of DT ≥4 thresholds in Arabic-speaking oncology populations, while still acknowledging that optimal thresholds may vary by context.

The practical domain (≈61%) has service-planning consequences. In lower-resource contexts, practical problems such as transportation, insurance/financing, and care coordination can directly intensify distress and indirectly worsen adherence and continuity (missed appointments, delayed investigations, treatment interruptions) [13, 21].

The spiritual/religious domain was both commonly reported and linked to higher distress (DT ≥4) in our analysis. In many Arab cancer populations, spiritual coping can be helpful, but spiritual struggles such as loss of meaning, fear about life and death, or religious concerns can add to distress and may need support from spiritual care providers or meaning-centered services [1, 19, 20]. Thus, spiritual screening should be seen as a meaningful indicator for referral rather than a secondary concern, with clear steps to connect patients to spiritual support or faith-based counseling where available [1, 13].

An important implication of these domain-level findings is that triage should not rely on DT score alone. Rather, the pattern of endorsed concerns should shape the response: high physical burden may justify symptom/palliative referral, prominent emotional burden may indicate psycho-oncology input, practical barriers may call for navigation or social-work support, and spiritual distress may warrant chaplaincy or culturally congruent spiritual counseling. Recent studies of unmet supportive care needs reinforce that distress is often linked to multiple coexisting domains, supporting this more differentiated response model [21, 22].

What our cancer center needs to consider when putting this into practice

The findings support the need for distress screening to be embedded as a program, not a form. High distress prevalence has operational consequences: workload for triage, referral capacity planning, and workflow standardization. Consensus recommendations emphasize that effective distress management (screening + response) can improve quality of life, reduce distress/anxiety/depression, and may contribute to medical cost offsets and reduced acute care utilization, but that many distressed patients still do not receive needed services [18]. For our center, the data can be leveraged as a "needs assessment" to justify (i) a defined referral algorithm (psychology/psychiatry, social work, symptom/palliative service, chaplaincy), (ii) documentation and follow-up re-screening intervals, and (iii) basic staffing levels needed to match the volume of patients who screened positive.

Recent literature strengthens this operational point. A 2024 review reiterated that psychosocial distress screening remains a quality standard in oncology and highlighted ongoing implementation challenges in routine care. A 2024 feasibility study further showed that integrating the DT into routine vital-sign collection in ambulatory oncology surgery was feasible, acceptable, and completed without missing data among approached patients. At the policy level, a 2024 global health-policy analysis argued that psychosocial needs in cancer care remain under-addressed internationally despite broad recognition of their clinical

Strength Points at the Study

1.Clinical relevance and real-world representativeness: The dataset reflects routine distress screening in a functioning cancer service, supporting external validity for similar centers transitioning from start-up to mature workflows.

2.Use of a widely adopted screening instrument: DT and Problem List is endorsed and extensively used internationally, with cross-cultural validation work in Arabic-speaking settings that supports interpretability in the region.

In conclusion, this cross-sectional analysis demonstrates a high burden of clinically significant distress among patients in Al Anbar cancer center, Iraq. with nearly three-quarters screening positive at DT ≥4 and a median DT score of 6. Physical and emotional concerns were the most frequently endorsed problem domains, and symptom-related burden particularly physical problems showed the strongest relationship with distress intensity and screening positivity. These findings support implementation of an integrated distress management program that couples routine DT screening with structured triage and referral pathways (symptom/ palliative support, psychosocial services, social work/ navigation, and spiritual care), aligned with established distress management guidance.

Acknowledgments

Statement of Transparency and Principles

•The authors declare no conflict of interest.

•The study was approved by the Research Ethics Committee of the authors' affiliated institution.

•The study data are available upon reasonable request.

•All authors contributed to the implementation of this research.

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