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PAPER

One in two cancer patients is significantly distressed: Prevalence and indicators of distress

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Abstract

Objective: Psychological distress is common in cancer patients, and awareness of its indicators is essential. We aimed to assess the prevalence of psychological distress and to identify problems indicative of high distress.

Methods: We used the distress thermometer (DT) and its 34-item problem list to measure psychological distress in 3724 cancer patients (mean age 58 years; 57% women) across major tumor entities, enrolled in an epidemiological multicenter study. To identify distress-related problems, we conducted monothetic analyses.

Results: We found high levels of psychological distress (DT ≥ 5) in 52% of patients. The most prevalent problems were fatigue (56%), sleep problems (51%), and problems getting around (47%). Sadness, fatigue, and sleep problems were most strongly associated with the presence of other problems. High distress was present in 81.4% of patients reporting all 3 of these problems (DT *M* = 6.4). When analyzing only the subset of physical problems, fatigue, problems getting around, and indigestion showed the strongest association with the remaining problems and 76.3% of patients with all 3 problems were highly distressed (DT *M* = 6.1).

Conclusions: Our results show a high prevalence of psychological distress in cancer patients, as well as a set of problems that indicate the likely presence of other problems and high distress and can help clinicians identify distressed patients even if no routine distress screening is available.

KEYWORDS

cancer, distress, fatigue, National Comprehensive Cancer Network distress thermometer, oncology, psychosocial

1 | INTRODUCTION

Numerous studies have shown cancer diagnosis and multimodal treatments to be associated with an increased risk of high emotional distress and mental comorbidity.[1-6] Treatment side effects and high levels of physical symptom burden negatively affect many aspects of patients' quality of life. Most patients report cancer-related fatigue,[7] pain,[8] and a variety of functional disabilities including impaired mobility and cognition[9,10] that impede survivors' private, social, and work life as well as many activities of daily living.[11]

High rates of psychological distress, anxiety, and depression have been found by using self-report or screening measures.[1,12-16] Thus, emotional distress is common in patients and can be seen as part of the psychological adaptation process to managing the diagnosis of cancer as a stressful life event. Nonetheless, high levels of distress may still require clinical attention and individualized

professional support. High levels of emotional distress have been associated not only with high physical symptom burden but also with significantly lower quality of life, satisfaction with care, and treatment adherence.[17-20]

It is a primary challenge in cancer care to identify patients with high distress and those in need of psychological support and to facilitate timely and low-threshold access to psychooncological care. Although there is some controversy over the effectiveness of screening tools for psychological distress,[21-25] their implementation in routine cancer care has been recommended by many international cancer care guidelines. Clinicians should be aware of indicators of psychosocial distress beyond screening questionnaires.

Despite this research, data comparing distress between different tumor entities in routine cancer care, taking into account sex and treatment settings, are still scarce. To our knowledge, few if any studies have attempted to determine whether easily identifiable practical problems are indicative of increased distress levels, although a variety of studies have investigated the association between distress and symptom frequency.[26-30] Yet, awareness of such indicators would be particularly useful to clinicians in routine cancer care to better identify patients in need for psychosocial support, especially in those patients who have difficulties to speak openly about emotional problems. Therefore, we investigated the prevalence of high psychological distress and distressing problems by using the National Comprehensive Cancer Network (NCCN) distress thermometer (DT) and problem list in a large sample of patients across different tumor entities; we also aimed to identify typical problems indicative of high psychosocial distress.

2 | METHODS

The full study protocol to this cross-sectional multicenter study has been published previously.[31] We enrolled adult cancer patients from acute care hospitals, outpatient cancer care facilities, and cancer rehabilitation clinics in 5 diverse study centers across Germany (Freiburg, Hamburg, Heidelberg, Leipzig, and Würzburg). Eligibility criteria were a confirmed diagnosis of a malignant tumor, age 18 through 75, and proficiency in German. Exclusion criteria comprised severe physical, cognitive, and/or verbal impairments that interfered with a patient's ability to give informed consent for research. Ethics committee approval was obtained at all centers (file numbers: Hamburg: 2768; Schleswig-Holstein: 61/09; Freiburg: 244/07; Heidelberg: S-228/2007-50155039; Würzburg: 107/07; and Leipzig: 200-2007). All participants provided written informed consent prior to study participation.

We used a proportional stratified random sample based on the nationwide incidence of all cancer diagnoses in Germany.[31] Eligible patients were asked to complete a set of validated self-report measures. A subsample of study participants also took part in a structured clinical interview, the results of which are presented elsewhere.[32,33]

2.1 | Measures

Demographic characteristics analyzed included age, sex, partnership/cohabitation, school education, employment status, and treatment setting. Medical information including tumor entity, disease condition, and Union for International Cancer Control disease stage was gathered from medical records.

We measured psychological distress by using the validated German version of the NCCN DT.[6] The DT is a valid, reliable, and widely used screening measure.[34] The screening contains a single-item visual analogue scale ranging from 0 ("no distress") to 10 ("extreme distress") to quantify the global level of distress experienced in the past week including the current day and a standardized problem checklist containing 34 potential causes of distress (yes/no questions) that are grouped into 5 categories including physical problems (20 items), practical (5), family (2), emotional problems (5), and spiritual/religious concerns (2). The questionnaire gives the following instructions: "First: Please circle the number (0-10) that best describes how much distress you have been experiencing during the past week, including today. Second: Please indicate if any of the following has been a cause of distress in the past week, including today." A score of ≥5 at the visual analogue scale is recommended as a cutoff for a clinically significant level of distress.[6]

2.2 | Statistical analysis

Differences in distress by sociodemographic and medical characteristics were compared with one-way ANOVA. To identify specific problems that were most strongly associated with the remaining problems, we conducted monothetic analysis (MONA), a method of hierarchical clustering, using R.[35] The first MONA included all 34 items; the second analysis included only the 20 items covering physical problems, as these might appear particularly often in cancer care. The MONA algorithm identifies the variable from a list, which has the maximal association with all other variables on the same list. The list is then divided into 2 clusters based on this variable. This is repeated for each new cluster, resulting in a hierarchical ranking.[36,37] Thus, the top-ranked items are those which are most predictive of the other items on the list.

In a second step, we analyzed mean levels of distress (DT) and prevalence of high distress (cutoff ≥ 5)[6] for patients who reported 1, 2, or all 3 of the top-ranked problems.

3 | RESULTS

3.1 | Participants

Out of 5889 eligible cancer patients, 4020 participated in the study, leading to a final sample of 3724 patients with complete data on psychological distress. Most frequent reasons for nonparticipation were "not interested" (n = 993, 55% of nonparticipants) and "too burdensome" (n = 588, 33%). As reported previously,[32] nonresponder analyses revealed that study participants were younger ($P < .001$), more educated ($P < .001$), and more likely to be recruited from a cancer rehabilitation center ($P < .001$) than nonparticipants.

Demographic and medical characteristics as well as levels of distress are presented in Table 1. Mean age was 58.3 years (SD = 11.3 years), and mean time since current cancer diagnosis was 13.5 months (SD = 24.9). Patients whose tumor stage could not be determined were mostly patients with unconfirmed metastases (stage III or IV).

TABLE 1 Sociodemographic and medical sample characteristics and levels of distress (N = 3724)

	Total Sample		High Levels of Distress (DT Cutoff: ≥5)		DT		
	n	%	n	%	*M*	SD	*P*
Total sample	3724	100.0	1791	51.9	4.55	2.57	
Sex							<.001
Female	1913	51.4	1087	56.8	4.84	2.51	
Male	1811	48.6	846	46.7	4.24	2.60	
Age in years*							<.001
18-35	140	3.8	83	59.3	5.08	2.42	
36-45	366	9.9	215	58.7	4.97	2.53	
46-55	849	23.0	502	59.1	5.01	2.52	
56-65	1164	31.5	576	49.5	4.42	2.60	
66-75	1178	31.9	541	45.9	4.14	2.54	
Cohabitating*							.44
Yes	2815	75.6	1453	51.6	4.50	2.57	
No	672	18.0	358	53.3	4.76	2.57	
School education							.29
≤10 years	2363	63.5	1242	52.6	4.58	2.58	
>10 years	1361	36.5	691	50.8	4.49	2.56	
Work situation							.015
Employed	1522	40.9	817	53.7	4.71	2.52	
Unemployed	355	9.5	203	57.2	4.80	2.56	
Retired	1666	44.7	824	49.5	4.36	2.61	
Housewife/househusband	181	4.9	89	49.2	4.47	2.57	
Cancer care setting							.08
Inpatient care	1580	42.4	852	53.9	4.68	2.66	
Outpatient care	1232	33.1	612	49.7	4.43	2.52	
Inpatient rehabilitation	912	24.5	469	51.4	4.47	2.49	
Tumor entity							<.001
Breast	849	22.8	440	51.8	4.56	2.47	
Prostate	594	16.0	235	39.6	3.78	2.53	
Colon/rectum	469	12.6	253	53.9	4.58	2.54	
Lung	287	7.7	155	54.0	4.75	2.55	
Hematological cancers	286	7.7	158	55.2	4.70	2.60	
Female genital organs	295	7.9	186	63.1	5.14	2.39	
Stomach/esophagus	138	3.7	70	50.7	4.57	2.58	
Kidney/urinary tract	121	3.2	67	55.4	4.74	2.78	
Head and neck	117	3.1	60	51.3	4.77	2.64	
Pancreas	77	2.1	45	58.4	4.67	2.65	
Thyroid	24	0.6	9	37.5	4.60	2.74	
Bladder	78	2.1	44	56.4	4.60	2.57	
Malignant melanoma	67	1.8	32	47.8	4.59	2.56	
Other	322	8.6	179	55.6	4.84	2.72	
Current disease condition*							.008
In remission	1459	39.2	179	55.6	4.84	2.72	
Not in remission	2163	58.1	1161	53.7	4.70	2.59	
UICC tumor stage							.006
I	556	14.9	290	52.2	4.45	2.50	
II	647	17.4	312	48.2	4.26	2.54	
III	513	13.8	239	46.6	4.28	2.51	
IV	801	21.5	435	54.3	4.84	2.52	
Uncertain	1207	32.4	657	54.4	4.67	2.66	

Abbreviation: UICC, Union for International Cancer Control.

*Different sample size due to missing data; *P* values based on one-way ANOVA.

3.2 | Prevalence of distress

We found that 52% of the total sample reported clinically significant levels of psychosocial distress (≥5 on the visual analogue scale). Our one-way ANOVA revealed that the levels of distress varied significantly for sociodemographic and medical groups. The highest levels of distress were found in women, patients who were 60 or older, unemployed, had cancers of the female genital organs or pancreatic cancer, or were in advanced stages of the disease (Table 1). Time since current diagnosis was minimally yet significantly correlated with distress (r = 0.06, P < .01). For frequencies of individual values on the DT, see supplementary Table S1 [available online].

TABLE 2 Frequency of cancer- and treatment-related problems (distress thermometer, DT) (N = 3724)

	Total Sample		Women (n = 1913)		Men (n = 1881)		
	n	%	n	%	n	%	*P*
Problems							
Fatigue	2079	55.8	1,237	64.7	842	46.5	<.001
Sleep	1912	51.3	1,092	57.1	820	45.3	<.001
Getting around	1749	47.0	957	50.0	792	43.7	<.001
Worry	1746	46.9	997	52.1	749	41.4	<.001
Pain	1703	45.7	950	49.7	753	41.6	<.001
Fears	1565	42.0	967	50.5	598	33.0	<.001
Sadness	1458	39.2	927	48.5	531	29.3	<.001
Nervousness	1224	32.9	731	38.2	493	27.2	<.001
Memory/concentration	1200	32.2	769	40.2	431	23.8	<.001
Sexual problems	1142	30.7	434	22.7	708	39.1	<.001
Tingling in hands/feet	1114	29.9	639	33.4	475	26.2	<.001
Indigestion	1088	29.2	613	32.0	475	26.2	<.001
Skin dry/itchy	1061	28.5	633	33.1	428	23.6	<.001
Eating	880	23.6	512	26.8	368	20.3	<.001
Loss of interest in daily activities	801	21.5	462	24.2	339	18.7	<.001
Changes in urination	800	21.5	292	15.3	508	28.1	<.001
Nausea	795	21.3	489	25.6	306	16.9	<.001
Breathing	781	21.0	430	22.5	351	19.4	.20
Nose dry/congested	767	20.6	459	24.0	308	17.0	<.001
Diarrhea	736	19.8	399	54.2	337	45.8	.09
Constipation	715	19.2	420	22.0	295	16.3	<.001
Feeling swollen	709	19.0	505	26.4	204	11.3	<.001
Depression	568	15.3	336	17.6	232	12.8	<.001
Mouth sores	543	14.6	320	16.7	223	12.3	<.001
Appearance	537	14.4	360	18.8	177	9.8	<.001
Bathing/dressing	512	13.7	250	13.1	262	14.5	.22
Family problems/partner	453	12.2	286	15.0	167	9.2	<.001
Work/school	361	9.7	199	10.4	162	8.9	.133
Housing	295	7.9	187	9.8	108	6.0	<.001
Family problems/children	279	7.5	187	9.8	92	5.1	<.001
Insurance	276	7.4	136	7.1	140	7.7	.469
Transportation	241	6.5	124	6.5	117	6.5	.978
Spiritual/religious concerns relating to God	202	5.4	118	6.2	84	4.6	.04
Fevers	165	4.4	89	4.7	76	4.2	.50
Loss of faith	125	3.4	71	3.7	54	3.0	.22
Child care	91	2.4	62	3.2	29	1.6	.001
No of problems							
No of practical problems (*M*, SD)	0.34	0.70	0.37	0.73	0.31	0.67	<.001
No of family problems (*M*, SD)	0.20	0.47	0.25	0.52	0.14	0.41	<.001
No of emotional problems (*M*, SD)	1.98	1.85	2.31	1.87	1.63	1.76	<.001
No of spiritual problems (*M*, SD)	0.09	0.35	0.10	0.37	0.08	0.33	<.001
No of physical problems (*M*, SD)	5.64	3.88	6.19	4.00	5.05	3.66	<.001
No of total problems (*M*, SD)	8.24	5.56	9.22	5.71	7.20	5.20	<.001

The most prevalent problems were fatigue (56%), sleep problems (51%), and problems getting around (47%; Table 2). On average, patients had 8 (SD = 5.6) problems (range 0-29). Women endorsed 26 of the 36 physical and psychosocial problems significantly more frequently than men did. Men, on the other hand, more frequently reported sexual problems as well as changes in urination ($P < .05$).

We found no significant difference in the number of problems among inpatient care, outpatient care, and rehabilitative settings ($P = .88$). The total number of problems was significantly associated with higher distress ($r = 0.56$; $P < .001$).

3.3 | Problems indicative of other problems and high distress

Table 3 shows the results of a cluster analysis using all 34 DT items covering practical, emotional, physical, family, and spiritual problems. We identified 2 physical problems (sleep problems and fatigue) and 1 emotional problem (sadness) as most strongly associated with psychological distress on the visual analogue scale.

Patients with any one of these problems had higher distress scores ($M = 3.5$-4.4) than patients that had none of the 3 problems ($M = 2.8$). Almost two-thirds (62.2%) of patients with any 2 out of the 3 problems showed distress scores above the clinical cutoff ($M = 5.2$). When patients reported all 3 problems, the distress score rose to $M = 6.4$ and at least 4 out of 5 patients (81.4%) with these problems were highly distressed. Men showed the same ranking of problems as the total sample. When analyzing only women, fatigue and sadness remained but worrying proved to be more strongly associated with distress than sleep problems compared with the total sample.

When analyzing only the 20 physical problems, the following 3 problems were most predictive of the other problems on the list: indigestion, problems getting around, and fatigue (Table 3). Patients with any one of the 3 problems were more distressed than patients with none of them ($M = 4.5$-4.8 vs $M = 3.1$). Fatigue was the most serious single problem with a mean distress score of 4.8. Patients with any 2 of the 3 problems showed higher distress scores ($M = 5.3$), and patients with all 3 problems had the highest levels of distress ($M = 6.1$). Three out of 4 patients from the latter group were highly distressed (76.3%, cutoff ≥ 5). This result proved stable across subanalyses by gender.

TABLE 3 Problems most strongly associated with high psychological distress (N = 3724)

	High Distress		Mean Distress (DT)		
	n	%	n	*M*	SD
All problems					
None of the 3 problems	210	23.7	888	2.80	2.26
Sleep problems[a]	132	34.3	385	3.53	2.22
Fatigue[b]	218	49.2	443	4.28	2.17
Sadness[c]	85	47.5	179	4.39	2.46
Any 2 of the 3 problems	650	62.2	1045	5.19	2.31
All 3 problems	638	81.4	784	6.37	2.06
Physical problems only					
None of the 3 problems	299	28.5	1051	3.10	2.40
Indigestion[d]	49	31.2	157	3.50	2.27
Problems getting around[e]	135	40.8	331	3.96	2.36
Fatigue[f]	292	57.1	511	4.80	2.27
Any 2 of the 3 problems	724	65.5	1105	5.31	2.30
All 3 problems	434	76.3	569	6.14	2.22

DT indicates distress thermometer visual analogue scale; high distress, DT ≥ 5.

[a]Patients with sleep problems without fatigue or sadness.

[b]Patients with fatigue without sleep problems or sadness.

[c]Patients with sadness without sleep problems or fatigue.

[d]Patients with indigestion without problems getting around or fatigue.

[e]Patients with problems getting around without indigestion or fatigue.

[f]Patients with fatigue without indigestion or problems getting around.

4 | DISCUSSION

In this large, representative sample across all major tumor entities, 52% of patients were found to have high psychological distress with the highest levels found in patients with female genital cancers or pancreatic cancer. The lowest level of distress was found in patients with prostate cancer.

Our results suggest a lower prevalence of distress than Meggiolaro and colleagues (60%)[16] but a higher prevalence than Kendall and colleagues (33%),[38] using the same instrument (DT) in similar populations. Discrepancies in distress could be caused by different sample compositions in sex, age, included cancer types, and treatment stages. In particular, our study used a random epidemiological sample, while some other studies may have used a self-selection of patients seeking psychosocial support. We also found higher levels of distress compared with an early study by Zabora and colleagues,[1] who found high distress in 35% of the patients, using the Brief Symptom Inventory. However, prevalence estimates derived from different instruments are difficult to compare.

Interestingly, in our sample, patients with female genital cancers had the highest levels of distress, whereas in Zabora's study, this patient group was found to have the lowest distress rate. This is even more surprising as our sample had fewer patients with more severe genital cancers such as ovarian cancer (40% vs 47% out of women with genital tumors). Compared with a study by Carlson and colleagues, we found similar distress rates for the total sample but slightly higher rates in breast cancer patients and considerably lower distress rates in lung cancer patients.[39]

It is also relevant to recognize that 58% of patients with pancreatic cancer were highly distressed but were found to have the lowest prevalence of mental disorders (20%) in a subsample of this study.[32] Future research should address the issue to what extent distress as assessed by the DT is linked to mental disorders.

The differences in cancer site may, in part, be due to differences in sex distribution. We found significantly higher levels of distress and frequency of reported problems in women compared with those in men, which is in accordance with other studies in cancer populations[40-42] and in the general population,[43,44] although the causes of these gender differences in prevalence rates are currently not well understood. Possible explanations include response bias, biological,

social, and demographic influences as well as internalizing versus externalizing liability structure of psychopathology.[45]

Research suggests that a variety of factors beyond sex may contribute, including specific demographic, clinical, dispositional, psychosocial, and health system variables. Consistent with the literature, we found the highest levels of distress in patients with advanced stages of the disease, although the relationship between tumor stage and distress was nonlinear.[46]

4.1 | Problems indicative of other problems and high distress

We identified 3 major problems accompanying high levels of psychosocial distress: fatigue, sadness, and sleep problems. It is unclear whether all of these problems are causal indicators of distress and reducing fatigue and other problems may not always translate into a reduction in distress levels. However, fatigue and associated problems may be used as markers to identify patients with a high level of distress, thus taking notice of patients who might be at a particularly high risk for developing mental disorders.

In women alone, the results of the overall monothetic analysis could not be reproduced. Instead of sleep problems, worrying was more indicative of distress in women. This could be due to gender differences in coping, which would suggest 3 major explanations: First, women may admit emotional problems more easily as they were socialized to be more expressive (methodological-artifact argument). Second, women may generally face more stressors (or more severe stressors) than men do (stress-exposure argument). Third, women may lack appropriate coping resources for handling the stressors they experience (vulnerability argument). It is unlikely, however, that women's responses are biased by social desirability of reporting problems,[47] even though men's responses might be. Because worrying may lead to sleeplessness, it is plausible that women and men may express similar concerns by using different words.

We further analyzed a subset of only physical problems for 2 main reasons: First, problems from other categories such as emotional problems or family problems overlap with the conceptualization of distress and depression; second, physical problems are more easily recognized and assessed by primary and oncological medical staff. This analysis revealed fatigue, problems getting around, and indigestion as those factors most strongly associated with other psychosocial and physical problems and good indicators of high psychosocial distress. These problems thus hold the potential of functioning as "red flags" for identifying highly distressed patients in oncological care settings, especially when occurring in combination.

There are several possible explanations for why these problems were associated with particularly high levels of distress. It is likely that these are problems that represent particularly strong limitations in daily living ability and lead to social isolation or high dependence on others. Future research could investigate to what extent these problems cause high distress, which mediators are involved, and how reducing these problems can lead to lower levels of distress.[48-50]

4.2 | Study limitations

Our sample was slightly biased toward younger age, higher school education, and rehabilitation setting.[32] In addition, the MONA we used to identify problems that best represent the remaining problems is a relatively fresh approach to the analysis of symptom clusters related to distress in cancer patients. Because our analysis does not guarantee that the problems identified represent the most distressing symptoms in general but is limited to the pool of problems from which they were chosen, we also aim to pursue further studies on this highly relevant subject to compare and replicate our results by using broader sets of potential indicators. In addition, the cross-sectional design did not permit inferences on causality. The age-limited inclusion criteria do not allow generalization to very young or old cancer patients.

Distress levels can be transient, and repeated assessment at appropriate intervals such as changes in disease status plus a full mental status assessment in those with high levels of distress is the most reliable method of ascertaining a clinically important psychological problem.[25,51] Furthermore, more research is needed on the performance of the DT against "gold standard" clinical interview.[34,52]

4.3 | Clinical implications and conclusions

Our results provide crucial insights for health-care professionals regarding the large number of patients facing a high psychosocial and physical symptom burden. In the spirit of personalized medicine, indicators of distress and therefore need of psychosocial support should be taken into account during routine inpatient and outpatient cancer care. We therefore identified the core problems that can indicate high distress and are easy and quick to assess. We hope that this represents a significant step toward better detection and treatment of psychosocial comorbidity in cancer patients.

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CONFLICT OF INTEREST

The authors have declared no conflicts of interest.

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SUPPORTING INFORMATION

Additional Supporting Information may be found online in the supporting information tab for this article.

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