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Original Paper

Prevalence of Anxiety and Depression in Cancer Patients Seen at the Norwegian Radium Hospital

N. Aass,[1] S.D. Fosså,[1] A.A. Dahl[2] and T.J. Moe[3]

[1]Department of Medical Oncology and Radiotherapy, The Norwegian Radium Hospital, 0310 Oslo;
[2]University Unit, Aker Hospital, Division of Psychiatry, 0320 Oslo; and [3]Department of Social Medicine, The Norwegian Radium Hospital, 0310 Oslo, Norway

The aim of this study was to investigate the prevalence of anxiety and depression in cancer patients seen at the Norwegian Radium Hospital, using the Hospital Anxiety and Depression Scale (HADS), the EORTC QLQ-C33 and an *ad hoc* designed questionnaire. In addition, information about the patients' malignant disease and treatment was obtained. The prevalence of anxiety and depression among 716 evaluable patients was 13% and 9% respectively, as assessed with HADS. In hospitalised patients, the risk of psychiatric distress was approximately twice that of patients in the outpatient clinic. Female patients reported significantly more anxiety than men. Patients <30 or >70 years old expressed less anxiety than all other patients. Age or gender had no influence on the occurrence of depression. Impaired ability to continue professional work and/or daily life activities, impaired social life and previous psychiatric problems were significantly correlated with anxiety and depression as were impaired physical function, fatigue and pain. The prevalence of depression, but not anxiety, increased in the presence of distant metastases, with less than a month since diagnosis, and with relapse or progression. In the logistic regression analysis, a history of previous psychiatric problems and impaired social life were correlated with both anxiety and depression. Female gender, impaired physical activity and impaired social role function were additional predictive parameters for anxiety, whereas fatigue predicted depression. Careful attention should be paid to cancer patients displaying these problems in order to diagnose and treat depression and anxiety disorders. © 1997 Elsevier Science Ltd.

INTRODUCTION

DURING RECENT years, increasing attention has been paid to the prevalence of psychiatric symptoms in cancer patients and the role of therapeutic interventions [1–13]. In 1983, Derogatis and associates [1] described anxiety and depression as a common pattern of psychiatric disorders in cancer patients. These authors found that 47% of newly referred cancer patients fulfilled the criteria for a DSM-III diagnosis, 68% presenting with anxiety and depression. Rodrigue and associates [2] and Stefanek and associates [3]

reported that 35% of oncological patients had emotional distress, whereas Harrison and associates [4] reported a 10.2% rate of major depression/general anxiety disorder. Lansky and associates [5] found a prevalence of 5.3% for depression among female cancer patients. These variations in prevalence may be due to the heterogeneity of the samples with regard to the type of cancer, patient's age, gender and the time since diagnosis [5–7], or may be due to methodological differences concerning data collection, diagnostic criteria and the kind of instruments used [8, 9, 14].

Testing four different types of self-rating questionnaires, Meakin [9] supported the use of the Hospital Anxiety and Depression Scale (HADS) [12] for screening cancer patients. Comparing HADS with interviews taken by trained

interviewers, Ibbotson and associates [13] also emphasised the suitability of HADS for detection of anxiety and depression in cancer patients. Moorey and associates [15] confirmed the two dimensions of anxiety and depression of HADS. Using HADS, Carroll and associates [11] categorised 23% of cancer patients seen at three different American general hospitals as having psychiatric distress, with 48% being probable cases. In Moorey's study [15], 27% of patients at a British cancer hospital qualified as probable cases of anxiety, as evaluated by HADS, and 9% as probable cases of depression. The figures from the two studies indicate a considerable difference in the prevalence of psychiatric symptoms (10–15%) and warrant further cross-sectional studies, which also should aim to identify predictive factors.

For the clinical oncologist who is not only interested in the somatic aspects of cancer, this variability in the prevalence of anxiety and depression indicates the need to reassess these figures among patients seen in routine practice at a major cancer centre. The aim of the present study was, therefore, to evaluate the prevalence of anxiety and depression among patients seen at the Norwegian Radium Hospital (NRH) and to identify socio-demographic and disease-related factors which predict the development of such psychiatric distress.

PATIENTS AND METHODS
Patients

The NRH serves as a regional cancer hospital for the Southern and Eastern part of Norway with a population of approximately 2 million inhabitants accounting for about 50% of the Norwegian population. The majority of hospitalised patients receive systemic cancer treatment and/or radiotherapy, whereas surgical treatment is mostly performed at county hospitals. Most patients at the outpatient clinic come for follow-up (80%) or easily applicable chemo- or radiotherapy (20%).

According to the study protocol, all cancer patients seen at the NRH's outpatient clinic or hospitalised on two randomly selected working days during January 1995 or March 1995 should receive three questionnaires (HADS, EORTC QLQ-C33 and an *ad hoc* designed questionnaire) (*vide infra*). Patient information was enclosed which explained the purpose of the patient-identifiable study. The patients were asked to complete the questionnaires and return them on the same day.

Instruments

Two psychometrically evaluated questionnaires were used: The Hospital Anxiety and Depression Scale (HADS) [12] and the EORTC QLQ-33 [16]. The HADS has been developed to rate anxiety and depression in patients with physical illness and consists of two subscales, one assessing anxiety and one depression. The summarised minimum score of each of the seven-item subscales is 0 and the maximum 21. As recommended by Zigmond and Snaith [12], the patients were grouped according to their subscale scores as follows: subscale score 0–7: non-cases; subscale score 8–10: doubtful cases; subscale score 11–21: cases.

The EORTC QLQ-C33 represents a modification of the EORTC QLQ-C30 [16] and evaluates symptoms and dimensions generally encountered by cancer patients. The questionnaire assesses the patients' cognitive function and their social life activity (=being together with family members/friends), their physical function and their emotional status as well as symptoms generally observed in cancer patients (changes of appetite, sleeping habits, gastrointestinal symptoms, fatigue). Global health status and quality of life are also assessed. In the present paper, only the questions concerning social role function (being able to perform professional work or household jobs, (question nos. 6 and 7) and social life (question nos. 28 and 29) were considered, together with general cancer symptoms as pain (question nos. 9 and 19), fatigue (question nos. 10, 12 and 18) and physical function (question nos. 1–5).

The patients were furthermore asked to complete a one-page form recording sociodemographic data and known previous psychiatric problems. Finally, a short questionnaire was designed by which the responsible physician reported the specific cancer diagnosis, the main events of the patient's past history of his/her malignancy, the current status of the disease (with or without malignant manifestations) and the patient's performance status on the day of the investigation. Evaluable patients were subsequently grouped according to the site of their malignancy, each of these main groups containing at least 36 patients. All patients whose diagnosis did not fit into this grouping system were included into the group 'other malignancies' (Table 1).

Statistics

Standard statistics (mean, median, standard deviation, range, chi square test, Student's *t*-test, Pearson's correlation) and logistic regression analysis were applied. A *P*-value of <0.05 was regarded as statistically significant. For patients not completing 1 or 2 questions on the HADS, the missing values were replaced by the mean of all available individual item scores.

RESULTS

Eight hundred and sixty-three individuals registered either as out-patients or as hospitalised patients were asked to participate. One hundred and thirty patients (15%) did not complete any questionnaire due to various reasons: refusal:

Table 1. Patients' characteristics

	Eligible patients*	Evaluable patients†
Age (years)		
Median	58.8	58.3
Range	(10.8–94.1)	(10.8–91.9)
	Number of patients	
Gender		
Females	550	451 (82%)
Males	313	265 (85%)
Tumour type		
Gynaecological	210	163 (78%)
Breast (females)	176	161 (91%)
Urological	113	102 (90%)
Haematological	77	66 (86%)
Gastrointestinal	74	56 (76%)
Lung	53	39 (74%)
Other	160	129 (81%)
Total	863	716 (83%)

*Patients asked to participate in the present study. †Patients who returned adequately completed forms

Table 2. The prevalence of anxiety and depression according to the HADS

Depression subscale score	No of patients (%) Anxiety subscale score			
	Non-cases (0–7)	Doubtful cases (8–10)	Cases (≥11)	Total
Non-cases (0–7)	445 (62)	93 (13)	35 (5)	573 (80)
Doubtful cases (8–10)	34 (5)	24 (3)	23 (3)	81 (11)
Cases (≥11)	14 (2)	15 (2)	33 (5)	62 (9)
Total	493 (69)	132 (18)	91 (13)	716 (100)

37 patients; poor general condition: 22 patients; major surgery on the day of investigation: 20 patients; reading problems: 7 patients; other reasons: 44 patients (administrative error: 2 patients; specified reasons: 6 patients; on leave: 8 patients; unknown reasons: 28 patients). Seventeen of the remaining 733 patients did not answer three or more questions of the HADS. These patients were excluded from further analysis, thus leaving 716 patients (83%) for the evaluation of prevalence of anxiety and depression (Table 1).

Prevalence of anxiety and depression

Thirteen per cent and 9% of the patients in the present study were categorised as cases (subscale score ≥11) regarding anxiety and depression, respectively (Table 2). Five per cent of the patients had a score of 11 or higher on both subscales. With a cut-off of 8, 31% of the patients would have been recorded as cases or doubtful cases regarding anxiety and 20% regarding depression. Thirteen per cent of the patients scored 8 or higher on both subscales.

Site of malignancy

Compared to all patients with other malignancies, patients with gynaecological malignancy tended to record anxiety most frequently (19%) (Table 3), but without reaching the level of statistical significance ($P = 0.06$, chi square test). Patients with haematological, gynaecological and gastrointestinal cancer showed depression (11–13%) most frequently, whereas only 5% of the patients with breast cancer and urological cancer were categorised as cases of depression (Table 3).

Sociodemographic parameters

Anxiety ($P = 0.0015$, chi square test) but not depression was significantly more often reported by females than by males (Table 4). Age did not relate to the prevalence of de-

pression. However, patients less than 30 years old and patients 70 years old or older, regardless of their gender, expressed significantly less anxiety compared to all other patients ($P = 0.007$, chi square test). Neither the patient's civil status (married, widowed, single) nor their situation of living (living alone or with others) as related to the prevalence of anxiety and depression (data not shown). No difference was found between patients living in urban and rural areas. Significantly more patients receiving disability pension reported anxiety compared to patients with earned income, patients on sick-leave, patients receiving age pension or unemployed patients ($P < 0.0001$, chi square test). Twenty-eight per cent of the males and 20% of the females reported previous psychiatric problems. Cases of anxiety and depression were significantly more frequent among this group of patients compared to those without a previous psychiatric history ($P < 0.001$, chi square test, Table 4).

In general, increasing impairment due to general cancer symptoms (impaired physical activity, fatigue and pain) correlated with higher incidence of anxiety and depression ($P < 0.001$, chi square test, Table 5). Both anxiety and depression were furthermore significantly correlated with the patients' social role function (professional work, household job) ($P < 0.001$, chi square test). Twenty per cent of the patients who were considerably inhibited in their social role function, expressed severe anxiety. The corresponding rate for depression was 14%. Without any impairment of their social role function, 7% of all patients recorded anxiety and 3% expressed depression. Considerable impairment of social life (being together with friends and/or family members) was also correlated with both anxiety and depression ($P < 0.001$, chi square test).

Disease-related parameters

Patient category. When compared to the individuals seen at the outpatient clinic, hospitalised patients displayed a higher prevalence of anxiety (14% versus 10%, $P = 0.11$, chi square test) and depression (11% versus 4%; $P = 0.0016$, chi square test, Table 6).

Time since diagnosis. The median time since the diagnosis of cancer was 0.7 years (range 0–38.4 years) for all patients. 11 of 66 patients (17%) for whom diagnosis had occurred within the last month were categorised as cases for depression (Table 6), while the comparable percentage of patients with a longer lasting history of disease was 8% (51 of 650 patients; $P = 0.015$, chi square test). No significant difference was found with regard to anxiety ($P = 0.16$, chi square test).

Table 3. Psychiatric distress according to the HADS and type of malignancy

Tumour type	Anxiety			Depression		
	Non-cases*	Doubtful cases†	Cases‡	Non-cases*	Doubtful cases†	Cases‡
Gynaecological (n = 163)	97	35	31 (19%)	126	17	20 (12%)
Breast (females) (n = 161)	98	40	23 (14%)	136	17	8 (5%)
Urological (n = 102)	83	12	7 (7%)	86	11	5 (5%)
Haematological (n = 66)	54	8	4 (6%)	52	7	7 (11%)
Gastrointestinal (n = 56)	36	14	6 (11%)	44	5	7 (13%)
Lung (n = 39)	30	7	2 (5%)	29	7	3 (8%)
Other (n = 129)	95	16	18 (14%)	100	17	12 (9%)
Total (n = 716)	493 (69%)	132 (18%)	91 (13%)	573 (80%)	81 (11%)	62 (9%)

*Subscale score 0–7. †Subscale score 8–10. ‡Subscale score 11–21.

Table 4. *Psychiatric distress according to the HADS and socio-demographic parameters*

		No. of patients				
	Non-cases*	Anxiety doubtful cases†	Cases‡	Non-cases	Depression doubtful cases	Cases
Gender						
Females (*n* = 451)	288	92	71 (16%)	364	47	40 (9%)
Males (*n* = 265)	205	40	20 (8%)	209	34	22 (8%)
Age (years)						
<30 (*n* = 39)	28	9	2 (5%)	33	5	1 (3%)
30– < 50 (*n* = 192)	118	44	30 (16%)	151	23	18 (9%)
50– < 70 (*n* = 339)	230	61	48 (14%)	270	40	29 (9%)
≥70 (*n* = 146)	117	18	11 (8%)	119	13	14 (10%)
Financial resources						
Earned income (*n* = 251)	179	50	22 (9%)	207	25	19 (8%)
Sickness and unemployment benefit (*n* = 62)	41	11	10 (16%)	49	9	4 (6%)
Disability pension (*n* = 121)	67	24	30 (25%)	93	18	10 (8%)
Age pension (*n* = 183)	146	19	18 (10%)	146	16	21 (11%)
Unclassified (*n* = 68)	40	20	8 (12%)	52	10	6 (9%)
Previous psychiatric problems						
No (*n* = 533)	404	89	40 (8%)	445	53	35 (7%)
Yes (*n* = 178)	86	41	51 (29%)	124	28	26 (15%)

*Subscale score 0–7. †Subscale score 8–10. ‡Subscale score 11–21.
The total number of alternatives may be less than the total number of patients due to incomplete data.

Extent of the disease. The prevalence of depression was similar in patients who were judged by their physician as disease-free at the time of investigation and in those with loco-regional disease extension (Table 6). However, patients with distant metastases at the time of the initial diagnosis and, particularly, at the time of the investigation, significantly more often displayed depression than all others (*P* < 0.001, chi square test). A finding of distant metastases at any point of time did not significantly influence the prevalence of anxiety.

Relapse/progression. Two hundred and ninety-four patients had experienced relapse or progression of their malignancy at least once with a median time of 0.4 years after the initial diagnosis (range 0–38.3 years). The event of relapse or progression, but not time elapsed thereafter was correlated with depression (*P* = 0.04, chi square test, Table 6).

Treatment. Whether the patient had previously received treatment or whether he or she was undergoing anticancer treatment had no influence on the prevalence of anxiety and depression (Table 7). Patients in whom anticancer

Table 5. *Psychiatric distress according to the HADS and general cancer symptoms and functional status (EORTC QLQ-C33)*

		No. of patients				
	Non-cases*	Anxiety Doubtful cases†	Cases‡	Non-cases	Depression Doubtful cases	Cases
Physical function						
No impairment (*n* = 239)	193	32	14 (6%)	222	12	5 (2%)
Slight impairment (*n* = 323)	201	67	55 (17%)	259	39	25 (8%)
Considerable impairment (*n* = 150)	96	33	21 (14%)	89	30	31 (21%)
Fatigue						
No (*n* = 86)	76	7	3 (3%)	85	1	(0%)
A little (*n* = 352)	263	64	25 (7%)	316	24	12 (3%)
Severe (*n* = 276)	152	61	63 (23%)	170	56	50 (18%)
Social role function						
No impairment (*n* = 381)	292	64	25 (7%)	346	22	13 (3%)
Considerable impairment (*n* = 325)	194	67	64 (20%)	221	57	47 (14%)
Social life						
No impairment (*n* = 220)	195	20	5 (2%)	212	6	2 (1%)
Slight impairment (*n* = 209)	147	46	16 (8%)	182	18	9 (4%)
Considable impairment (*n* = 278)	144	66	68 (24%)	172	56	50 (18%)
Pain						
No (*n* = 260)	219	29	12 (5%)	237	16	7 (3%)
A little (*n* = 209)	136	47	26 (12%)	176	22	11 (5%)
Severe (*n* = 243)	134	56	53 (22%)	157	43	43 (18%)

*Subscale score 0–7. †Subscale score 8–10. ‡Subscale score 11–21.
The total number of alternatives may be less than the total number of patients due to incomplete data.

Table 6. Psychiatric distress according to the HADS and disease-related parameters

		No. of patients				
		Anxiety			Depression	
	Non-cases*	Doubtful cases†	Cases‡	Non-cases	Doubtful cases	Cases
Patient category						
Hospitalised (n = 457)	306	86	65 (14%)	343	63	51 (11%)
Out-patient (n = 259)	187	46	26 (10%)	230	18	11 (4%)
Time since diagnosis of present malignant disease						
<1 month (n = 66)	43	11	12 (18%)	47	8	11 (17%)
≥1 month (n = 650)	450	121	79 (12%)	526	73	51 (8%)
Status of the disease at diagnosis						
Locoregional (n = 514)	362	90	62 (12%)	426	56	32 (6%)
Distant metastases (n = 184)	120	37	27 (15%)	135	23	26 (14%)
Unknown (n = 18)	11	5	2 (11%)	12	2	4 (22%)
Status of the disease at the time of the investigation						
NED§ (n = 165)	121	29	15 (9%)	139	16	10 (6%)
Locoregional (n = 295)	204	52	39 (13%)	250	28	17 (6%)
Distant metastases (n = 227)	147	49	31 (14%)	159	36	32 (14%)
Unknown (n = 29)	21	2	6 (21%)	25	1	3 (10%)
Relapse/progression						
No (n = 422)	299	71	52 (12%)	351	40	31 (7%)
Yes (n = 294)	194	61	39 (13%)	222	41	31 (11%)
Time since first relapse/progression						
<1 month (n = 44)	26	14	4 (9%)	29	8	7 (16%)
≥1 month (n = 250)	168	47	35 (14%)	193	33	24 (10%)

*Subscale score 0–7. †Subscale score 8–10. ‡Subscale score 11–21. §No evidence of disease.

treatment was planned for the near future were significantly more often depressed (P = 0.02, chi square test) than patients without definite treatment plans at the time of the investigation, whereas no difference was obvious concerning anxiety. Furthermore, those patients in whom treatment had palliative aims only reported significantly more often depression than patients with curatively intended therapy (P = 0.02, chi square test).

Mulitvariate analyses

Separate logistic regression analyses were performed with regard to cases (cut-off point 11) of anxiety and depression including those sociodemographic data, general cancer symptoms and disease-related parameters for which the univariate analysis displayed a P-value <0.1. Previous psychiatric problems and impaired social life predicted anxiety

(P < 0.001 for either parameter) and depression (P = 0.02 [previous psychiatric problems]; P < 0.001 [impaired social life]). Gender (P = 0.015), impaired physical function (P = 0.007) and impaired social role function (P = 0.047) were additionally correlated with anxiety and fatigue with depression (P < 0.001). None of the disease-related parameters remained independent predictive factors in the multivariate analysis.

DISCUSSION

Our results have to be interpreted against the background of the limitations of the present study. Due to health political regulations, patients are referred to the NRH only if they are in need of radiotherapy, complicated combined chemotherapy or specialised cancer surgery. Terminally ill cancer patients or patients who are in need of palliative

Table 7. Psychiatric distress according to the HADS and treatment parameters

		No. of patients				
		Anxiety			Depression	
	Non-cases*	Doubtful cases†	Cases‡	Non-cases	Doubtful cases	Cases
Previous treatment						
No (n = 178)	128	28	22 (12%)	142	19	17 (10%)
Yes (n = 538)	365	104	69 (13%)	431	62	45 (8%)
Ongoing treatment						
No (n = 245)	171	41	33 (13%)	195	26	24 (10%)
Yes (n = 471)	322	91	58 (12%)	378	55	38 (8)
Treatment planned						
No/Unknown (n = 502)	360	83	59 (12%)	410	58	34 (7%)
Yes (n = 214)	133	49	32 (15%)	163	23	28 (13%)
Treatment option						
Curative (n = 422)	297	79	46 (11%)	354	39	29 (7%)
Palliative (n = 267)	179	50	38 (14%)	198	37	32 (12%)
Unknown (n = 27)	17	3	7 (26%)	21	5	1 (4%)

*Subscale score 0–7. †Subscale score 8–10. ‡Subscale score 11–21.

therapy without the use of complicated chemotherapy, hormone treatment or radiotherapy are usually not referred to the NRH. Due to the country's geographic conditions, the majority of referred patients are hospitalised during their treatment. Regular post-treatment follow-up is principally provided at county hospitals or by general practitioners, with annual or 6-monthly check-ups at the NRH's outpatient department for 3–5 years. Most patients from the outpatient clinic are without evidence of their malignancy, have less advanced disease and/or do not receive any treatment [17], while hospitalised patients usually have active disease and/or undergo some kind of therapy. Approximately 60% of hospitalised patients receive palliative treatment.

The above referral and treatment policy led to unavoidable prestudy selection of our patients based on diagnosis, treatment strategies and stages of the disease. However, for the referred cancer patients no further selection was made in relation to age, diagnosis, stage or phase of the disease or treatment. The response in the current study was high (83%). Due to the above referral and management policy the present series should, however, not be viewed as representative of the population of Norwegian cancer patients in general, although we think that our patients are comparable to most patients at regional cancer centres in Northern Europe.

The EORTC QLQ-C30 (and its version EORTC QLQ-C33 as used in the present study) is a standard quality of life instrument that is supplemented with disease-specific questions. The core questionnaire has been thoroughly evaluated with regard to validity and reliability, and it has been found applicable for a wide range of patient populations and treatment settings [16–21]. As patients with a great variety of cancer diagnoses were included in the present study, no disease-specific modules were applied.

The evaluation of anxiety and depression in the present study was based solely on the HADS. No psychiatric interviews were used for validation of cases. Though Meakin [9] and Kathol and associates [8] offered strong support for the use of self-administered questionnaires as screening instruments, we do not know if our patients with scores 11 or higher on the HADS would meet the criteria for a mental disorder according to the DSM-IV or ICD-10 classifications.

The disease-related parameters were based on information from the patients' records, the hospital's central registry and the forms completed by the responsible physician. Our forms did not assess the patients' knowledge of their disease status, treatment intention and prognosis. It is routine in Norway to explain to cancer patients the diagnosis, extent of disease and treatment policy. However, some patients may not have understood the given information and may not have been aware of the true extent of their malignancy when completing the questionnaire.

Different cut-off points both with regard to the total HADS score and with regard to the anxiety and depression subscale scores have been found to be optimal in different cancer populations. Razavi and associates [22] found a total HADS score of 19 to be an optimal cut-off score for major depressive disorders (sensitivity 70%, specificity 76%). Applied to the present investigation, 13% of the patients would have been recorded as having major depression and this figure is in relatively good agreement with the prevalence of 9% found using the depression subscale score of 11

or higher. Ibbotson and associates [13] observed that a total HADS cut-off score of 15 performed optimally (sensitivity 80%, specificity 76%). Forty per cent of the patients scoring 15 or higher on the HADS were found to be 'true' cases according to the interviews performed. In our study, 163 patients (23%) had a total score of ≥15, which corresponds to 9% of our patients being 'true' cases. This is only around half the prevalence found using a subscale score of ≥11 for anxiety and/or depression. This difference could indicate that the cut-off point for the subscales should be higher than 11 in order to reduce the number of false positive diagnoses.

Using a cut-off point of ≥11 on the HADS subscales, Carroll and associates [11] reported 18% anxiety and 10% depression in approximately 800 cancer patients. These rates are in agreement with our results. Moorey and associates applied the HADS with a cut-off point of 8 for both the subscales [15]. Their rate for anxiety (27%), but not the rate for depression (9%), corresponds well with our observations when using the same cut-off point. Although the patients in Moorey and associates study represented a variety of cancer diagnoses, they included only those patients who had an estimated duration of survival of more than 12 months. As no such selection was performed in our investigation, this could explain our higher percentage of patients reporting depression. HADS has so far not been applied to a sample of the general Norwegian population. Therefore, we cannot directly compare our results of the cancer patients with those of the general population. However, based on HSCL-25 (anxiety and depression) used in a Norwegian population-based study of 6380 individuals, Moum [14] observed 4.5% of the males and 8.5% of the females (aged 62–70 years) and thus most comparable to patients with cancer, to be probable cases for a psychiatric disorder. Using a total HADS cut-off score of ≥19 as a strong indication of a mental disorder [22], a rate of 13% in our series probably indicates an increased prevalence of psychiatric distress among cancer patients compared to the general population.

At our hospital the prevalence of anxiety exceeded that of depression (13% versus 9%), confirming Carroll and associates' [11], Brandberg and associates' [23], Noyes and associates' [24] and Maraste and associates' [25] findings. As also found in Carroll and associates' [11] and Pinder and associates' [26] reports, psychiatric distress tended to be most frequent in hospitalised patients and in patients with metastatic disease. However, neither Lansky and associates [5] nor Stefanek and associates [3] found any correlation between psychiatric distress and disease-related variables. In our investigation, the incidence of anxiety but not of depression was significantly higher in females than in males. Furthermore, patients less than 30 years old and patients 70 years old or older expressed significantly less anxiety than other patients, whereas no age difference was found with regard to depression. Few other investigations have looked at age and gender differences. Stefanek and associates [3] and Plumb and Holland [27] did not find any difference in anxiety between sexes, whereas Brandberg and associates [23] reported a higher proportion of female melanoma patients to be depressed compared to male patients. Carroll and associates [11] observed that the prevalence of anxiety was significantly higher in female patients 59 years old or younger compared to older female patients. On the other

hand, in the same study male patients 60 years old and older represented the subpopulation with the highest prevalence of depression. It seems from most of the above studies and from our own results that concern due to serious or possible lethal disease is greater in middle-aged patients, in particular in females, than in younger and older patients.

In our investigation and in agreement with Carroll and associates [11], the prevalence of anxiety and depression did not vary significantly between the main cancer groups, although patients with gynaecological malignancies reported the highest prevalence of psychiatric distress. Surprisingly, psychiatric distress was much less prevalent among female breast cancer patients. The age distribution was the same for these two diagnostic groups of females. More gynaecological patients had distant metastases at the time of diagnosis compared to our breast cancer patients. However, when compared to the group with gynaecological cancer, more patients with breast cancer had experienced relapse or disease progression, displayed distant metastases at the time of the investigation and/or received palliation treatment. Thus, the difference as regards psychiatric distress between these groups of female cancer patients remains difficult to explain. A previous observation from our outpatient clinic that gynaecological patients more often reported emotional dysfunction and dissatisfaction than all other cancer patients, supports our results [17]. Maybe the stigma of a genital malignancy, its treatment and unavoidable side-effects are greater for the patients with gynaecological cancer than the psychological reactions breast cancer patients experience. However, neither Lansky and associates [5] nor Noyes and associates [24] observed differences of psychological distress among female cancer patients.

In the univariate analysis impaired physical function, impaired social role function, fatigue and pain and impaired social life activity was significantly correlated with anxiety and depression. The disease-related variables correlated mostly with depression and to a much lesser degree to anxiety. Previous psychiatric problems necessitating either sick leave or medical treatment were a significant risk factor for anxiety and/or depression. Other investigators also found a history of depression to be a predictor of current depression during the course of cancer [5, 10]. Special attention should, therefore, be paid to these patients in order to support and treat them at an early phase of their cancer illness.

In the logistic regression analysis, the disease-related parameters did not remain independent parameters predictive for depression or anxiety, whereas premorbid psychiatric problems, gender, fatigue and impairment of social life activity, impairment of social role function and impairment of physical activity persisted as significant risk factors for psychological distress. Both impaired physical function and fatigue can be viewed as an expression of the patient's malignancy, its extent and the severity and the frequency of side-effects of ongoing or previous therapy. Fatigue, in particular, is common during intensive cancer therapy and may be long-lasting after treatment discontinuation even in patients without evidence of disease.

In summary, using the HADS the prevalence of anxiety and depression was found to be 13% and 9%, respectively, among cancer patients seen at a European comprehensive cancer centre. The prevalence of psychiatric distress is approximately doubled in hospitalised patients as compared to those from the outpatient clinic. The independent impact of other disease-related parameters (time since diagnosis, current therapy, treatment intention) on psychiatric illness was low, but female patients, patients with a premorbid history of psychiatric distress, those with fatigue and patients with impaired physical activity, impaired social role function and impaired social life represent a high-risk group for the development of depression and/or anxiety and require special awareness among health care providers.

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