Psychological distress in cancer patients undergoing radiation therapy treatment

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3.1 Abstract

Purpose

The objective of this study was to examine the likely presence of, and factors associated with, anxiety, depression and overall psychological distress in cancer outpatients undergoing radiation therapy treatment in Sydney, Australia.

Methods

A touchscreen computer survey was conducted in four radiation therapy treatment centre waiting rooms. Patients waiting to receive treatment completed the survey which included questions about demographic and disease characteristics, survey acceptability and the Hospital Anxiety and Depression Scale (HADS).

Results

A total of 454 patients (70%) completed the touchscreen computer survey. The likely presence of anxiety (HADS-A ≥11), depression (HADS-D ≥11) and overall psychological distress (HADS-T ≥15) was 15, 5.7 and 22%, respectively. Cancer type was found to be associated with each HADS screening category. The majority of patients reported high survey acceptability and willingness to complete similar touchscreen computer surveys in the treatment centre waiting room on additional occasions.

Conclusions

As radiotherapy patients frequently attend the radiation oncology department, routine screening and intervention for elevated levels of psychological distress in this setting appears to be feasible. High survey completion rates and high patient-rated acceptability supports this approach to screening. The likely presence of psychological distress is reported for this sample; however, the selection of HADS threshold scores is likely to have influenced the reported rates. Further research is needed to identify how

cancer type impacts on likely caseness across the different HADS classifications examined.

3.2   Introduction

Cancer and assessment of psychological distress

Cancer is a leading cause of morbidity and mortality, with an estimated 12.7 million new cancer cases and 7.6 million cancer deaths worldwide in 2008 [1]. Cancer has also been associated with elevated levels of psychological distress [2-4]. Undetected and untreated psychological distress may have implications for important patient outcomes, including treatment adherence, level of self-care, length of hospital stays and service use [3, 5]. Routine screening for psychological distress in oncology settings has been recommended; however, it has not been widely adopted [6]. Further exploration of the acceptability of distress screening in clinical settings is warranted.

Why focus on radiation therapy patients?

It is recommended that approximately half of all new cancer patients should receive radiation therapy (RT) [7]. RT is usually delivered on an outpatient basis through cancer treatment centres on a Monday-Friday schedule over 2-8 weeks [8, 9]. It has been suggested that this intensive treatment period may provide a valuable opportunity for screening and intervening for psychological distress [10, 11]. Despite the large body of research on prevalence and factors associated with psychological distress in cancer patients [3, 12-14], only a small number of studies have focused on RT patients during treatment [9]. Amongst existing studies, the use of relatively small sample sizes [15, 16] and a focus on a limited range of cancer types [17] has limited the degree to which these findings can be generalised to all cancer patients undergoing RT treatment.

Why examine factors associated with poorer psychosocial outcomes in radiation oncology patients?

Identification of factors associated with poorer psychosocial outcomes in RT patients may aid the radiation oncology health care team in identifying patients who may be in

4

need of additional psychosocial support. For instance, studies in oncology patients have suggested that cancer patients who are younger [12, 15, 18], female [12, 18, 19], and perceive that their treatment aim is palliative [20] may be more likely to suffer from elevated levels of psychological distress. It has also been suggested that other demographic factors such as ethnicity [12, 21] and cancer type [13] may influence rates of distress. To the best of our knowledge, this is the first Australian study of psychological distress in a large, heterogeneous sample of radiation oncology outpatients who are currently undergoing treatment [9]. This study aimed to establish in a radiation oncology patient population (1) the likely presence of (a) anxiety, (b) depression and (c) overall distress using the HADS, and (2) factors associated with a likely presence of (a) anxiety, (b) depression and (c) overall distress. We also assessed the acceptability of a touchscreen computer survey conducted in RT treatment waiting rooms to investigate the likely presence of psychological distress.

3.3   Patients and methods

Design

This was a cross-sectional patient survey.

Participants

Cancer outpatients were recruited from four metropolitan RT treatment centres attached to large public hospitals in Australia between February and December 2010. Eligibility criteria included being aged 18 years or older, having a cancer diagnosis, receiving RT treatment, and understanding sufficient English to complete the patient survey.

Ethical standards

Human research ethics approvals were obtained from The University of Newcastle and the New South Wales Population and Health Services Research Ethics Committee. Research governance authorisations were also obtained from participating hospitals.

Procedure

A research assistant (RA) attended the radiation oncology departments. Patients waiting for their RT treatment were invited to participate based on the availability of the RA and touchscreen computers. Informed consent was sought from eligible patients. Consenting patients were allocated a unique identification code to login to the touchscreen computer survey, which they completed whilst waiting for their RT treatment.

The patient survey

The survey was programmed into a Dell Latitude XT2 touchscreen computer using Digivey survey software (CREOSO Corporation, Arizona). Touchscreen computer surveys assessing psychological distress and completed in an oncology waiting room have been previously found to be acceptable to cancer patients [22]. The following modules were embedded within a larger survey.

The Hospital Anxiety and Depression Scale

The Hospital Anxiety and Depression Scale (HADS) is a brief (14-item) patient self-report measure of anxiety and depression requiring respondents to report their symptoms during the previous week [23]. The HADS has demonstrated reliability and validity in cancer patient populations [24] and has been found to be an effective screening tool for cancer patients currently undergoing treatment [25]. Additionally, HADS scores have been found to be comparable when administered by touchscreen computer and pen-and-paper modes [26].

6

The sensitivity and specificity of the HADS are influenced by the threshold scores used to identify a likely presence of anxiety and depression [27, 28]. The HADS is divided into anxiety (HADS-A) and depression (HADS-D) subscales. Subscale scores of 0-7 are classified as normal, 8-10 as mild, 11-14 as moderate and 15-21 as severe [29]. Subscale scores ranging from 8 [24, 30] to 11 [31] are typically used for identifying the *possible* presence of anxiety and depression. Cancer research has extensively applied subscale thresholds of 11 to indicate the *likely* presence of anxiety and/or depression, reported as achieving 70-95% sensitivity and 83% specificity [32]. Although the use of the HADS total score (HADS-T) was not recommended by the scale developers [23], recently, HADS-T scores of 10-15 have been used to indicate the likely presence of overall psychological distress. Ibbotson et al [25] found that a HADS-T threshold score of ≥15 resulted in 80% sensitivity, 76% specificity and a positive predictive value of 41% for detecting generalised anxiety disorder or major depressive illness as assessed by the Psychiatric Assessment Schedule. This HADS-T threshold has also been applied in similar studies examining cancer patients' psychological distress.

Demographic and disease explanatory variables

Participant age, sex, cancer diagnosis, time since diagnosis, country of birth, and treatment aim were collected via patient self-report. Self-reported clinical information, including reporting of cancer site and time since diagnosis, in this population has been found to provide reliable when compared to cancer registry records [33].

Acceptability of touchscreen computer survey

A subsample of consecutive patients completed investigator-derived items assessing the acceptability of the touchscreen computer survey. Respondents were asked how much they agreed with a series of statements on a four-point Likert scale (strongly disagree, disagree, agree, and strongly agree). Statements included "The instructions

were easy to follow", "The questions were easy to understand", "The touchscreen was easy to use", "I had enough time to complete all the questions", "I felt comfortable answering the questions" and "The touchscreen allowed enough privacy". Respondents were also asked to indicate on how many visits to the treatment centre they would be prepared to complete a similar touchscreen computer survey. Response options were "Only once (just this survey)", "Less than half the visits", "Half of the visits", "Most visits" or "Every visit".

Statistical analysis

HADS-A and HADS-D subscale scores were calculated for each participant. The proportion with scores meeting or exceeding threshold scores for moderate–severe levels (≥11) on each subscale was calculated with 95% confidence interval (CI). The proportion of participants with a likely presence of psychological distress defined as total HADS threshold score of ≥15 was also reported with 95% CIs. Univariate logistic regression analyses were then used to identify factors associated with a likely presence of anxiety, depression and overall distress. Variables with a p value of 0.2 or less were included in the multiple logistic regression model. Variables examined at univariate level included age (18-49 years, 50-59 years, 60-69 years and 70 years or more), sex, country of birth (Australian born and not Australian born), cancer type (breast, prostate, other common cancer, other cancer) and perceived treatment aim (palliative and not palliative). The backward stepwise method was used to remove variables with a p value of 0.1 or greater on the likelihood ratio test [34]. Recruitment site (hospital) was included in the multiple regression analysis to account for the sampling strategy. Odds ratios with 95% confidence intervals are reported for univariate and multiple regression models, and a significance level of 5% used. The proportion of patients reporting that they agreed or strongly agreed with each of the

acceptability items are also reported with 95% CIs. Analyses were undertaken using Stata version 11.2.

Sample size

This study aimed to invite 600 eligible patients from the four hospital sites to participate. Assuming a survey consent and completion rate of 75% this would provide 450 respondents. Based on prevalence rates previously found in oncology settings, this would allow us to obtain prevalence estimates with 95% CIs within ±3% of the point estimate for likely anxiety and depression and ±4% of the point estimate for likely psychological distress. This sample size would also be sufficient to detect differences in characteristics between those with and without the outcome of interest of 20% for anxiety and psychological distress, and 25% for depression. Assuming 90% acceptability, a subsample of 160 patients would also allow us to obtain prevalence estimates with 95% CIs within ±5% of the point estimate for the acceptability items.

3.4   Results

Patient characteristics

Of the 785 patients screened for eligibility, 659 were considered eligible to participate and were invited to join the study. Reasons for ineligibility included inadequate English (n = 60); not currently receiving RT (n = 21); clinic staff noted ineligibility regarding inpatient status and/or in ability to give informed consent (n=13); and if the patient had already been approached about the survey (n = 6), was not diagnosed with cancer (n = 4), or was under the age of 18 (n = 2). For 13 patients, the specific reason for ineligibility was not recorded. Of the eligible patients, 570 (86%) agreed to participate. Surveys with completed HADS were obtained from 454 (70% of eligible patients) who are classified as respondents for the purposes of this study. Incomplete data generally resulted from respondents being called into their appointment before survey

completion. Twelve completed surveys with responses indicating that the respondent was attending an outpatient appointment other than treatment were excluded from further analysis to fit with eligibility criteria for this study. The first 159 consecutive respondents answered the survey acceptability items.

Of the respondents, 233 (51%) were male, 221 (49%) were living with a husband, wife or partner, 98 (22%) were living with children/stepchildren, 30 (6.6%) with other family, 9 (2.0%) with friends, 6 (1.3%) with an unrelated flatmate or cotenant, 90 (20%) were living alone and 315 (69%) were born in Australia. The mean age was 61.2 years (SD = 13.1), ranging from 18.9 to 91.4 years. Fifty-nine participants (13%) perceived that their treatment aim was palliative. One hundred and thirty-one participants (29%) were diagnosed with breast cancer, 100 (22%) with prostate cancer, 44 (9.8%) with head and neck cancer, 23 (5.1%) with colorectal (bowel) cancer, 20 (4.4%) with brain cancer, 19(4.2%) with lung cancer, 16 (3.6%) with melanoma, 15 (3.3%) with non-Hodgkin's lymphoma, 9 (2%) did not know and 73 (16%) had other cancer types. Respondents were a median of 28.4 weeks since diagnosis (Q1, Q3: 16.1, 55.6).

Participants identified as likely cases on the HADS-A, HADS-D and HADS-T

Sixty-eight respondents (15%; 95% CI: 11-18%) met or exceeded threshold scores for the likely presence of moderate–severe anxiety and 26 (5.7%; 95% CI 3.6-7.9%) for the likely presence of moderate–severe depression. The HADS threshold score of 15 was met or exceeded in 102 participants (22%; 95% CI: 19-27%), indicating the likely presence of psychological distress.

Factors associated with a likely presence of anxiety, depression and distress

Tables 3.1-3.3 show the initial and final multiple logistic regression models for respondents with and without a likely presence of anxiety, depression and psychological distress, respectively. As seen in Table 3.1, for HADS categorised

moderate–severe anxiety, the variables age, sex and cancer type were included in the multiple logistic regression analysis. A diagnosis of prostate cancer was also associated with lower odds (0.2) of a likely presence of anxiety compared to the breast cancer reference group. Additionally, respondents in the older age category (aged 70 or above) had marginally significantly lower odds of a likely presence of anxiety compared to the youngest age group (18-49 years old).

Table 3.2 shows that for a HADS categorised likely presence of depression, age, cancer type and palliative treatment aim were included in the initial model for multiple regression analysis. Respondents diagnosed with other common cancers (including brain, colorectal, head and neck, lung, melanoma and non-Hodgkin's lymphoma) had 3.4 times the odds of having a likely presence of depression compared with the breast cancer reference category.

The variables age, sex and cancer type were included in the initial model for multiple regression analysis of the likely presence of psychological distress outcome (see Table 3.3). Compared with the breast cancer reference group, respondents with a diagnosis of prostate cancer had lower odds (0.2) of having a likely presence of psychological distress.

Table 3.1: Multiple logistic regression analysis of demographic and disease characteristics of those with a HADS classified likely presence of anxiety

	Likely presence of anxiety [b] n (column %)	Unadjusted OR (95% CI)	Likelihood ratio Chi^2 (df), *p* Adjusted OR (95% CI)
Hospital			0.7 (3), *p* = 0.9
Site 1	26 (16%)	1	1
Site 2	19 (15%)	0.9 (0.5-1.8)	1.1 (0.6-2.3)
Site 3	12 (16%)	1.0 (0.5-2.2)	1.1 (0.5-2.3)
Site 4	9 (11%)	0.6 (0.3-1.4)	0.8 (0.3-1.9)
Age group			7.8 (3), *p* = 0.05
18-49	20 (22%)	1	1
50-59	21 (21%)	1.0 (0.5-1.9)	1.1 (0.6-2.3)
60-69	16 (11%)	0.4 (0.2-0.9)	0.6 (0.3-1.2)
70+	9 (8.0%)	0.3 (0.1-0.7)	0.4 (0.2-1.0)
Sex			
Male	21 (9.0%)	1	
Female	45 (20%)	2.6 (1.5-4.5)	
Cancer type			16.9 (3), *p* = 0.0007*
Breast cancer	23 (17%)	1	1
Prostate cancer	2 (2.9%)	0.1 (0.02-0.4)	0.1 (0.03-0.6)
Other common cancer [a]	23 (17%)	0.9 (0.5-1.8)	1.0 (0.5-2.0)
Other or unknown cancer	18 (21%)	1.2 (0.6-2.5)	1.5 (0.7-3.0)

Note. Observations within each variable may not add to the total due to missing values
[a] Includes brain cancer, colorectal cancer, head and neck cancer, lung cancer and non-Hodgkin's lymphoma
[b] Assessed using the Hospital Anxiety and Depression Scale (HADS) anxiety subscale threshold score of ≥11

Table 3.2: Multiple logistic regression analysis of demographic and disease characteristics of those with HADS classified likely presence of depression

	Likely presence of depression [b] n (column %)	Unadjusted OR (95% CI)	Likelihood ratio Chi^2 (df), *p* Adjusted OR (95% CI)
Hospital			5.2 (3), *p* = 0.2
Site 1	12 (7.2%)	1	1
Site 2	6 (4.6%)	0.6 (0.2-1.7)	0.8 (0.3-2.2)
Site 3	7 (9.5%)	1.3 (0.5-3.6)	1.3 (0.5-3.5)
Site 4	1 (1.2%)	0.2 (0.02-1.2)	0.2 (0.02-1.5)
Age group			
18-49	6 (6.5%)	1	
50-59	9 (9.1%)	1.4 (0.5-4.2)	
60-69	9 (6%)	0.9 (0.3-2.7)	
70+	2 (1.8%)	0.3 (0.05-1.3)	
Cancer type			11.2 (3), *p* = 0.02*
Breast cancer	4 (3.1%)	1	1
Prostate cancer	1 (1.0%)	0.3 (0.04-2.9)	0.3 (0.04-3.1)
Other common cancer [a]	14 (10%)	3.6 (1.2-11.3)	3.4 (1.1-10.8)
Other or unknown cancer	7 (8.1%)	2.8 (0.8-9.9)	2.5 (0.9-9.0)
Palliative treatment aim			
No	19 (5.0%)	1	
Yes	6 (10%)	2.1 (0.8-5.6)	

Note. Observations within each variable may not add to the total due to missing values
[a] Includes brain cancer, colorectal cancer, head and neck cancer, lung cancer and non-Hodgkin lymphoma
[b] Assessed using the Hospital Anxiety and Depression Scale (HADS) depression subscale threshold score of ≥11

Table 3.3: Multiple logistic regression analysis of demographic and disease characteristics of those with HADS classified likely presence of psychological distress

	Likely presence of psychological distress[b] n (column %)	Unadjusted OR (95% CI)	Likelihood ratio Chi^2 (df), *p* Adjusted OR (95% CI)
Hospital			1 (3), *p* = 0.8
Site 1	42 (25%)	1	1
Site 2	24 (18%)	0.7 (0.4-1.2)	0.8 (0.4-1.4)
Site 3	19 (26%)	1.0 (0.5-1.9)	1.0 (0.5-2.0)
Site 4	17 (20%)	0.7 (0.4-1.4)	0.9 (0.5-1.8)
Age group			
18-49	24 (26%)	1	
50-59	32 (32%)	1.4 (0.7-2.5)	
60-69	28 (19%)	0.7 (0.3-1.2)	
70+	18 (16%)	0.5 (0.3-1.1)	
Sex			
Male	45 (19%)	1	
Female	57 (26%)	1.5 (0.9-2.3)	
Cancer type			29 (3), *p* < 0.001*
Breast cancer	30 (23%)	1	1
Prostate cancer	5 (5.0%)	0.2 (0.07-0.5)	0.2 (0.06-0.5)
Other common cancer [a]	41 (30%)	1.4 (0.8-2.5)	1.4 (0.8-2.4)
Other or unknown cancer	26 (30%)	1.5 (0.8-2.7)	1.4 (0.7-2.6)

Note. Observations within each variable may not add to the total due to missing values
[a] Includes brain cancer, colorectal cancer, head and neck cancer, lung cancer, and non-Hodgkin's lymphoma
[b] Assessed using the Hospital Anxiety and Depression Scale (HADS) total threshold score of ≥15

Survey acceptability

Of the 159 respondents, the majority agreed that the touchscreen computer survey that they had just completed was easy to use (99%; 95% CI 96-100%), allowed enough privacy (99%; 95% CI 97-100%), had questions that were easy to understand (96%; 95% CI 92-99%), instructions that were easy to follow (99%; 95% CI 96-100%), and that they felt comfortable answering the questions (99%; 95% CI 97-100%). Overall, 111 participants (70%; 95% CI 62-77%) indicated that they would be willing to complete a touchscreen computer survey while waiting for the RT appointment on more than one visit to the radiotherapy treatment centre. Thirteen percent (95% CI 7.9-19%) said they would be willing to do this on less than half the visits, 15% (95% CI 9.9-22%) on half of the visits, 28% (95% CI 21-36%) on most of the visits and 14% (95% CI 8.9-20%) on every visit.

3.5   Discussion

Proportion of outpatients with a likely presence of anxiety, depression and distress
Using HADS subscale threshold score of 11, a likely presence of anxiety was observed in 15% of participants and depression in 5.6%. Previous studies conducted in the UK using the HADS have reported anxiety in between 9% and 19% and depression in between 5% and 9% of radiotherapy patients [15, 35]. Similarly, Pascoe et al [12] found that in a sample of 504 Australian oncology outpatients (of whom 41% were receiving radiotherapy), approximately 12% were likely cases of anxiety and 7% were likely cases of depression.

Debate remains about whether it is most appropriate to use the HADS total score or the subscale scores, which allow bi-dimensional assessment of anxiety and depression [36, 37]. In the present study, using a HADS-T threshold of ≥15, close to one quarter of respondents were identified with a likely presence of psychological distress. This is

consistent with research applying the same total threshold score recommended by Ibbotson et al [25]. Strong et al [14] and Sharpe et al [38] conducted studies in cancer patient populations in the UK and identified a likely presence of distress using the HADS total score in 22 and 23% of patients, respectively.

Factors associated with a likely presence of anxiety, depression and distress

Respondents aged 70 or more had marginally significantly lower odds of experiencing a likely presence of anxiety according to the HADS than the younger respondent group aged 18-49 years. It has been previously reported that younger cancer patients are likely to experience more severe distress [39]. However, Aass et al [18] identified lower levels of anxiety in Norwegian cancer patients under 30 and over 70, suggesting anxiety was greater in middle-aged cancer patients. Pascoe et al [12] did not find any association between age group and anxiety or depression using a binary categorisation of age group (<65 and ≥65). It seems likely that the categorical groupings of age across these studies may relate to the discrepancies between these findings. In the current study, the youngest age group (and reference category) was from 18 to 49 years. It is possible that lower anxiety in respondents aged less than 30 was not detected because of this categorisation; however, due to the low numbers of respondents aged less than 30 in the current study, this relationship was not examined further.

In the current study, no association was found between sex and a likely presence of anxiety. In contrast, previous studies have reported that female sex is associated with higher anxiety [19, 30]. However, it was found that compared to breast cancer patients, patients with a prostate cancer diagnosis had lower odds of having a likely presence of anxiety and/or overall psychological distress. A study of 4,496 cancer patients with common cancer types (lung, brain, Hodgkin's lymphoma, pancreas, lymphoma, liver,

head and neck, adenocarcinoma, breast, leukaemia, melanoma, colon, prostate and gynaecological) suggested that psychological distress prevalence varied by cancer type, with a trend towards prostate cancer patients having lower mean anxiety and depression scores than breast cancer patients [13]. It is possible that this finding by cancer type may be a surrogate for sex; however, more investigation of this is warranted.

The odds of a likely presence of depression were 3.3 times higher in respondents diagnosed with other common cancer types (including brain, colorectal, head and neck, lung, melanoma and non-Hodgkin's lymphoma) compared to respondents diagnosed with breast cancer. This is consistent with past findings indicating that patients diagnosed with some common and less common cancer types (e.g. lung cancer, brain cancer and pancreatic cancer) report high levels of distress [3, 13, 40].

Acceptability of psychological screening within radiotherapy treatment centres
Radiotherapy treatment centre-based assessment of psychological distress appears to be both feasible and highly acceptable to patients. Consent rates to the current study were high and a large proportion of participants also indicated that they would be willing to complete additional touchscreen computer surveys in the same setting on future occasions.

Limitations
The HADS appears to be a sensitive instrument for screening purposes; however, the selection of threshold scores should be carefully considered [28]. The HADS is likely to provide a good indication of the likely presence of anxiety, depression and psychological distress among cancer outpatients, particularly when used in similar settings to previous studies applying the same threshold scores.

Selection of patients undergoing outpatient radiotherapy treatment is likely to have limited the current sample to well-functioning patients. There are a number of other disease variables which have been linked to mood outcomes in the past, including variables relating to current physical status [9]. These factors were not assessed is the current study, as any large variation in physical status is likely to have been screened out of the study by the selection of outpatients only.

Although a priori sample size and power calculations were undertaken, because the prevalence of depression was lower than anticipated, the study is likely to be underpowered to detect relationships between explanatory variables and this outcome. At least 800 participants would have been needed to detect differences of 20% in characteristics between groups with 5% significance level and 80% power.

Implications

The likely presence of anxiety and depression was found to be slightly higher in this patient population compared to normative data from a non-clinical UK population using the same HADS threshold scores, where 13% were identified with a likely presence of anxiety and 3.6% with a likely presence of depression [41]. Since RT patients attend daily treatments and weekly treatment reviews, a window of opportunity exists for clinicians to intervene with patients in this setting [11]. Assessment of psychological distress in a radiotherapy treatment centre setting using touchscreen computers appears to be both feasible and acceptable to cancer patients.

The odds of a likely presence of anxiety, depression and overall psychological distress were found to differ by cancer type. This might reflect differences in prognosis, treatments or potentially in models of care. For instance, some cancer types are associated with worse side effects from radiotherapy treatment [42]. It has also been suggested that elevated levels of proinflammatory cytokines in some cancer types may

be linked to higher rates of depression [43]. Alternatively, although tumour-specific nurse specialists or care coordinators are now available within institutions for more common cancer types, not all cancer types are routinely linked into a service such as this [44]. A limitation of this finding is that socio-demographic and medical predictor variables assessed in this study were all collected via patient self-report. Although self-reported data have been criticised for lacking accuracy as a result of recall biases [45], the accuracy of self-reported variables such as cancer type and time since diagnosis have been shown to be comparable with cancer registry data [33]. Future research should investigate in more detail these differences between cancer types.

Conclusions

This study provides information on the likely presence of anxiety and depression in a heterogeneous sample of cancer patients. The current findings partially support previous research suggesting an association between younger cancer patients and elevated levels of anxiety. Additionally, these findings also raise the question of how cancer type may influence a likely presence of anxiety, depression and psychological distress. Assessment of psychological distress in RT treatment centres appears to be acceptable to patients. RT settings hold promise for system-based identification and referral of oncology outpatients potentially affected by anxiety, depression and psychological distress.

Conflict of interest

No authors have reported financial relationships with research sponsoring organizations. Ms Lisa Mackenzie, the corresponding author, had and has full control of the primary data. The authors agree to allow *Supportive Care in Cancer* to review the data, if requested.

Disclosures

None.

3.6   References

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