Age-specific norms and determinants of anxiety and depression in 731 women with breast cancer recruited through a population-based cancer registry

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Abstract

The aim of this study was to determine population norms and determinants of anxiety and depression in a population-based sample of 731 women with breast cancer (aged 23–60 years) with the Hospital Anxiety and Depression scale (HADS). The prevalence of 'probable' psychological morbidity due to anxiety was 23% and due to depression was 3%. When the women identified as 'possible' cases were included, the respective proportions were 45 and 12%. Higher anxiety was present in younger, less educated women not born in Australia. There was no clear pattern of risk factors for depression. These population-based findings highlight the need for clinicians to be aware that age, education and country of birth may identify a particularly vulnerable subgroup. While brief scales such as the HADS are limited in their ability to accurately predict a clinical diagnosis, high scores identify those who may warrant referral for clinical evaluation.
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1. Introduction

There has been increasing interest in the evaluation and enhancement of the quality of life (QoL) that women with breast cancer experience following diagnosis and treatment. However, there are few data on the normative scores for commonly used instruments. Most studies have been based on convenience samples such as clinics, hospitals, clinical trials or in women attending mammographical screening [1–3]. Few studies have compared breast cancer patients with representative samples of the general population [4,5]. There is a need to establish the prevalence and severity of psychological distress in patients newly diagnosed and treated for breast cancer to allow comparisons between groups, to identify subgroups at greatest risk of affective disorders, and to prioritise targets for interventions.

An important dimension of QoL is affective states such as anxiety and depression. The most accurate method to determine whether an affective disorder is present in a patient is via formal clinical interview to arrive at a specific diagnosis. This method is generally unsuitable for large epidemiological surveys where multiple endpoint data are being collected. Subject burden in such studies limits the quantity and detail of data that might be collected.

The Hospital Anxiety and Depression scale (HADS) [6] has been used extensively in the last decade as an indicator of psychological morbidity [7]. While the diagnostic sensitivity and specificity of the scale seems to vary according to the patient sample [8,9], it has been used both as an initial screening instrument (used with cut-off points) and as a research tool (used as a continuous scale) [7]. Due to the misclassification rate being unacceptably high in some studies, the HADS cut-offs

are best regarded as indicators of possible morbidity. The utility of the scale lies in its brevity, respondent tolerance, familiar scores, reasonable concordance with clinical ratings, and consistency of the factor structure across studies [7].

Several studies using the HADS have reported the prevalence of anxiety and depression in breast cancer patients based on the cut-off scores > 10 as recommended by the authors of the scale [6]. The prevalences range from 10 to 40% in women after diagnosis of metastatic disease [10,11], to 14% in patients selected for a clinical trial [1], and to 6% in long-term survivors of breast cancer [2]. The sampling strategies and sample size of many of these studies make it difficult to accurately estimate the level and extent of psychological morbidity in the breast cancer population.

We administered the HADS to a population-based sample of 731 women with breast cancer and collected demographic and clinical data. Our aims were to estimate the prevalence of anxiety and depression, to assess whether clinical factors or personal factors (e.g. education, country of birth, adjustment, social support) are associated with high scores on the HADS and to thereby identify subgroups at risk of psychological morbidity.

2. Patients and methods

A population-based case–control-family study of breast cancer was carried out during 1992–1999 in Melbourne and Sydney [12], but only those women from Melbourne were administered a psychological questionnaire and were included in the present study. Given the particular interest in familial factors and genetic risk factors, younger age groups were over-sampled. The research protocol received institutional ethics committee approval and all women gave written informed consent.

Women with breast cancer were identified through the population-based Victorian Cancer Registry. Pathology reports were obtained from the state cancer registry, hospitals or pathology laboratories. Of 1335 adult women with a histologically-confirmed first primary invasive breast cancer (ICD-9: 174) who were identified, 885 participated (66%), 255 (19%) refused, 117 (9%) were not invited as the patient's surgeon declined to give permission for the patient to be contacted, 22 (2%) had moved house, 28 (2%) were deceased, and 8 (1%) doctors and 20 (1%) women with breast cancer failed to respond to the invitations to participate. For this paper, cases were restricted to women living in the Melbourne Metropolitan area, who were 60 years of age or less at diagnosis, who could speak and read English and who were asked to complete psychosocial questionnaires. Of the 763 women in this sub-sample, 731 (96%) provided complete responses to the psychological questionnaires.

A face-to-face interview was conducted using structured questionnaires addressing demographics, cancer history and risk factors.

2.1. Measures

The Hospital Anxiety and Depression Scale (HADS) is a brief 14-item, self-administered questionnaire specifically designed for patients with physical illness [6]. The item scores range from 0 to 3 and are added so that both the anxiety and depression scale each ranges from 0 to 21. A score above 10 indicates 'probable' psychological morbidity whereas a score between 7 and 10 indicates 'possible' psychological morbidity. The HADS has been used in several studies of breast cancer patients and a stable factor structure and high reliability (Cronbach's $\alpha > 0.9$ for both scales) have been demonstrated [7].

The Mental Adjustment to Cancer (MAC) scale has 40 items and was designed in the UK to assess adjustment responses to cancer [13]. The rescaled Australian version was used in the current analysis and dimensions include fighting spirit—minimising the illness, fighting spirit—positive orientation to the illness, helplessness/hopelessness, fatalism, angst and loss of control [14]. The scales assess the extent to which these responses are adopted in the adjustment to the diagnosis and treatment of cancer. The reliability of the scales ranged from 0.52 to 0.81.

The Duke-UNC Functional Social Support (DUFSS) questionnaire is a brief eight-item measure that assesses self-perceived affective support and support from a confidant [15]. Affective social support covers support from people who care and people who give love and affection. Confidant social support covers chances to talk about personal, money or work problems and invitations to participate in activities with others. The DUFSS has undergone validation and is regarded as a suitable measure for studying social support in cancer patients [16].

2.2. Statistical methods

Odds ratios as estimates of relative risks and 95% confidence intervals (CIs) were calculated by multiple logistic regression according to Breslow and Day [17]. Standard deviation (S.D.) units (or standardised effect size (ES) = mean divided by pooled S.D.) were calculated to provide an estimate of the magnitude of the group differences. Following Cohen's convention, an ES < 0.5 is regarded as 'small', 0.5–0.8 is regarded as 'medium' and > 0.8 is regarded as 'large' [18]. Correlations between scales were assessed using Pearson's correlation coefficient (R). All analyses were conducted using the Statistical Package for the Social Sciences (SPSS) version 10.0.

3. Results

The mean (S.D.) age at interview was 43.5 (8.2) years (range 23–60 years). One quarter had attempted or completed a university education and only 7% had completed up to 8 years of education. At the time of this survey, the grade of breast cancer pathology at diagnosis was available for only 536 (73%) cases from the Victorian Cancer Registry. Of these, 40% were stage I, 55% were stage II, 4% were stage III and 0.6% were stage IV. A family history of breast cancer in first- and/ or second-degree relatives was reported for 33% of cases. See Table 1 for full demographic details.

The mean (S.D.) anxiety score on the HADS was 7.5 (4.3). Overall, 167 (23%) had scores above the cut-off for probable anxiety disorder (>10). In the oldest age group (55–60 years), 17% had high scores whereas the proportion with high scores in the remaining groups ranged from between 19% for those aged between 40 and 44 years and 27% for those aged 45–49 years (Table 3).

The mean (S.D.) depression score on the HADS was 3.3 (3.1). Overall, there were few women with high depression scores; only 23 (3%) had scores above 10, 65 (9%) had a score from 8 to 10, and 643 (88%) had scores below 8. In the oldest age group (55–60 years), 5 (6%) had high scores, whereas the proportion with high scores in the remaining groups ranged between 2 and 4% (see Tables 2 and 3).

Table 1
Mean (S.D.) for the anxiety scale of the HADS and association (crude OR) between high scores (HADS score 8 or higher) and personal and clinical variables

Anxiety	N	Mean (S.D.)	OR (95% CI)
Age at interview (years)			
23–34	99	8.04 (4.22)	1.59 (0.88–2.89)
35–39	206	7.67 (4.35)	1.29 (0.76–2.17)
40–44	126	7.25 (3.58)	1.06 (0.60–1.88)
45–49	114	7.46 (4.22)	1.59 (0.88–2.78)
50–54	104	7.35 (4.83)	1.19 (0.66–2.15)
55–60	82	6.73 (4.40)	Reference
Education			
University, attempted/graduated	190	6.47 (3.98)	Reference
Training/vocational	143	7.22 (4.33)	1.79 (1.13–2.81)
Secondary year 11–12	197	7.53 (3.95)	2.10 (1.37–3.17)
Secondary year 9–10	152	8.42 (4.58)	3.04 (1.95–4.75)
Primary to year 8	49	8.73 (4.98)	3.68 (1.91–7.08
Stage of breast cancer			
I	214	7.98 (4.335)	Reference
II	296	7.02 (3.93)	0.69 (0.48–0.98)
III and IV	26	7.70 (4.46)	1.33 (0.59–3.05)
Unknown	195	7.46 (4.55)	0.73 (0.49–1.08)
Country of birth			
Australia	504	7.17 (4.11)	Reference
Other	227	8.10 (4.54)	1.52 (1.10–2.08)
Marital status			
Married, living as married	661	7.56 (4.32)	Reference
Never married	70	6.56 (3.58)	0.66 (0.39–1.10)
Time since diagnosis (months)			
<6	76	7.92 (4.23)	Reference
6–9	189	7.41 (4.15)	0.88 (0.51–1.50)
9–12	130	6.94 (4.13)	0.78 (0.44–1.38)
12–15	126	7.54 (4.41)	1.07 (0.60–1.88)
>15	210	7.62 (4.35)	1.07 (0.63–1.80)
Family history of breast cancer			
None	488	7.51 (4.24)	Reference
2nd degree relative only	154	7.38 (4.30)	1.10 (0.77–1.58)
1st degree relative only	65	7.42 (4.62)	0.95 (0.56–1.60)
1st and 2nd degree relatives	24	7.21 (3.79)	0.84 (0.37–1.90)

OR, Odds Ratio; 95% CI, 95% Confidence Interval; S.D., standard deviation; HADS, The Hospital Anxiety and Depression scale.

Table 2
Mean (S.D.) for the depression scale of the HADS and association (crude OR) between high scores (HADS score 8 or higher) and personal and clinical variables

Depression	n	Mean (S.D.)	OR (95% CI)
Age at interview (years)			
23–34	99	3.10 (2.92)	0.42 (0.15–1.18)
35–39	206	3.10 (2.94)	0.70 (0.32–1.52)
40–44	126	3.20 (3.02)	1.08 (0.48–2.41)
45–49	114	3.88 (3.40)	1.37 (0.62–3.05)
50–54	104	3.33 (3.20)	0.92 (0.39–2.18)
55–60	82	3.33 (3.20)	Reference
Education			
University, attempted/graduated	190	3.05 (2.95)	Reference
Training/vocational	143	3.13 (3.14)	1.01 (0.51–2.01)
Secondary year 11–12	197	3.15 (2.97)	0.76 (0.39–1.48)
Secondary year 9–10	152	3.51 (3.31)	1.31 (0.69–2.48)
Primary to year 8	49	5.29 (3.50)	2.91 (1.33–6.34)
Stage of breast cancer			
I	214	3.31 (3.16)	Reference
II	296	3.11 (2.92)	0.87 (0.51–1.49)
III and IV	26	4.58 (4.54)	2.08 (0.77–5.63)
Unknown	195	3.53 (3.23)	0.88 (0.48–1.60)
Country of birth			
Australia	504	3.13 (3.06)	Reference
Other	227	3.79 (3.30)	1.47 (0.93–2.33)
Marital status			
Married, living as married	661	3.41 (3.21)	Reference
Never married	70	2.59 (2.45)	0.42 (0.15–1.17)
Time since diagnosis (months)			
<6	76	4.00 (3.11)	Reference
6–9	189	3.43 (3.35)	1.18 (0.50–2.76)
9–12	130	3.17 (2.97)	1.28 (0.52–3.12)
12–15	126	3.25 (3.04)	1.42 (0.58–3.44)
>15	210	3.16 (3.14)	0.99 (0.42–2.34)
Family history of breast cancer			
None	488	3.48 (3.14)	Reference
2nd degree relative only	154	3.08 (3.19)	1.02 (0.59–1.78)
1st degree relative only	65	2.88 (3.21)	0.88 (0.38–2.01)
1st and 2nd degree relatives	24	3.25 (2.83)	0.95 (0.30–3.59)

OR, Odds Ratio; 95% CI, 95% Confidence Interval; S.D., standard deviation; HADS, The Hospital Anxiety and Depression scale.

Table 3
Distribution of HADS anxiety and depression scores by age at interview

Age (years)	Total n	Anxiety score			Depression score		
		0–7	8–10	>10	0–7	8–10	>10
		n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
26–34	99	49 (49)	27 (27)	23 (23)	93 (94)	4 (4)	2 (2)
35–39	206	113 (55)	40 (19)	53 (26)	186 (90)	14 (7)	6 (3)
40–44	126	75 (60)	27 (21)	24 (19)	108 (86)	15 (12)	3 (2)
45–49	114	57 (50)	26 (23)	31 (27)	94 (82)	17 (15)	3 (3)
50–54	104	59 (57)	23 (22)	22 (21)	91 (88)	9 (9)	4 (4)
55–60	82	50 (61)	18 (22)	14 (17)	71 (87)	6 (7)	5 (6)
Total	731	403 (55)	161 (22)	167 (23)	643 (88)	65 (9)	23 (3)

HADS, The Hospital Anxiety and Depression scale.

A total of 173 (24%) women were found to have a score of greater than 10 on either the anxiety or depression scales or both.

3.1. Demographic predictors of anxiety or depression

Table 1 also describes the associations between anxiety and demographic and clinical variables. When compared with the oldest age group (55–60 years), those women who were < 35 years were at a slightly increased risk of having a possible or probable anxiety disorder (score of 8 or higher) (unadjusted OR (95% CI) 1.59 (0.88–2.89)). There was no overall trend of decreasing anxiety with age when age was treated as a categorical variable or as a continuous variable. A strong trend of decreasing anxiety with increasing education was found (P for trend < 0.001). Compared with those women who had attempted or completed a university education, those with an education to Year 8 were at almost four times the risk of having a high anxiety score (3.68 (1.91–7.08)). Stage of cancer was marginally associated with anxiety. Compared with women with stage I disease, those with stage II disease were at a slightly lower risk of have high anxiety (0.69 (0.48–0.98)) and those with stage III or IV disease were at a slightly increased risk (1.33 (0.59–3.05)). Not being born in Australia was associated with a 50% increase in the risk of anxiety compared with being born in Australia (1.52 (1.10–2.08)) and not being married nor living as married was associated with a marginally lower risk (0.66 (0.39–1.10)). Time since diagnosis and having a family history of breast cancer were not associated with anxiety.

Risk of a depression score of 8 or higher was not associated with age, stage of cancer, time since diagnosis or a family history of breast cancer (Table 2). A trend of increasing depression was found for a decreasing number of years of education (P for trend = 0.06) where those with the lowest education were more likely to have high scores compared with those with the highest education (2.91 (1.33–6.34)). Women not born in Australia tended to be at a greater risk compared with those that were Australian born (1.47 (0.93–2.33)) and those who had never married tended to have approximately half the

Table 4
Risk of high anxiety scores on the HADS by Mental Adjustment to Cancer (MAC) and social support

Scale	Anxiety score		Risk of anxiety	ES[b]
	< 8	⩾ 8	OR[a] (95% CI)	
	Mean (S.D.)	Mean (S.D.)		
MAC				
Positive orientation to the illness	31.0 (3.4)	29.6 (4.2)	0.91 (0.87–0.95)	0.37
Minimise the illness	16.2 (2.4)	16.3 (2.2)	1.02 (0.95–1.09)	−0.07
Helplessness/ hopelessness	7.7 (2.0)	11.3 (2.7)	1.41 (1.31–1.52)	−0.84
Angst	9.2 (2.4)	12.6 (3.3)	1.53 (1.43–1.64)	−1.20
Loss of control	7.2 (2.0)	8.8 (2.2)	1.43 (1.31–1.55)	−0.76
Fatalism	8.0 (2.4)	8.7 (2.4)	1.13 (1.05–1.20)	−0.30
Social support				
Affective support	13.3 (2.1)	12.2 (2.8)	0.84 (0.78–0.89)	0.45
Confidant support	21.3 (3.7)	19.0 (4.3)	0.87 (0.84–0.91)	0.56

HADS, The Hospital Anxiety and Depression scale; S.D., standard deviation.
[a] Odds ratio adjusted for age, tumour stage, country of birth and education.
[b] Standardised mean difference (effect size) = mean group difference/pooled standard deviation (S.D.).

Table 5
Risk of high depression scores on the HADS by Mental Adjustment to Cancer (MAC) and social support

Scale	Depression score		Risk of depression	ES[b]
	< 8	⩾ 8	OR[a] (95% CI)	
	Mean (S.D.)	Mean (S.D.)		
MAC				
Positive orientation to the illness	30.8 (3.6)	27.3 (4.1)	0.80 (0.75–0.85)	0.94
Minimise the illness	16.4 (2.3)	15.4 (2.4)	0.83 (0.75–0.92)	0.40
Helplessness/ hopelessness	8.2 (2.3)	12.1 (3.8)	1.56 (1.41–1.72)	−1.55
Angst	10.3 (3.0)	13.9 (3.5)	1.42 (1.31–1.55)	−1.17
Loss of control	7.7 (2.1)	9.4 (2.2)	1.41 (1.26–1.58)	−0.78
Fatalism	8.2 (2.4)	9.0 (2.4)	1.11 (1.00–1.22)	−0.34
Social support				
Affective support	13.1 (2.2)	10.9 (3.2)	0.76 (0.70–0.83)	0.91
Confidant support	20.7 (3.8)	16.9 (5.1)	0.83 (0.78–0.88)	0.98

HADS, The Hospital Anxiety and Depression scale; S.D., standard deviation.
[a] Odds ratio adjusted for age, tumour stage, country of birth and education.
[b] Standardised mean difference (effect size) = mean group difference/pooled standard deviation (S.D.).

Table 6
Pearson's correlation coefficient* (R) matrix between HADS, MAC and social support scales

| | | HADS | | MAC | | | | | | Social support (affective support) |
		Anxiety	Depression	Positive orientation	Minimise the illness	Helplessness/ hopelessness	Angst	Loss of control	Fatalism	
HADS										
Depression	R	0.59								
	P	0.00								
MAC										
Positive orientation	R	−0.25	−0.34							
	P	0.00	0.00							
Minimise the illness	R	−0.01	−0.15	0.44						
	P	0.82	0.00	0.00						
Helplessness/hopelessness	R	0.52	0.58	−0.41	−0.20					
	P	0.00	0.00	0.00	0.00					
Angst	R	0.62	0.47	−0.20	−0.04	0.59				
	P	0.00	0.00	0.00	0.23	0.00				
Loss of control	R	0.40	0.34	−0.25	0.02	0.57	0.51			
	P	0.00	0.00	0.00	0.67	0.00	0.00			
Fatalism	R	0.09	0.08	0.01	0.25	0.23	0.15	0.39		
	P	0.01	0.03	0.84	0.00	0.00	0.00	0.00		
Social support										
Affective support	R	−0.25	−0.34	0.25	0.10	−0.31	−0.22	−0.19	−0.07	
	P	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.05	
Confidant support	R	−0.35	−0.42	0.19	0.03	−0.33	−0.23	−0.21	−0.08	0.70
	P	0.00	0.00	0.00	0.45	0.00	0.00	0.00	0.04	0.00

HADS, The Hospital Anxiety and Depression scale; MAC, Mental Adjustment to Cancer. *Pearson's correlation coefficient using anxiety and depression as continuous variables.

risk of a high depression score compared with those that were married or living as married (0.42 (0.15–1.17)).

Variables that were predictors of anxiety in the univariate analysis indicated above as well as age were included in a multivariate logistic model. Of these, younger age, lower education and not being born in Australia were independently and significantly associated with an increased risk of high anxiety whereas marital status was not. In a model of predictors of depression, age, education, marital status and country of birth were entered in a model and the only significant predictor of high depression was lower education.

3.2. Mental adjustment to cancer, perceived social support and risk of psychological morbidity

After adjustment for demographic variables (age, tumour stage, country of birth and education), several variables were associated with an increased risk of high anxiety (scores of 8 or higher); Helplessness/hopelessness (adjusted OR 1.41 (1.31–1.52)), Angst (OR 1.53 (1.43–1.64)), Loss of control (OR 1.43 (1.31–1.55)) and Fatalism (OR 1.13 (1.05–1.20)), whereas Positive orientation to the illness was associated with a lower anxiety (OR 0.91 (0.87–0.95)). Minimising the illness was not associated with anxiety. The two social support scales were associated with a reduced risk of high anxiety;

Affective support (OR 0.84 (0.78–0.89)) and Confidant support (OR 0.87 (0.84–0.91)). The standardised effect sizes are also reported (Table 4).

An increased risk of depression was associated with Helplessness (OR 1.56 (1.41–1.72)), Angst (OR 1.42 (1.31–1.54)) and Loss of control (OR 1.41 (1.26–1.58)). Fatalism was only marginally associated with a higher risk of depression (OR 1.11 (1.00–1.22)). Variables that were associated with a reduced risk of depression were Positive orientation to the illness (OR 0.80 (0.75–0.85)), Minimising the illness (OR 0.83 (0.750–0.92)), Affective support (OR 0.76 (0.70–0.83)) and Confidant support (OR 0.83 (0.78–0.88)). The standardised effect sizes are also reported (Table 5) and the correlation between each scale is reported in Table 6.

4. Discussion

The prevalence of 'probable' psychological morbidity due to anxiety in this age-stratified population-based sample of women with breast cancer is 23% and the prevalence of psychological morbidity due to depression is much less common at 3%. When the women identified as 'possible' cases are included in this estimate the respective proportions are 45 and 12%. These data suggest that a high prevalence of affective disorders is present in women with breast cancer, particularly anxiety. This is the first

report of norms of psychological morbidity in breast cancer obtained through a population cancer registry.

The prevalences of anxiety and depression are lower than a study published more than 25 years ago where patients with any cancer were sampled from hospital admissions and assessed by a formal psychiatric interview [19]. While findings for psychological morbidity in the present study are somewhat higher than that of overall psychiatric morbidity reported among the general Australian population (18%) [20], they are lower than a recent Australian hospital-based study of early stage breast cancer where a prevalence of 45% of current psychiatric disorder was reported [21].

In other studies of women with metastatic breast cancer, 19–39% report high anxiety [10,22,23] which is higher than several studies assessing anxiety proximal to treatments, follow-up or participating in clinical trials (6–14%) [1,24,25]. For depression, the prevalence we report is much lower than studies of metastatic disease (12–31%) [10,22] and similar to those found in studies with early stage breast cancer (0–5%) [1,24,25]. The items of the HADS depression scale have a narrow focus on anhedonia symptoms, also some studies have reported a low sensitivity of the scale [7], thus the scale may return a substantial underestimate of depression symptoms and therefore a low prevalence of probable cases of depression.

The differences between studies are likely to be a reflection of differing sampling strategies, the research settings and cultural differences. In the present study, young women with breast cancer were over-sampled, possibly leading to a higher overall mean anxiety for the sample. The prevalence of anxiety cases in the younger age groups is somewhat more than the older age groups (24% in those < 50 years compared with 19% in those ≥ 50 years).

Women with breast cancer were identified via the Victorian Cancer Registry and permission to contact the patient was sought from the patients' surgeons. A letter of invitation to participate in the study was then sent directly to the women. This sampling strategy minimised prestudy screening enabling the participation of most asymptomatic and symptomatic patients. In addition, an interview was scheduled at a time of convenience for the women and was conducted in their own homes. Even though severely anxious or depressed women may have been less likely to have participated, the research setting and the 'in the last week' timeframe of the HADS mean the prevalence estimates of the present study are likely to be a reasonably unbiased.

A high score on the HADS does not necessarily mean that the respondent has anxiety or depression as the instrument's specificity is somewhat variable. While the limitations of the HADS in deriving a clinical diagnosis are acknowledged [8], high scores (>10) on the scale indicate 'probable' morbidity and therefore identify those who may warrant referral for clinical evaluation.

Particular subgroups were found to be at an increased risk of anxiety or depression. In multiple logistic regression analyses, being younger, less educated and not being born in Australia were independently associated with an increased risk of anxiety. The most striking finding here was that women with little education (up to Year 8) were almost four times more likely to be highly anxious compared with those with the highest education (university/attempted university). No clear pattern was identified that predicted which women might be at a higher risk of depression. These analyses highlight the need for clinicians to be aware that this combination of demographics (i.e. young, poorly educated and born in another country) identifies a particularly vulnerable group

In a recent meta-analytic review of psychological distress in people with cancer, van't Spijker and colleagues concluded that other than some clinical factors (i.e. disease burden and time since diagnosis) the only demographic factor related to psychological distress was age and not education or marital status [26]. Our findings only agree with this conclusion with regard to marital status. We found little effect of age and found no association with stage of disease, but this may be due to the modest (although comparable with other studies discussed above) number of women in the oldest age groups and those with stage III and IV disease. Contrary to the van't Spiker review, we found a strong effect of education, which may be a reflection of the population-based sampling such that substantial numbers of women were recruited from across a range of socioeconomic category, independent of the private and public health care systems.

It is interesting to note that no association was found between the HADS scores and time since diagnosis. Given that this study was cross-sectional, only limited inferences about changes in anxiety and depression can be made, however, the prevalence was remarkably similar for those diagnosed less than 6 months earlier when compared with those diagnosed greater than 15 months earlier. Longitudinal studies have shown that mood disorders are highest around the time of surgery (approximately 40%), but then decline to 30% in the following 2–3 months and remain at this level until 12 months postsurgery [27,28]. Hopwood and colleagues administered the HADS to women with advanced breast cancer on two occasions 1–3 months apart soon after diagnosis and found that the overall prevalence of high scores was similar at each administration. However, approximately one-third of women remained persistently anxious or depressed [11]. This indicates that for many women, psychological morbidity is a persistent problem. Long term prospective research is required to determine risk factors for persistent psychological morbidity in women with breast cancer.

While age, previous education and country of birth are extrinsic factors, not amenable to interventions, coping styles and social support are. We identified several adjustment styles and social support that were associated with an increased risk of psychological morbidity. Two variables were associated with less anxiety; positive orientation to the illness and perceived social support. These scales indicated low to moderate standardised effect sizes (ES 0.4–0.6), and therefore may offer only a modest opportunity to impact on the level of psychological morbidity through interventions. Three negative adjustment styles were strongly associated with the risk of morbidity (i.e. ES $\geqslant 0.76$); helplessness, angst and loss of control. Angst was the most strongly associated (ES $= -1.2$) and is characterised by strong negative responses such as being very angry, suffering great anxiety and worry about the cancer returning. Risk of depression was strongly and negatively associated with positive orientation to the illness and the social support scales (ES > 0.9). Three adjustment styles were moderately to strongly associated with a high depression; helplessness, angst and loss of control. Given that this study is cross-sectional the direction, or even the existence, of a causal link cannot be inferred. Interventions targeted at increasing the quality of life of women with breast cancer could well be directed at both anxiety/depression as well as the adjustment styles we have identified. Our findings lend support to interventions that have been developed to reduce psychological morbidity in people with cancer [29].

In this population-based sample of women with breast cancer we have identified a high prevalence of anxiety and low prevalence of depression. Those who appear to be at the highest risk of morbidity are those who are less educated and those who were not born in Australia and thus represent a group that maybe particularly vulnerable. Harrison and Maguire suggest that such morbidity, if left untreated, may lead to a disabling and prolonged illness [30]. Psychological interventions which focus particularly on reducing helplessness, angst and increasing the positive orientation to the illness and social support, may provide the greatest opportunity to increase the psychosocial wellbeing of women with breast cancer.

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