

## ORIGINAL ARTICLE

# Psychosocial characteristics of chronic pain in cancer survivors referred to an Australian multidisciplinary pain clinic

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## Abstract

**Objective:** To describe the clinical and psychosocial characteristics of chronic pain in cancer survivors referred to one Australian hospital's ambulatory pain clinic over a 7-year period (2013-19), and to compare cancer treatment-related pain with comorbid non-malignant pain.

**Method:** Retrospective chart review including responses to standardized self-report questionnaires (Brief Pain Inventory, Depression Anxiety Stress Scale, Pain Self-Efficacy Questionnaire, Pain Catastrophizing Scale), routinely collected in all patients referred to pain clinics at Australian and New Zealand hospitals.

**Results:** Of 3510 new referrals during the study period, 267 (7.5%) had a history of cancer and 176 (5.0%) met the study's eligibility criteria. Their average age was  $63 \pm 13$  years, with 55% female. Breast cancer survivors were commonest, followed by hematological, prostate, melanoma, and colorectal, a median of 3 years post-diagnosis. Pain was attributed to cancer treatment in 87 (49%), surgery being the commonest modality. Multimodal treatment ( $n = 89$ , 58%) was significantly commoner in the treatment-related pain group ( $p < 0.001$ ). Average pain severity was moderate, as was pain-related disability and distress. Pain cognitions were often maladaptive (low pain self-efficacy, high pain catastrophizing), predicted by pre-existing anxiety and depression. Associations between pain cognitions and outcomes were medium-to-large. Differences between treatment pain and comorbid pain were small-to-medium. Their scores were similar to Australian pain clinic norms.

**Conclusion:** Cancer treatment causes tissue damage, but pain-related distress and disability in survivors is associated with maladaptive pain cognitions. Survivors with poor pain outcomes should be evaluated for unhelpful thoughts and beliefs especially when they have pre-existing depression or anxiety.

## KEYWORDS

cancer, chronic pain, depression, disability, psycho-oncology, psychological adaptation, survivors

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## 1 | INTRODUCTION

Chronic pain is highly prevalent in cancer survivors.<sup>1</sup> It may result from cancer treatment,<sup>2</sup> or be related to a pre-existing painful comorbidity.<sup>3</sup> In the past, when the prognosis of cancer was often poor, pain management focused on providing relief with opioids, irrespective of the underlying cause.<sup>4</sup> Nowadays, the outlook after a cancer diagnosis is much better. Consequently, chronic opioid therapy in cancer survivors is causing the same concerns as it does in chronic non-cancer pain: limited long-term efficacy but ongoing risks of side effects, tolerance, addiction, and overdose.<sup>5,6</sup> These concerns have led to the release of guidelines aiming to change opioid prescribing practices in chronic pain,<sup>7</sup> including for pain in survivors.<sup>8</sup>

A biopsychosocial approach is now recommended for the assessment and treatment of chronic pain.<sup>9</sup> Thoughts and beliefs about pain are associated with physical and emotional outcomes: low self-efficacy to function despite pain is associated with pain-related disability while high pain catastrophizing is associated with pain-related depression.<sup>10</sup> A small number of older studies have found similar associations in cancer pain,<sup>11</sup> and any differences in coping between the two types of pain were small.<sup>12</sup> More recent studies are lacking.

We previously analyzed data on pain intensity, pain outcomes and pain cognitions in a national sample of patients with cancer pain referred to hospital-based multidisciplinary pain clinics in Australia and New Zealand. These data are collected routinely at the time of referral for an initiative known as the electronic Persistent Pain Outcomes Collaboration (ePPOC).<sup>13</sup> Our analysis again found that pain-related distress and disability were common in these patients with cancer pain, in association with low pain self-efficacy and high pain catastrophizing scores. An acknowledged limitation of the analysis was the paucity of clinical information collected by ePPOC. Furthermore, there was no way of linking ePPOC with patients' medical records for data on diagnoses, pain etiology, comorbidities, or cancer treatment.

Therefore, the aim of this study is to identify all patients with a history of cancer who were seen at one of the largest participating ePPOC sites so that their medical record could be accessed and linked to their ePPOC data. The objectives of doing so were to:

- i. determine the number of cancer survivors – defined here as people who have completed primary treatment for cancer – seen in the clinic during the first 7 years of the ePPOC initiative
- ii. determine the proportion of survivors whose chronic pain was attributed to cancer treatment versus a comorbid painful condition
- iii. describe and compare the psychosocial characteristics of cancer-treatment related pain versus comorbid chronic non-cancer pain in survivors, and versus published national normative data,<sup>14,15</sup> and
- iv. identify predictors of unhelpful thoughts and beliefs about pain in survivors.

## 2 | METHODS

### 2.1 | Study design and ethical approval

Retrospective chart review, approved by the Human Research Ethics Committee, Northern Sydney Local Health District, reference number 2019/STE10013. Participants provided written informed consent for their clinical information to be used for research purposes.

### 2.2 | Participants

Eligible participants were identified by a multistep process (see Figure 1).

*Step 1* We searched the ePPOC database (known as epiCentre) for all patients referred to the pain clinic at Royal North Shore Hospital in Sydney, Australia from the launch of ePPOC in 2013 until 30 June 2019, and who had completed the pre-assessment questionnaires ( $n = 3510$ ).

*Step 2* From this cohort, there were 267 (7.6%) individuals who self-reported having cancer, attributed their pain to cancer, or who had been coded in ePPOC as a “cancer pain” episode of care.

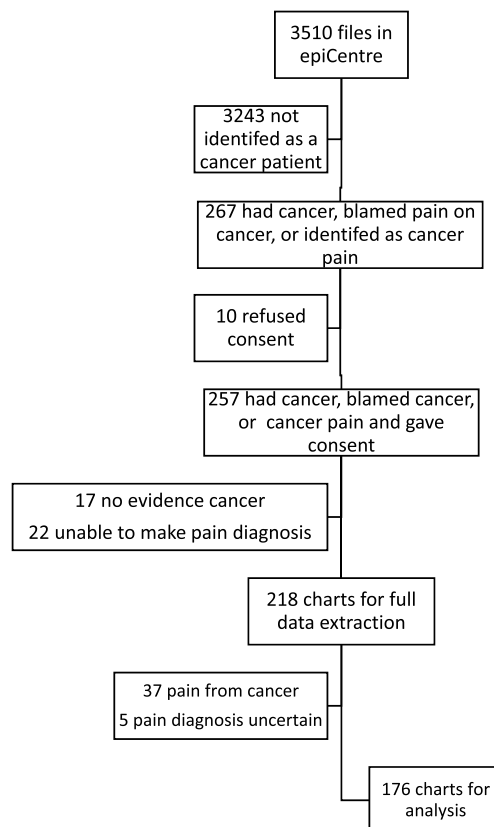


FIGURE 1 Study schema

**Step 3** The medical records of the 267 patients were accessed (paper charts prior to 2016, and Powerchart electronic medical record for 2016–2019). Patients were excluded if they had opted out in writing from allowing their information to be used for research ( $n = 10$ ).

**Step 4** The remaining 257 medical records were searched for documentation of a cancer diagnosis and sufficient clinical information to make a chronic pain diagnosis. The ICD-11 chronic pain terminology was used for coding.<sup>16</sup> Thirty-nine patients were excluded at this step, due to a lack of documentation of cancer ( $n = 17$ ) or insufficient information for pain diagnosis ( $n = 22$ ), leaving 218 charts to review.

**Step 5** A further 42 were excluded due to disease-related cancer pain ( $n = 37$ ) or the pain diagnosis was indeterminate ( $n = 5$ ).

Consequently, 176 charts were available for data extraction.

### 3 | STUDY MEASURES

#### 3.1 | Demographic and clinic data

These included: age, sex, ethnicity and place of birth; cancer diagnosis, years since diagnosis; cancer treatment modalities; physical and mental comorbidities; patient attribution of pain causality; pain duration; pain medications, total daily dose (TDD) of opioid in mg of oral morphine equivalents (OME).

#### 3.2 | Pain diagnosis

The first author (Australian equivalent of Board certified in Pain Medicine) made the pain diagnoses. These were then grouped into cancer treatment-related chronic pain, chronic non-cancer pain from an unrelated comorbidity, or mixed etiologies.

#### 3.3 | Patient self-report responses to the ePPOC questionnaires

**Brief Pain Inventory - Short Form (BPI-SF):** assesses pain intensity and interference with activity and enjoyment of life in the past week. Clinically relevant cut-points for patients with cancer are 0–4 for mild, five to six for moderate and 7–10 for severe.<sup>17</sup>

**Depression Anxiety Stress Scale (DASS) - short form.** 21-item questionnaire assesses severity of depression, anxiety, and stress symptoms over the past week. For each subscale, scores are classified either as normal (0–9 for depression, 0–7 for anxiety, 0–14 for stress), mild (10–13 for depression, 8–9 for anxiety, 15–18 for stress), moderate (14–20 for depression, 10–14 for anxiety, 19–25 for stress), severe (21–27 for depression, 15–19 for anxiety, 26–33 for stress) or extremely severe ( $\geq 28$  for depression,  $\geq 20$  for anxiety,  $\geq 34$  for stress).<sup>18</sup>

**Pain Self-Efficacy Questionnaire (PSEQ):** 10-item questionnaire assesses how strongly the respondent believes he or she can perform

a range of activities despite being in pain. Each item scores 0–6, lower scores indicating less confidence to perform the specified activities. In this study, pain self-efficacy was categorized as 0–19 for severe, 20–30 for moderate, 31–40 for mild,  $\geq 41$  for minimal.<sup>19</sup>

**Pain Catastrophizing Scale (PCS):** 13-item questionnaire assesses thoughts reflecting helplessness, magnification and rumination in relation to pain. Items are scored 0–4, higher scores being worse. The cut-points used in this study were 0–19 for mild, 20–30 for high, 31–52 for severe.<sup>20</sup>

#### 3.4 | Other patient self-report questionnaires and items

In addition to the standard ePPOC questionnaires, in some years patients also completed other validated pain questionnaires to obtain a more complete understanding of their pain cognitions. These included:

**Injustice Experience Questionnaire (IEQ):** 12-item questionnaire assessing perceived injustice associated with an injury or wound. Items are scored 0–4, higher scores worse.<sup>21</sup> IEQ is mainly used in musculoskeletal pain (e.g., whiplash after motor vehicle accident) and does not appear to have been previously used in cancer patients.

**Modified Roland Morris Disability Questionnaire (mRMDQ):** 24-item questionnaire, with higher scores reflecting greater pain-related disability. Modified Roland Morris Disability Questionnaire has been shown to yield reliable measurements which are valid for inferring the level of disability, and sensitive to change over time for various pain types,<sup>22</sup> including in cancer patients.<sup>23</sup>

**Tampa Scale of Kinesiophobia Scale (TSK):** 17-item checklist for measuring fear of movement or (re)injury. It has been used in cancer survivors.<sup>24</sup>

**Distress “thermometer”:** single item self-report of distress during the past week using an 11-point numerical rating score from 0 (no distress) to 10 (extreme distress). Screening for cancer-related distress has been a standard of the American College of Surgeons Commission on Cancer since 2015.<sup>25</sup>

**Self-rated health:** The first item of SF36, it is valid, reliable, and responsive to change in oncology populations.<sup>26</sup>

#### 3.5 | Miscellaneous questions about pain beliefs

Lastly, patients of this clinic are also asked five other questions about their pain, including the percentage of pain needed to be relieved to be acceptable; the prognosis for their pain; whether they know anyone else with chronic pain; if they think a serious problem was being missed; and if they think stronger pain medications are required.

#### 3.6 | Data analysis and statistical methods

Patients who had both cancer treatment-related pain and a painful comorbidity concurrently were analyzed with the treatment-related

group. The variables of interest were, BPI scores for average pain intensity and mean of pain interference items, DASS scores for depression and anxiety, PSEQ score, total PCS score, and scores on Distress Thermometer, IEQ, mRMDQ and TSK.

We first compared the scores for each of the variables between those who had cancer treatment-related pain and those that did not, using an independent-samples *t*-test. These were compared to recent national normative values for BPI, DASS, PSEQ and PCS,<sup>14</sup> older local norms for mRMDQ and TSK,<sup>15</sup> and published values for IEQ.<sup>21</sup> To account for possible non-normality of distributions, we based interpretation on bias-corrected and accelerated confidence intervals estimated using bootstrapping with 1000 samples. We also calculated standardized mean differences using the pooled standard deviation across groups, and their confidence intervals.

Next, we examined Pearson product-moment correlation coefficients between the variables. Applying Cohen's definitions,<sup>27</sup> coefficients close to 0.2, 0.5, and 0.8 were interpreted as being small, medium, and large, respectively. The magnitudes of association of the distress and disability scores with pain cognitions scores were of most interest.

Finally, for the sub-sample with cancer treatment-related pain, we conducted multiple linear regression with bootstrapped confidence intervals (1000 replications) to examine possible predictors of pain self-efficacy and pain catastrophizing. We ran separate regression analyses for the two dependent variables, but both models included the same predictors: age, sex, previous mental health history (yes/no), pain duration (less than 3 months, 3–12 months, 1–2 years, 2–5 years, more than 5 years, although there were none with <3 months in the sub-sample.), opioid dose (<100 mg OME daily vs. ≥100 mg OME daily), and whether cancer treatment had been multimodal (surgery alone, surgery plus other treatment).

Unfortunately, the distress thermometer score and the self-rated health items were unable to be included in the regression analysis because of the large amount of missing data for each. Even the best method for retaining as much data as possible resulted in a sample that was too small. There was insufficient information to impute values, and pairwise deletion only made a small improvement.

## 4 | RESULTS

### 4.1 | Demographic and clinical characteristics

The demographic and clinical characteristics of all 176 patients are summarized in Table 1. Their average age was in the early 60s with more females than males. Furthermore, 90% were Caucasian and 70% born in Australia or New Zealand.

According to the medical records, the commonest cancer diagnosis by far was breast, accounting for 30% of all cases, followed by haematological, prostate, melanoma and colorectal. The average time since diagnosis was 7 years, although this was skewed by some very long-term survivors so that the median time since diagnosis was 3 years, interquartile range, 1.5–9.0 years (not shown in Table 1).

Surgery was the commonest treatment modality followed by chemotherapy, radiation therapy, and other modalities such as hormonal therapy, immunotherapy and transplantation. Treatment was multimodal in 96 (59%) cases.

The patients were sub-grouped according to their pain diagnoses. Cancer treatment-related pain syndromes were diagnosed in 58 (34%), unrelated chronic non-malignant pain syndromes in 88 (51%) and mixed pain syndromes in 26 (15%). In Table 1 and Table 2, the cancer treatment-related pain and mixed pain subgroups have been combined to allow comparison with survivors with unrelated pain only. Those in the treatment-related pain group were statistically significantly younger, closer to the time of cancer diagnosis, more likely to have had chemotherapy or multimodal cancer therapy, and shorter pain duration. Not surprisingly, medical comorbidities were commoner in those with unrelated pain.

Table 1 also shows respondents' self-reports of having cancer and comorbidities, pain duration and attribution, and opioid usage. Mental health comorbidities were commonly reported by both subgroups. Respondents with treatment-related pain were significantly more likely to attribute their pain to cancer. Unrelated pain was misattributed to cancer by 14 (16%), although in 5 it had been made worse by deconditioning associated with cancer and its treatment. More than half reported taking opioids, but the TDD was usually moderate, exceeding 100 mg OME daily in only 24% cases, with no significant differences between the two subgroups.

### 4.2 | Patient self-report responses to the questionnaires in ePPOC

Questionnaires were completed within the previous 8 weeks of the initial clinic visit by 75% respondents. The response rate was >95% for each questionnaire. The mean scores for the questionnaires across the whole sample and for the subgroups with treatment related pain or only unrelated pain are shown in Table 2. These results indicate that overall, cancer survivors referred to this pain clinic had pain of moderate intensity (BPI intensity score mean  $5.46 \pm$  standard deviation 1.83) which moderately interfered with living (BPI interference score  $5.68 \pm 2.44$ ) and they had moderate psychological distress (DASS depression score  $14.78 \pm 13.13$ , and DASS anxiety score  $10.06 \pm 9.13$ ). Pain self-efficacy and pain catastrophizing scores were in the moderately abnormal range (PSEQ  $29.95 \pm 15.65$ , PCS  $22.86 \pm 13.71$ ). Almost two in three respondents (112/170, 66%) had little or no confidence to cope with pain without taking medications (score 0–1 on PSEQ Item 7). The scores were all somewhat lower than the pain clinic norms (with pain self-efficacy somewhat higher).

The results of the comparisons between survivors with cancer treatment-related pain versus unrelated chronic non-malignant pain are also shown in Table 2. The mean scores were all lower in the treatment-related pain group (again, pain self-efficacy higher) but the standardised mean differences were small to moderate, the majority falling in the 0.2–0.5 range.

**TABLE 1** Demographic and clinical data on the participants combined and according to the two diagnostic subgroups (treatment related pain with or without comorbid chronic pain, vs. comorbid chronic pain only)

Dependent variables	All cases (n)	Value	Treatment related component (n = 87)	Comorbid unrelated only (n = 89)	p, treatment related versus unrelated
<b>Demographics</b>					
Average age, years ± SD	176	62.6 ± 12.9	<b>58.9 ± 11.6</b>	66.2 ± 13.2	<0.01
Males (n, %)	176	78 (45%)	39 (46%)	39 (44%)	0.88
<b>Clinical data from medical record</b>					
Coded as cancer pain	175	76 (43%)	<b>53 (61%)</b>	23 (26%)	<0.01
<b>Cancer, primary site</b>					
Breast	176	53 (30%)	25 (29%)	28 (31%)	0.70
Colorectal	176	10 (6%)	7 (8%)	3 (3%)	0.21
Hematologic	176	34 (19%)	17 (20%)	17 (19%)	1.00
Melanoma	176	17 (10%)	8 (9%)	9 (10%)	1.00
Prostate	176	20 (11%)	5 (6%)	<b>15 (17%)</b>	<0.01
Other sites	176	47 (27%)	22 (25%)	25 (28%)	0.74
Average time since cancer diagnosis, in years ± SD	167	7.0 ± 7.0	<b>5.7 ± 6.0</b>	8.3 ± 7.6	<0.02
<b>Cancer treatment modalities</b>					
surgery	170	127 (75%)	67 (75%)	60 (72%)	0.49
chemotherapy	170	65 (39%)	<b>43 (49%)</b>	22 (27%)	<0.01
radiotherapy	170	64 (38%)	37 (43%)	27 (33%)	0.21
other modalities	170	32 (19%)	<b>22 (25%)</b>	10 (6%)	<b>0.03</b>
multi-modality	170	89 (58%)	<b>57 (66%)</b>	32 (39%)	<0.01
Painful comorbidities	164	122 (74%)	39 (46%)	<b>82 (96%)</b>	<0.01
<b>Data from patient self-reports</b>					
<b>Pain duration</b>					
< 1 year	171	47 (27%)	<b>33 (40%)</b>	14 (16%)	<0.01
1–5 years	171	33 (38%)	33 (41%)	31 (35%)	0.64
> 5 years	171	60 (55%)	17 (20%)	<b>43 (49%)</b>	<0.01
Has cancer	174	118 (68%)	54 (63%)	64 (73%)	0.11
Pain attributed to cancer	175	116 (66%)	<b>52 (60%)</b>	14 (16%)	<0.01
Has mental health diagnosis	161	58 (36%)	24 (30%)	34 (42%)	0.14
Is taking prescribed opioids <sup>a</sup>	173	99 (57%)	50 (55%)	49 (56%)	0.65
Average TDD in OME, mg ± SD	93 <sup>b</sup>	69.4 ± 84.6	66.9 ± 86.0	72.0 ± 84.0	0.77
TDD >100 OME	93 <sup>b</sup>	23 (25%)	11 (13%)	12 (14%)	1.00

Abbreviations: mg, milligrams; OME, oral morphine equivalents; SD, standard deviation; TDD, total daily dose.

<sup>a</sup>77 (45%) taking strong opioids (morphine, oxycodone, hydromorphone, fentanyl) and 22 (13%) taking only weak opioids (tramadol, tapentadol, buprenorphine, codeine).

<sup>b</sup>TDD too variable to quantify in 6 of 99.

### 4.3 | Other thoughts and beliefs about pain

Compared to normative values, survivors completing the additional questionnaires had significantly higher injustice scores ( $p = 0.009$ ), similar disability scores ( $p = 0.744$ ) and significantly lower

kinesiophobia scores ( $p = 0.002$ ), see Table 2. Those with treatment-related pain felt less injustice than those with unrelated pain ( $p = 0.054$ ), but there was no significant difference in disability or kinesiophobia scores. As a whole, survivors were pessimistic about their pain, 68% (96/141) expecting it to persist or get worse. Most (90/

**TABLE 2** Results of bootstrapped independent-samples *t*-tests examining differences in psychosocial outcomes between individuals with cancer-treatment-related pain and pain unrelated to cancer

Dependent variable	All cases			Treatment-related pain			Unrelated pain			Differences			Norm-active values	
	mean	SD	n	mean	SD	n	mean	SD	N	MD	95% CI	SMD		95% CI
Average pain	5.76	2.01	172	5.43	2.01	85	6.02	1.97	88	0.58	-0.01, 1.19	0.29	-0.01, 0.60	n/a
BPI intensity	5.77	1.95	171	5.46	1.83	84	6.01	2.04	87	0.52	-0.03, 1.06	0.27	-0.04, 0.58	6.4
BPI interference	6.16	2.30	171	5.68	2.44	84	6.61	2.06	87	0.92	0.23, 1.59 <sup>a</sup>	0.41	0.10, 0.72	7.0
DASS depression	16.01	12.57	173	14.78	13.13	86	17.22	11.94	87	2.43	-1.13, 6.17	0.19	-0.11, 0.50	20.2
DASS anxiety	10.96	9.85	172	10.06	9.13	85	11.85	10.49	87	1.79	-1.20, 4.56	0.18	-0.12, 0.49	14.1
PSEQ	27.32	14.34	170	29.95	15.65	84	24.74	12.49	86	-5.21	-9.27, -0.53 <sup>a</sup>	-0.37	-0.68, -0.06	20.7
PCS	24.49	5.06	170	22.86	13.71	85	26.13	13.83	85	3.27	-0.89, 7.47	0.24	-0.07, 0.54	29.8
Distress	6.33	2.50	116	5.68	2.56	55	6.96	2.30	60	1.29	0.38, 2.17 <sup>a</sup>	0.53	0.16, 0.90	n/a
IEQ	20.82	14.11	113	18.33	13.11	57	23.41	14.75	56	5.08	-0.33, 9.95	0.36	-0.01, 0.74	n/a
DQ	14.11	6.20	119	9.76	5.70	58	12.97	6.30	61	3.20	1.05, 5.40 <sup>a</sup>	0.53	0.16, 0.90	12.3
TSK	38.23	10.20	108	37.92	10.16	52	38.52	10.32	56	0.59	-3.56, 4.10	0.06	-0.32, 0.44	41.2

Note: Normative values for BPI, DASS, PSEQ and PCS are from published national data.<sup>14</sup> Normative values for DQ and TSK are from unpublished local data.

Abbreviations: BPI= Brief Pain Inventory; CI = confidence intervals; DASS = Depression Anxiety Stress score; DQ = modified Roland Morris Disability Questionnaire; IEQ=Injustice Experiences Questionnaire; MD = mean difference; n = number; n/a = not available; PCS= Pain Catastrophizing Scale; PSEQ= Pain Self-Efficacy Questionnaire; SMD = standardised mean difference; TSK: Tampa scale of kinesiophobia.

<sup>a</sup>statistically significant result.

102, 89%) needed greater than 50% reduction in pain to be able to function. A quarter (22/88, 25%) worried that "something serious" was being missed. Consistent with the low self-efficacy to cope without analgesics, more than 20% wanted stronger pain medicines.

#### 4.4 | Correlations between pain outcomes and pain cognitions

The magnitudes of association between pain outcomes (depression, pain interference, pain disability) and unhelpful pain cognitions (low self-efficacy, catastrophizing) were mostly medium-to-large, with correlation coefficients in the 0.5–0.8 range (see Supplementary Data). Depressive symptoms and disability scores were also seen to have medium-sized (approximately 0.5) correlations with other unhelpful thoughts and beliefs, such as injustice and kinesiophobia.

#### 4.5 | Predictors of low pain self-efficacy and high pain catastrophizing

The results of the multiple linear regression analyses, shown in Table 3, found that the four predictors tested (age, sex, pain duration and previous diagnosis of a mental illness) accounted for a non-significant proportion of variance in the PSEQ total score,  $R^2 = 21.7%$ ,  $F(7, 49) = 1.95$ ,  $p = 0.082$ . The only significant predictor was self-

report of a previous mental health disorder, predicting to score 10.7 points lower on the PSEQ. Similarly for PCS, only self-reported mental health disorders accounted for a significant proportion of variance in the score and predicting to score 8.8 points higher on the PCS, and the overall model was significant,  $R^2 = 24.4%$ ,  $F(7, 49) = 2.26$ ,  $p = 0.045$ .

## 5 | DISCUSSION

Cancer survivors made up 7.5% of referrals to this pain clinic. The median time since diagnosis was 3 years, but some had been many years earlier. Their pain was somewhat less in terms of severity, outcomes, and associated cognitions when compared to that of other clinic patients, based on normative data.<sup>14</sup> Those with chronic pain attributed to cancer treatment were significantly younger, closer to time of cancer diagnosis, had a shorter pain duration, and were more likely to have had chemotherapy and multimodality cancer treatment. However, despite the increased risk of tissue damage from multimodal treatment, the patients with treatment-related pain had less intense pain and better pain outcomes than survivors with painful comorbidities although the differences were small to moderate. Those with pain comorbidities had scores closer to the normative values for other pain clinic patients.<sup>14</sup>

The questionnaire scores revealed that survivors harbored unhelpful thoughts and beliefs about their pain, scoring moderately low

**TABLE 3** Estimates from the multiple linear regression of Pain Self-Efficacy Questionnaire (PSEQ) (left panel) and Pain Catastrophizing Scale (PCS) (right panel) on sex, age, history of mental health and psychological distress

Dependent variables	PSEQ			PCS		
	B	BCa 95% confidence interval		B	BCa 95% confidence interval	
Predictors	B	Lower bound	Upper bound	B	Lower bound	Upper bound
Constant	25.63	3.18	46.63	31.44	17.25	48.19
Age	0.14	-0.26	0.54	-0.26	-0.54	0.01
Sex	0.49	-8.37	10.28	2.63	-5.72	11.16
Pain duration, 3–12 months versus 1–2 years	5.68	-6.88	17.10	-0.69	-11.73	8.78
2–5 years	-6.67	-17.85	3.90	9.62	-1.12	20.28
more than 5 years	9.03	-1.01	18.47	1.81	-9.53	12.20
Self-reported mental health diagnosis	-10.74	-18.99	-1.56*	8.80	1.17	16.43*
Multimodal treatment	-5.28	-15.02	4.64	2.05	-6.79	10.55

Abbreviations: B, unstandardized regression coefficient; BCa, bias corrected and accelerated 95% confidence intervals.

on pain self-efficacy and moderately high on pain catastrophizing. Feelings of injustice, fear of movement, fear of undiagnosed recurrence, and pessimism about pain resolving were also commonly reported. A history of anxiety or depression predicted low pain self-efficacy and high pain catastrophizing.

Slightly more than half of the survivors reported taking prescription opioids, with almost one-quarter consuming high doses (>100 mg OME daily) irrespective of whether pain was attributed to cancer treatment or not. Many lacked confidence to manage their pain without analgesic medications, indicating a passive approach to managing their chronic pain. Consistent with the low self-efficacy to cope without analgesics, many wanted stronger pain medicine.

## 5.1 | Clinical implications

These findings are consistent with previous literature that pain coping is largely independent of etiology, with similar levels of pain catastrophizing seen in people with chronic pain with and without a history of cancer referred to a tertiary level pain clinic.<sup>12</sup> The results illustrate the importance of screening for psychological distress and maladaptive pain cognitions in cancer survivors reporting high impact pain, especially when they have a history of mental illness. Currently, screening for distress beyond the initial cancer treatment is not required by the Commission on Cancer (Standard 5.2) but may be undertaken at the discretion of the cancer program or health care provider. Psychological support and psychiatric services may be offered as part of survivorship programs (Standard 4.8), but screening for distress during survivorship is not currently required. As per guidelines promulgated by the American Society for Clinical Oncology, cancer survivors may benefit from psychological therapies,<sup>8</sup> especially if they have unhelpful thoughts and beliefs about their pain. Learning more adaptive ways to cope with persistent pain can result in less pain-related disability and distress.<sup>28–30</sup>

## 5.2 | Study limitations

The findings and the generalizability of the study are limited by the data being collected from one Australian site. Although 7 years' worth of cases were reviewed, the sample size was small due to the low referral rate of cancer patients to chronic pain clinics in Australia.<sup>13</sup> As a result, some of the trends identified here may become significant with a larger sample. A prospective, multisite international survey using these standardized questionnaires is needed. Our methodology for identifying cancer survivors in the clinic may have missed some cases. Approximately one-quarter did not identify themselves as cancer survivors on the ePPOC questionnaire, typically attributing their pain to 'surgery' and excluding cancer from their problem list because they were currently free of disease. To overcome this limitation, linkage of the ePPOC dataset with the state cancer registry would be needed, but there is currently no data-sharing agreement in place to allow this. We were unable to include data from the distress thermometer in our predictive model. This is an important limitation because of the integral role of the thermometer for screening in psycho-oncology.<sup>31</sup> While the scores on the standard ePPOC questionnaires were similar between groups, there could be other psychosocial factors affecting cancer survivors' thoughts and beliefs about pain that are confounders for the associations described here but were not evaluated. These include for example, cancer related PTSD,<sup>32</sup> fear of recurrence,<sup>33</sup> late treatment effects such as fatigue and 'chemobrain',<sup>2</sup> public perceptions about the severity of cancer pain,<sup>34</sup> and the enduring emphasis on pain relief via pharmacotherapy in cancer,<sup>35</sup> rather than adapting to pain.

## 6 | CONCLUSION

Cancer survivors were more likely to attend this hospital-based pain clinic for chronic non-malignant pain than chronic pain following cancer treatment. Those with treatment-related pain often held the

same unhelpful thoughts and beliefs as other people living with chronic pain. Survivors with moderate-severe pain should be screened for maladaptive pain cognitions and referred to appropriate professionals when they are detected.

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## CONFLICT OF INTEREST

The authors declare that they have no conflicts of interest.

## DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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#### SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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