Chapter 4
FURTHER EXLORATION OF THE INFLUENCE OF PSYCHOLOGICAL VARIABLES ON ADJUSTMENT

This chapter reported a third empirical study involving patients with advanced cancer who were experiencing pain. The main aim was to explore the relationships between breakthrough pain characteristics (intensity, frequency and duration) two psychological factors (meaning of pain and perceived effectiveness of pain management strategies), and one aspect of adjustment (level of coping) in a way that addressed some of the limitations of the previous study. Study 2 found relationships between pain characteristics, meaning ascribed to pain, perceived effectiveness of pain management strategies and adjustment. However, the insufficient sample size and restricted range of scores across most variables made it impossible to draw strong conclusions, or to determine whether variables contributed independent variance.

Three enhancements were planned in the current study: the measures were improved, a second aspect of adjustment was introduced - symptoms of depression, and steps were taken to secure an increase in sample size.

Adjustment in the Context of Pain

The present study focuses on the influence of two psychological factors (meaning of pain and perceived effectiveness of pain management strategies) on adjustment. Two aspects of adjustment were explored in the present study, level of coping and symptoms of depression.

Level of Coping

As in Studies 1 and 2, coping was conceptualised as the patient's perception of their overall ability to adapt to pain using whatever cognitive, behavioural, emotional and/or social strategies they employ, consciously or unconsciously. The present study used the same wording for the single-item measure of level of coping as for Study 2. However, the number of response alternatives was expanded to nine, in order to attempt to increase discrimination between patients and to improve the distribution of scores. In addition, the verbal analogue scale was replaced with an analogue scale that provided both verbal and numerical anchors. Although verbal analogue scales are widely used in palliative contexts, and are often considered to be more suitable than visual analogue or numerical scales for use with elderly people and clinical populations (Briggs & Closs, 1999), this format proved difficult to use. The patients who participated in Study 2 had been socialised to use numerical rather than verbal scales by Australian health professionals. Since previous research has shown that verbal rating, numerical rating and visual analogue scales are all suitable for use among patients with acute and chronic pain (Cook et al., 2004; Holgate et al., 2003), an analogue scale with verbal and numerical anchors was adopted in this study.

Symptoms of Depression

Study 3 also includes a second aspect of adjustment, symptoms of depression. Depression is frequently reported to be prevalent and distressing for patients with chronic pain (e.g., Finset et al., 2005; Fischer et al., 2010). In addition, relationships have been found between depression and pain characteristics (including

breakthrough pain) (Cleeland, 1984; Koopman, Hermanson, Diamond, Angell & Spiegel, 1998; Portenoy, Payne & Jacobsen, 1999; Rustoen et al., 2005; Spiegal et al., 2006) and depression and meaning of pain (Barkwell, 1991), among heterogenous cancer patients. These patients also reported poorer coping (e.g., Parle, Jones & Maguire, 1996; Turk et al., 1998). Thus, a significant negative relationship between level of coping and symptoms of depression will improve the face validity of the single-item measure of coping with pain.

However, as discussed in the introductory chapter, measurement of depression in this population is challenging (Endicott, 1984). Existing tools for assessment of depression are lengthy and/or contain items that are not relevant to people at the end-of-life. To overcome these problems, "symptoms of depression" was assessed using a two-item screening tool which assessed the key symptoms of depression, depressed affect and anhedonia. In previous research, these questions were found to correctly identify clinically depressed patients receiving palliative care with a high degree of accuracy (Chochinov et al., 1997). Although this screening tool has not always been able to successfully identify patients with depression in subsequent studies (Lloyd-Williams, Taylor & Baker, 2003; Robinson & Crawford, 2005), it was adopted as it was the only available tool validated by palliative care populations, that imposed low burden on patients.

Factors That Influence Adjustment

The range of factors that have been found to influence a person's ability to adapt and adjust to cancer pain have been discussed in earlier chapters. Consistent with Study 2, the present study focuses on the relationships between adjustment breakthrough

pain characteristics and two psychological factors: meaning of pain and perceived effectiveness of pain management strategies.

Breakthrough Pain

Like Study 2, the present study focuses on breakthrough pain, which is particularly distressing because it is unpredictable. In past research, patients have reported on average, four breakthrough pains per day that last on average 35 minutes (Fine et al., 2008; Portenoy et al., 1999; Zeppetella, O'Doherty & Collins, 2000; Zeppetella, 2008, in press). However, in Study 2 most breakthrough pains were infrequent and short, even though they were of moderate to excruciating intensity. Therefore, Study 3 explores whether these characteristics of breakthrough pain are unique to the sample in Study 2.

Despite the characteristics of the breakthrough pain and the high level of coping reported, relationships between some pain characteristics and adjustment were detected in Study 2. Specifically, breakthrough pain frequency was associated with lower level of coping. There was also a trend suggesting a relationship between higher pain intensity and lower levels of coping. Therefore Study 3 further explores these relationships using a measure of coping accommodating more response alternatives in an attempt to make greater differentiation between patients.

Psychological Factors

A range of psychological factors that may exacerbate or have a protective influence on adjustment was discussed in earlier chapters. The present study continues the focus on two of these, meaning of pain and perceived effectiveness of pain management strategies.

Meaning of Pain in Cancer

Study 3 continues the focus on patients' understanding of, or the sense they make of, their experience of pain. Study 2 extended past research by exploring the relationship between adjustment, pain characteristics, and meaning of pain using a measure of meaning of pain derived from the Barkwell (1991) study. However, very few of the eight meaning categories were endorsed by the sample and the pattern of findings were not consistent with previous research (Barkwell, 1991; Lipowski, 1970). In addition, half of the patients in the present study endorsed multiple meanings of pain. The Barkwell study was conducted in Canada and the Lipowski study in the USA. These populations have historical, demographic and cultural patterns specific to these countries which may influence meaning ascribed to pain by patients from these countries. Hence, it was concluded that the brief custom-designed measure had not adequately captured meaning of pain in this Australian sample. Therefore, the present study substituted an abridged version of the *Perceived Meanings of Cancer Pain Inventory* (PMCPI) (Chen 1995). This is a quantitative instrument based upon a Cognitive Theory of emotions (Lazarus & Folkman, 1984). It comprised 27 items which assess seven meaning categories. These represent three primary appraisal outcomes (loss, threat, challenge), two secondary appraisal outcomes, self blame and blame of others, and one meaning, spiritual awareness, which was derived from qualitative interviews. The PMCPI was validated in a sample of Taiwanese cancer patients who were a various stages in the trajectory of illness, including patients with advanced disease, and of which 43.5% of the participants were Buddhist and 13 % were Christian. The scale has not been used in an Australian sample of patients, or in a sample consisting exclusively, of patients with advanced disease. In addition, the relationship between the meanings assessed on this scale and patients' adjustment

has not explored. The present study examined the relationships between the meanings of pain (assessed using the PMCPI) and adjustment among an Australian sample of patients.

Perceived Effectiveness of Pain Management Strategies

Study 3 also includes a second psychological factor, the patients' perception of the effectiveness of their range of pain management strategies. In Study 2, higher perception of effective pain management was associated with a higher level of coping. However, most patients in Study 2 reported that their pain management strategies were effective. The present study replicates Study 2 using a measure of perceived effectiveness of pain management strategies with more response alternatives in an attempt to better differentiate between patients.

Potential Moderators of the Relationship between Pain and Adjustment

Study two aimed to determine whether meaning of pain and perceived effectiveness of pain management strategies moderated the relationship between breakthrough pain characteristics and adjustment, in addition to having a main effect on adjustment. However the sample size was too small to allow the analysis relevant to moderation to be conducted. Moreover, although main effects were found for both variables, it is unclear whether these are artifacts of the relationship between pain characteristics and meaning of pain and perceived effectiveness of pain management strategies. Study 3, therefore, aims to recruit a larger sample in order to allow the potential moderation of the relationships between breakthrough pain characteristics and adjustment by these two psychological factors to be examined.

Summary

This study provides a parallel for Study 2 by examining the relationships between characteristics of breakthrough pain (frequency, duration and intensity), two psychological factors (meaning of pain and perceived effectiveness of pain management strategies), and two aspects of adjustment (level of coping, symptoms of depression), using improved measures. The model under examination is summarised in Figure 4.1.

Research Hypotheses

The main purpose of the present study was to test a number of hypotheses relating to adjustment and breakthrough pain characteristics and meaning of pain, and to conduct planned exploratory analyses concerning the relationships between adjustment and perceived effectiveness of pain management strategies. The present study also aimed to document the prevalence and characteristics of breakthrough pain experienced by Australian cancer patients receiving community-based palliative care.

1. More extreme breakthrough pain (frequency, duration and intensity) will be associated with lower self-reported levels of coping.
2. More extreme breakthrough pain (frequency, duration and intensity) will be associated with more symptoms of depression.
3. One non-aversive meaning of pain (challenge) will be associated with higher self-reported levels of coping with pain, while two aversive meanings of pain (threat and punishment) will be associated with lower levels of self-reported coping with pain.

4. One non-aversive meaning of pain (challenge) will be associated with fewer symptoms of depression, while two aversive meanings of pain (threat and punishment) will be associated with more symptoms of depression.

Planned Exploratory Analyses

Additional planned exploratory analyses were designed to answer the following research questions, for which there was insufficient prior research to support hypotheses.

1. Are other meanings of pain associated with:
   (a) self-reported level of coping?
   (b) symptoms of depression?
2. Is perceived effectiveness of pain management strategies associated with:
   (a) self-reported level of coping?
   (b) fewer symptoms of depression?
3. Is the relationship between breakthrough pain (frequency, intensity and duration) and self-reported level of coping moderated by
   (a) meaning of pain?
   (b) perceived effectiveness of pain management strategies?
4. Is the relationship between breakthrough pain (frequency, intensity and duration) and symptoms of depression moderated by
   (a) meaning of pain?
   (b) perceived effectiveness of pain management strategies?

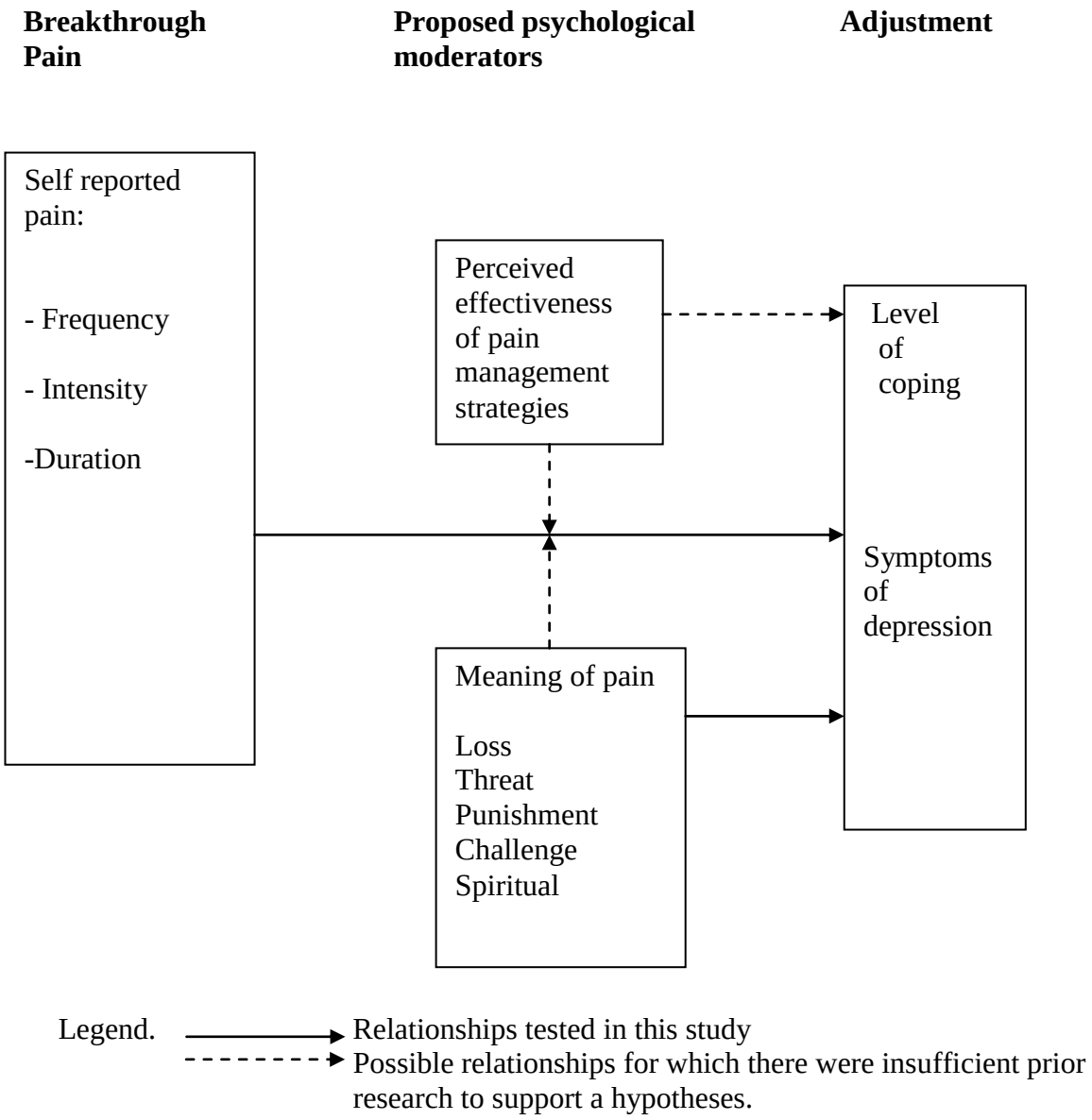

Figure 4.1. The relationship between pain characteristics, perceived pain management effectiveness, meaning of pain and adjustment.

METHOD

Participants

This chapter reports the quantitative component of the analyses. The details concerning the qualitative component are reported in Chapters 5 and 6. All patients were adults with advanced cancer who were receiving community-based palliative care. There were six selection criteria to be met for inclusion in the study. Patients needed to be at least 18 years of age, to have been diagnosed with incurable cancer, to have experienced at least one breakthrough pain during the past week, to speak fluent English, to have been judged by clinical staff as capable of completing an interview lasting 30 minutes and to have the cognitive capacity to provide informed consent. Clinical staff referred patients who consented to being contacted by researchers to the study. These patients were then contacted by the researcher to discuss the research and to determine whether those patients who agreed to participate met the inclusion criteria.

I planned to recruit at least 230 participants for the study to provide sufficient power (.08) and a medium effect size (f^2 =.15) for the planned analyses. Lyell McEwin Palliative Care Service in Adelaide South Australia was chosen as the recruitment site for three reasons. First, this service had a sufficiently large intake of patients to allow the target sample to be reached. Second, there was no other study recruiting during the same period. Third, clinicians indicated that pain management, including management of breakthrough pain, was a significant challenge to the service. Based upon the large number of patients who were referred to this service each year, referral of approximately 120 patients per year was anticipated. However, although

recruitment was conducted for two years, and despite regular contact with the service, only 40 patients were referred within the timeframe for the study. Attrition was high and only 18 were able to complete the study (Figure 4.2). There are two possible explanations for this unexpectedly low level of recruitment. First, clinicians may have not have referred potentially eligible patients because they did not want to burden their patients with research, or they forgot to refer because of the conflicting pressures involved in providing a clinical service. Second, the prevalence of breakthrough pain may not have been as high as indicated by previous research conducted in other countries (Bhatnagar et al., 2010; Bruera, 1997; Fine, 2008; Portenoy & Hagen, 1990; Zeppetella, 2000). Again, modifications needed to be made to the planned analysis. It was originally intended that the relationship between the predictors (intensity, frequency and duration of breakthrough pain, meaning of pain and perceived effectiveness of pain management strategies) and the outcome variables (level of coping, symptoms of depression) would be examined using multiple regression, however, the final sample was too small to allow either multiple or logistic regression. Again, this meant that the planned exploratory analyses pertaining to moderation, needed to be abandoned. However, although the quantitative analyses were severely compromised, sufficient data were collected from the participants for the qualitative analyses (reported in Studies 4 and 5).

Although it was not possible to access the desired number of patients, 90% of eligible patients who were contacted agreed to participate. The most common reason for ineligibility was that the patient had not reported experiencing a breakthrough pain in the week preceding data collection. However, 47% of those who agreed to participate were unable to do so because of physical decline or death before data

collection (Figure 4.2). One participant became ill during the interview and therefore had to withdraw. Due to the advanced and unpredictable trajectory of illness, just over 50% of the 34 eligible patients were able to complete the study.

The youngest participant was 44 and the oldest 79 years of age (M = 66 years, SD = 10.44). The sample was balanced for gender (Females = 44%). All patients were of Caucasian descent and were residents of Australia. Clinical staff at the recruitment site, judged that the demographic characteristics of the sample were typical of

palliative care patients attending the service.

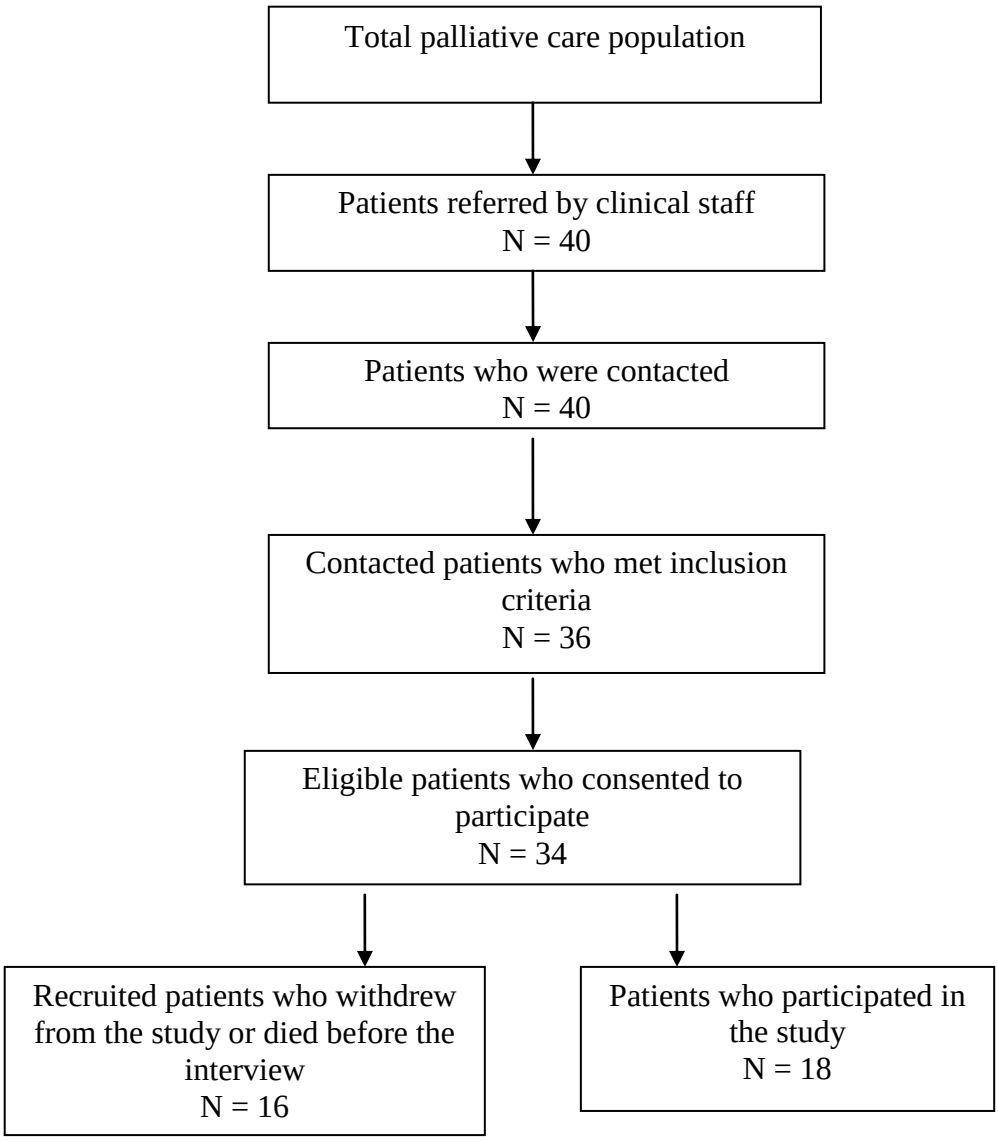

Figure 4.2. Flowchart showing derivation of the sample.

Patients had a wide variety of solid tumours (Table 4.1). The most commonly reported tumours were located in the lung, liver and pancreas.

Table 4.1

Primary Diagnosis of Participants N= 18

Primary site of neoplasm	**N**	**%**
Lung	4	22.2

Bowel	2	11.1
Prostate	2	11.1
Liver, Pancreas	4	22.2
Other	6	75.0

Measures

All measures were gathered using questionnaires administered in interview format by the author. As in Studies 1 and 2, patients were very ill. So, the overriding concern in selecting among measures that were directly relevant to the research questions was to minimise participant burden. Measures are included in Appendix G.

Predictor Variables

Breakthrough Pain

Three dimensions of breakthrough pain (intensity, frequency and duration) were assessed using the same questions as in Study 2. However, in the present study, the scale for breakthrough pain intensity was modified. The patients responded, based upon an analogue scale with verbal and numerical anchors (1 to 3 = mild discomfort, 4 to 6 = moderately painful, 7 to 9 = severe pain and 10 = worst pain imaginable).

Meaning of Pain

The meaning of pain was assessed using the Perceived Meanings of Cancer Pain Inventory (PMCPI) (Chen, 1995). The measure needed to be abridged to maintain adequate reliability for all subscales. The abridged version consisted of 23 questions which assessed a total of five meanings: challenge (original 4 items; abridged: 3 items), punishment (original 5 items; abridged; 3 items), threat (original 6 items;

abridged: 5 items), loss (original 7 items; abridged: 6 items), spiritual (5 items). Patients rated their endorsement of each item using an analogue scale with verbal and numerical anchors (1 = never, 2 = rarely, 3 = sometimes, 4 = usually and 5 = always). Responses for each dimension of meaning were added and then divided by the number of items on the dimension. The internal consistency of the abridged PMCPI was satisfactory for research purposes (Chronbach alphas are as follows: challenge = 0.55, punishment = 0.67, threat = 0.68, loss = 0.79, spiritual = 0.82).

Pain Management Effectiveness

Perceived effectiveness of pain management strategies was assessed using the same question as in Study 2. However, in the present study, the patient responded, based upon an analogue scale with verbal and numerical anchors (1 = never helpful, 2 to 3 = rarely helpful, 4 to 6 = sometimes helpful, 7 to 8 = usually helpful and 9 = always helpful).

Outcome Variables

The present study included two patient measures of adjustment: level of coping with breakthrough pain and two symptoms of depression, which were assessed on the same occasion as predictor variables.

Level of Coping

The wording of the single-item item used to measure self-reported level of coping with breakthrough pain was the same as that used in Study 2. The difference was that in this study, the patients were asked to make their rating using a 9-point analogue scale with verbal and numerical anchors (1 to 3 = coping very poorly, 4 to 6 = sometimes coping/sometimes not and 7 to 9 = coping very well). Higher scores

indicated higher levels of coping.

Symptoms of Depression

Symptoms of depression were assessed by two questions designed to screen for clinical depression in palliative populations (Chochinov et al., 1997). Patients responded "yes" or "no" to the following questions:

1. "During the past two weeks, have you often been bothered by feeling down, depressed or without hope?"
2. "During the past two weeks have you often been bothered by a lack of interest or pleasure in doing things?"

Because Chochinov's findings were not replicated in some subsequent studies (Lloyd & Williams et al., 2003), Robinson and Crawford (2005) chose to amend scoring and to use the measure to assess presence of core symptoms of depression, rather than as a screening instrument. The sum of these responses (1= no, 2 = yes) was calculated, resulting in a possible score range of 2 to 4. This was then recoded to form a dichotomous variable (2 to 3 = none or one of the core symptoms and 4 = both core symptoms).

Procedures

The procedures followed for data collection were the same as for Study 2. Informed Consent Agreement was obtained from each participant prior to the interview and each patient was given an Information Sheet describing the study (see Appendices E and F.)

Statistical Analysis Plan

This study used a cross-sectional design in a sample with high attrition due to rapid deterioration in health or death of patients. The sample was much smaller than intended and therefore relationships between predictors and the outcome were examined using simple bivariate correlations. This precluded four research questions being answered:

Q3. Is the relationship between breakthrough pain (frequency, intensity and duration) and self-reported level of coping moderated by

(a) meaning of pain?

(b) perceived effectiveness of pain management strategies?

Q4. Is the relationship between breakthrough pain (frequency, intensity and duration) and symptoms of depression moderated by

(a) meaning of pain?

(b) perceived effectiveness of pain management strategies?

However, the planned examination of the relationship between pain variables, meaning of pain, and level of coping could be conducted (Hypotheses 1 to 4).

Results

The results are presented in three sections: preliminary analyses conducted to ascertain the appropriateness of the data for the amended analysis plan, descriptive statistics and correlation analyses pertaining to aims two and three. Due to the low statistical power of the analysis, I will comment on both statistical significance and

effect sizes of .32 or greater, because associations of 10% or greater may indicate useful directions to pursue in future research.

Preliminary Analyses

The distribution of scores was examined for each of the predictor and criterion measures. Because only one variable, pain intensity, was normally distributed, Spearman correlations rather than Pearson correlations were used to examine Hypotheses 1 to 4 and to explore Research Questions 1 and 2.

Descriptives Statistics

Pain characteristics. Most patients reported breakthrough pain of problematic intensity (Median = 6.00) (Table 4.2). More than one-third of the patients (39%) reported severe pain, while very few patients (11.1%) reported pain of mild pain. However the frequency of breakthrough pain was generally low (Median = 1.00 per day, maximum = 6). More than half the patients experienced one or fewer breakthrough pains per day. Moreover, the total breakthrough pain duration was typically 20 minutes or less per day (Median = 20, maximum 180 minutes). The intensity of breakthrough pain reported by this sample is consistent with previous research, however, the frequency and duration of breakthrough pain reported was usually less than that reported in previous studies (Bruera, 1997; Cleeland, Gonin, Baez, Loehrer & Pandya, 1997; Coyle, Adelardt, Foley & Portenoy, 1990; Fine & Busch, 1998; Gomez-Batiste et al., 2002; van den Beuken, van Everdingend, de Rijke, Kessesls & Schouten, 2007; Zeppetella, 2008).

The pattern of breakthrough pain characteristics was examined for individual

patients. It appeared that breakthrough pain was likely to present a significant challenge to adjustment for only a minority of patients. In contrast, the breakthrough pains of the majority of participants were usually of moderate intensity, occurred once per day and lasted between 1 and 120 minutes. Approximately 22% of patients reported intense and frequent breakthrough pain lasting more than 120 minutes. Thus, as in Study 2, although all the patients in the sample experienced breakthrough pain, the characteristics of this pain were not ideal to answer the research questions. Most patients reported rare and short breakthrough pains, even though their pain was usually moderate to severe in intensity. The resulting restricted range of scores on breakthrough pain frequency and duration had several implications for the main statistical analyses.

Table 4.2

Summary of Pain Variables (n = 18)

	%
Pain	
Intensity	
Mild 1	0.0
Mild 2	0.0

Mild 3	11.1
Moderate 4	16.7
Moderate 5	11.1
Moderate 6	22.2
Severe 7	22.2
Severe 8	11.1
Severe 9	5.6
Frequency (per day)	
1	55.6
2	0.0
3	5.6
4	11.1
5	22.2
6	5.6
Duration (minutes)	
1 to 5	16.8
6 to10	11.1
11 to 15	11.1
16 to 20	11.1
21 to 30	5.6
31 to 50	5.6
51 to 60	5.6
61 to 80	0.0
81 to 100	0.0
101 to 120	16.7
> 121	11.1

Meaning variables. Most patients subscribed to both non-aversive and aversive meanings of pain. Nearly all patients (94%) reported multiple meanings of pain, among which some were more strongly endorsed than others. The most strongly endorsed meaning was non-aversive: "challenge." More than three quarters of patients interpreted their pain as a challenge. However, over half of the patients endorsed each of two aversive meanings of pain: "threat" and "loss" to their pain. In addition, approximately one half of the patients perceived a spiritual meaning. This meaning was not assessed in Study 2. The extent to which these meanings applied is summarised in Table 4.3.

Table 4.3

Mean Endorsement of the Five Meaning Categories for Pain (n = 18)

Meaning	Mean	SD
Challenge	3.42	1.44
Threat	3.29	1.29
Loss	3.11	1.35
Spiritual	2.43	1.26
Punishment	1.65	1.01

Perceived effectiveness of pain management strategies. Most patients reported that their repertoire of pain management strategies was relatively effective (Table 4.4). All but one patient reported that their pain management strategies were at least sometimes helpful. Half of the patients perceived that their pain management was usually helpful. The resulting lack of cases at the lower end of the distribution reduced the possibility of identifying relationships using correlations.

Table 4.4

Perceived Effectiveness of Pain Management Strategies (n = 18)

	Score range	N	%
Never helpful	1	0	0.0
Rarely helpful	2 - 3	1	5.6
Sometimes helpful	4 - 6	5	27.7
Usually helpful	7 - 8	9	50.0
Always helpful	9	3	16.7

Level of coping. Most patients reported that they were coping rather well (Table 4.5). The spread of scores was therefore not improved by the increasing the range of responses. Over half the patients (62%) reported they were coping very well and only one reported coping very poorly. One patient became very ill and withdrew

from the study before the level of coping measure could be obtained. Thus, as with most of the predictor variables, the range of scores is restricted.

Table 4.5

Level of Coping with Pain (n= 18)

	Score Range	N	%
Coping			
very poorly	1 to 3	1	5.6
sometimes	4 to 5	5	27.8
very well	7 to 9	11	61.6
Missing		1	5.6

Symptoms of depression. Most patients report no symptoms of depression. Less than ¼ of the patients (17%) reported one symptom of depression. However, a little over 1/5 of the patients (22.2%) reported two symptoms of depression. One patient withdrew from the study before her symptoms of depression could be assessed. Thus, as with most of the predictor variables, the range of scores is restricted.

Conclusions from descriptive statistics. There was a restricted range of scores on three predictors and one outcome variable. This reduced the possibility of detecting relationships using correlations.

Exploratory Analyses

Correlations between pain characteristics, meaning of pain and perceived effectiveness of pain management strategies were examined. Potential relationships between predictors needed to be identified because they have implications for

interpretation of the main analyses.

Relationship between Pain Variables

There were no observed relationships between the three pain variables (intensity, frequency and duration) (all rho < .24, all p >.36) and therefore it is possible to be confident that any relationships found between a pain variable and outcome variables are unique (Table 4.6).

Relationship between Meaning Variables

However, there were inter-correlations between some of the meaning variables (Table 4.6). There were moderate to high positive correlations between the endorsement of four meanings (Table 4.6). Therefore, if the main analyses show any relationships between the outcome variables and these inter-correlated predictor variables it will not be possible to identify unique sources of variance or moderation in the absence of partial correlations or regression analysis.

Relationships between Breakthrough Pain Characteristics and Meaning Variables

Only one of the five meaning categories was related to any of the pain characteristics (Table 4.6). There was a moderate positive correlation between pain intensity and the degree to which patients viewed their breakthrough pain as having the meaning "punishment". Therefore, if the main analyses show any relationships between the outcome variables and these inter-correlated predictor variables it will not be possible to identify unique sources of variance or moderation in the absence of partial correlation or regression analysis. However, there was also a trend towards a negative association between pain duration and the degree to which patients viewed

their breakthrough pain as having a "spiritual" meaning. Therefore, interpretation of any associations between these predictors and the outcome variables need to be done with caution.

Relationships between Breakthrough Pain and Perceived Effectiveness of Pain Management Strategies

None of the pain variables were significantly related to the perceived effectiveness of pain management strategies (Table 4.6). However there was a trend towards a negative association between pain intensity and perceived effectiveness of pain management strategies. Therefore, interpretation of any associations between these predictors and the outcome variables need to be done with caution.

Relationships between Perceived Effectiveness of Pain Management Strategies and Meaning Variables

Although perceived effectiveness of pain management strategies and meaning categories were not significantly related, there were trends towards negative associations between perceived effectiveness of pain management strategies and the degree to which patients viewed their pain as a "loss," and a "punishment" (Table 4.6). Therefore any associations between these predictors and the outcome variables need to be interpreted with caution.

Table 4.6

Intercorrelations Between Pain, Meaning Variables and Perceived Effectiveness of Pain Management Strategies (N = 18).

	2	3	4	5	6	7	8	9
Pain								

1. Intensity	.24	.13	.27	.02	.14	.62**	.04	-.39
2 Duration		-.05	-.24	-.03	.14	.14	-.47	-.02
3. Frequency			.17	-.08	-.08	-.12	-.24	-.15
Meaning								
4. Loss				.68**	.58*	.06	.71**	-.35
5. Threat					.94**	.26	.55*	-.15
6. Challenge						.39	.43	-.11
7. Punish							-.04	-.37
8. Spiritual								-.11
9. Pain management effectiveness								

* $p \leq .05$ ** $p \leq .01$

Main Analyses

In the amended analysis plan, Spearman correlations were conducted to test the hypotheses that higher levels of breakthrough pain characteristics (frequency, intensity and duration) are associated with lower levels of coping with pain, and with more symptoms of depression. These analyses also tested the hypotheses that one meaning (challenge) is associated with higher level of coping and fewer symptoms of depression, and that two meanings (threat and punishment) are associated with lower levels of coping with pain and more symptoms of depression. These analyses also answered questions about the relationship between adjustment (level of coping with pain and symptoms of depression) and other meaning categories and adjustment (level of coping with pain and symptoms of depression) and perceived effectiveness of pain management strategies.

Relationships between Pain Variables and Level of Coping with Breakthrough Pain

It was predicted that all three breakthrough (intensity, frequency and duration) would be negatively associated with self-reported level of coping with pain. However, only

pain intensity was significantly correlated with level of coping (Table 4.8). A high negative correlation was found between pain intensity and level of coping with pain, rho (17) = -0.75, $p < .001$. Contrary to expectations, a relationship between pain frequency and pain duration and level of coping with pain was not observed. Thus, Hypothesis 1 was only partially supported.

Table 4.7

Intercorrelations Between Pain Variables and Adjustment (Level of Coping with Pain and Symptoms of Depression (n = 18)

	Pain				
	Intensity	Duration	Frequency	Coping	Depression
Pain					
Intensity		.24	.13	-.75**	.45
Duration			-.05	-.24	-.05
Frequency				.17	.20
Coping					-.68**
Depression					

* $p \leq .05$ ** $p \leq .01$

Relationships between Meaning Variables and Level of Coping with Breakthrough Pain

It was predicted that the meaning "challenge" would be associated with higher level of coping with pain but that the meanings "threat and punishment" would be associated with lower level of coping. Only one meaning was significantly correlated with level of coping. There was a moderate negative correlation between the extent to which patients viewed their pain as a punishment and level of coping (Table 4.8). However, the expected relationships involving the meaning categories "challenge" and "threat" were not observed. Therefore, Hypothesis 3 was only partially supported.

The analyses also explored whether other meanings of pain were associated with level of coping with pain. This was the case for only one meaning. There was a non-significant trend towards a negative correlation between the extent to which patients viewed their pain as a loss and level of coping (Table 4.8).

Relationship between Perceived Effectiveness of Pain Management Strategies and Level of Coping

This planned exploratory analysis found that there was a strong positive correlation between perceived effectiveness of pain management strategies and level of coping (Table 4.8), indicating that higher levels of perceived pain management effectiveness were associated with higher levels of coping.

Relationships between Pain Variables and Symptoms of Depression

Contrary to expectations, none of the pain variables were significantly correlated with symptoms of depression (Table 4.7). However, there was a non-significant trend towards a positive association between pain intensity and symptoms of depression. Despite this, Hypothesis 2 was not supported.

Table 4.8

Intercorrelations Between Meaning Variables, Perceived Effectiveness of Pain

Management Strategies and Outcomes (Level of Coping with Pain and Symptoms of Depression. n = 18

	Meaning					Outcome	
	1	2	3	4	5	6	7	8
Meaning								
1. Loss		.68**	.58*	.06	.71**	-.35	-.41	.73**
2. Threat			.94**	.26	.55*	-.15	-.03	.40
3. Challenge				.39	.43	-.11	-.07	.34
4. Punishment					-.04	-.37	-.57*	.34
5. Spiritual							-.24	.58*
6. Pain management effectiveness							.69**	-.48*
7. Coping								-.68**
8. Depression								

* $p \leq .05$ ** $p \leq .01$

Relationships between Meaning Variables and Symptoms of Depression

It was predicted that the meaning "challenge" would be associated with fewer symptoms of depression, and the meanings "threat and punishment" would be associated with more symptoms of depression. No significant correlations were found. However, there were non-significant trends in the expected direction between symptoms of depression and the extent to which patients viewed their pain as a punishment and a threat. A relationship between the meaning "punishment" was also found for level of coping. There was also a non-significant trend towards a positive association between symptoms of depression and the extent to which patients viewed their pain as a challenge, but this trend was not in the expected direction (Table 4.8). Therefore, Hypothesis 4 was not supported.

The analyses also explored whether other meanings of pain were associated with symptoms of depression. This was the case for two meanings. There was a high positive correlation between symptoms of depression and the extent to which patients

viewed their pain as signifying loss (Table 4.8). The meaning category "loss" was also associated with poorer coping. There was also a moderate positive correlation between the extent to which patients viewed their pain as having spiritual meaning and symptoms of depression (Table 4.8). These results indicate that more symptoms of depression are associated with the extent to which patients view their breakthrough pain as a loss or having a spiritual meaning.

Relationships between Perceived Effectiveness of Pain Management Strategies and Symptoms of Depression

The planned exploratory analyses showed a moderate negative correlation between perceived effectiveness of pain management strategies and symptoms of depression, indicating that higher levels of perceived pain management effectiveness were associated with fewer symptoms of depression (Table 4.8).

Conclusions from Results

The relationships between predictors and adjustment are summarised in Figures 4.3 and 4.4. Despite the small sample size, low frequency and duration of breakthrough pain and limited range of responses on predictor variables, this study confirmed previous findings that there is a relationship between higher levels of pain intensity and poorer adjustment (lower levels of coping and more symptoms of depression). It also discovered relationships between two meanings of pain (punishment and loss) and poorer coping, and more symptoms of depression and the meanings punishment, loss, threat and challenge. More effective pain management strategies were associated with high levels of coping and fewer core symptoms of depression.

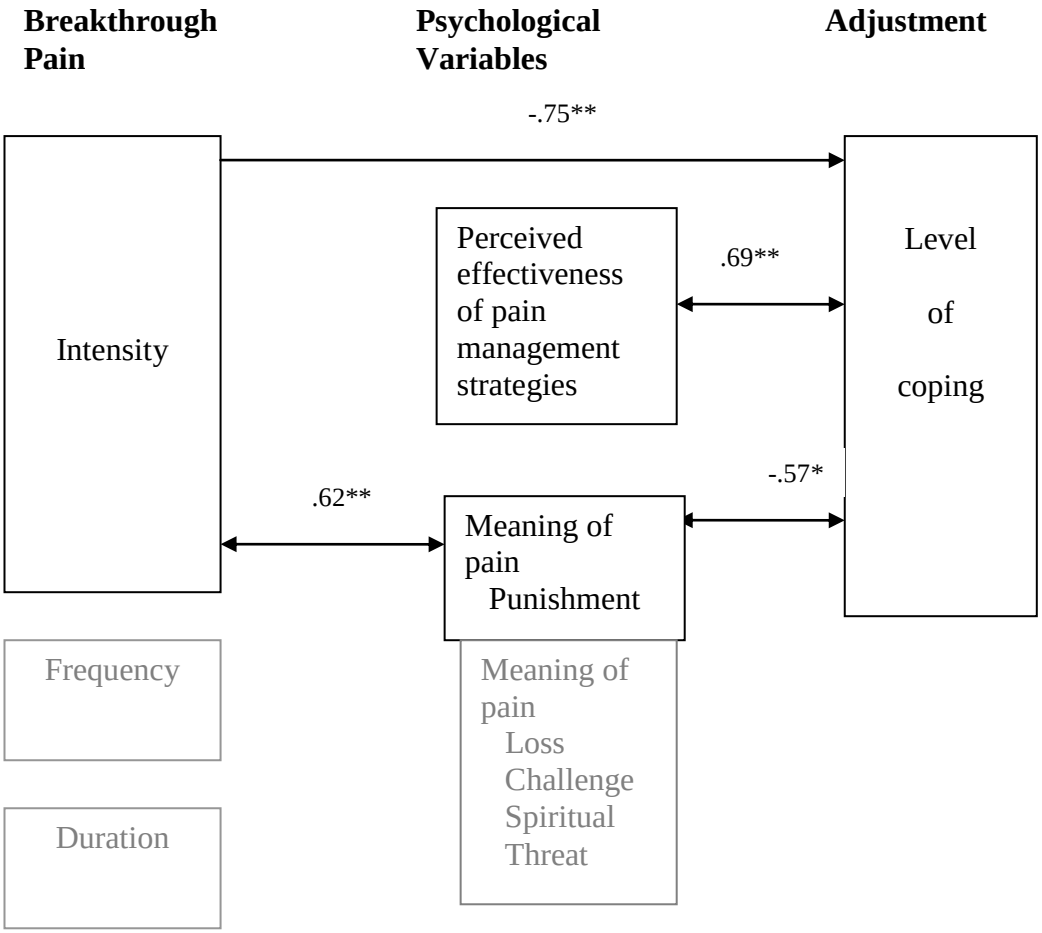

Figure 4.3. Summary of findings concerning predictors of level of coping.
Note: Significant relationships are in black. Grey text denotes variables that were examined but which no significant relationships were found.

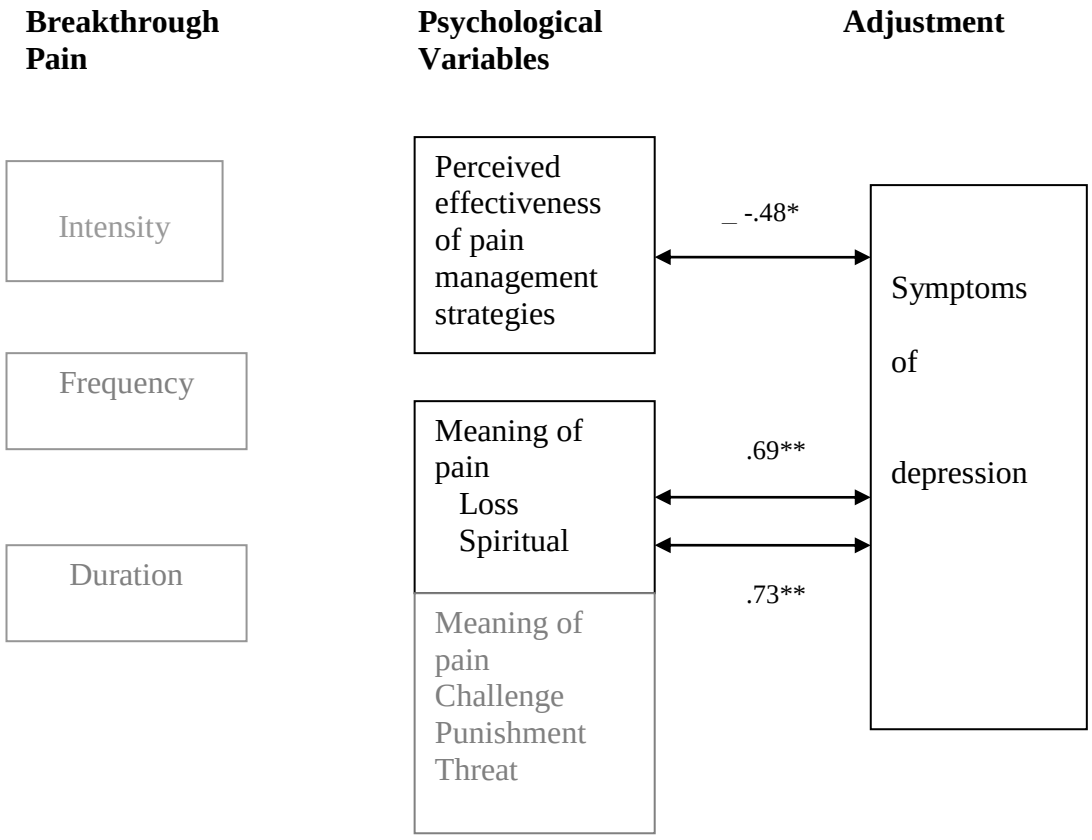

Figure 4.4. Summary of findings concerning predictors of symptoms of depression. Note: Significant relationships are in black. Grey text denotes variables that were examined but which no significant relationships were found.

Discussion

The purpose of the present study was to replicate Study 2 using a larger range of response alternatives on all measures, a different measure of meaning of pain and an additional adjustment outcome (symptoms of depression), in a sample that was large enough to conduct analyses pertaining to moderation, and to obtain a better distribution of responses on the measures. Planned analyses of the relationships between meaning of pain, perceived effectiveness of pain management strategies and adjustment (level of coping, symptoms of depression) were undertaken, however, I was unable to conduct the analyses as originally planned, due to events outside of my control that prevented recruitment of sufficient participants.

Despite efforts to obtain a large sample, very few patients were referred to the study during the two years available for recruitment. There are several possible explanations for this. First, potentially suitable patients may not have been referred. Clinicians may have had conflicting priorities (e.g., demanding clinical caseload, shielding patients from additional burden, low priority assigned to research). Second, patients may have been reluctant to consent to contact by a researcher. The Lyell McEwin Palliative Care Service is a division of a public hospital in the northern suburbs of Adelaide. Unlike patients of large University Hospitals in Australia and overseas, the patients of this service may be less socialised to the concept of participating in research (Sugarman et al., 1998). Third, the prevalence of breakthrough pain in Australia may not be as high as expected. Despite recruitment for two studies, from two different sites, no more than 20 participants were obtained from each site.

Another limitation of this study was that the sample consisted of patients who reported few symptoms of depression and who were coping reasonably well. In addition, patients were experiencing relatively few breakthrough pains and perceived their pain management to be effective. The sample was therefore not ideal for answering some of the research questions. Moreover, most responses on the level of coping and perceived effectiveness of pain management strategies measures were at the upper end of the scales. Therefore, it was not possible to determine the overall effectiveness of increasing the range of response alternatives as a strategy. Ideally, multi-item measures with multi-dimensional scales would have been used, but this was not done for two reasons. First, it was necessary to minimise patient burden in this population by keeping measures very brief. Second, the original plan (which proved not to be feasible) was to merge the data-sets from both sites and therefore measures that could be collapsed for the pooled data-sets were needed.

Despite these limitations, this exploratory study has extended previous research by revealing several relationships between adjustment, breakthrough pain characteristics, meaning of pain and perceived effectiveness of pain management strategies.

Breakthrough Pain Characteristics

Most patients experienced moderate intensities of breakthrough pain, although the episodes were relatively brief and infrequent. However, approximately one-fifth of patients still reported breakthrough pain that was intense, frequent and lasting more than 120 minutes per day. These characteristics were similar to those reported in

Study 2, and also similar in variability and intensity to those reported in previous research (Bhatnagar et al., 2010; Fine & Busch, 1998; Portenoy & Hagen, 1990; Portenoy et al., 1999; Zeppetella, 2000; 2008). However, the frequency and duration of breakthrough pain reported in this thesis is much less than reported in previous research (Bhatnagar et al., 2010; Bruera, 1997; Cleeland, Gonin, Baez, Loehrer & Pandya, 1997; Coyle, Adelardt, Foley & Portenoy, 1990; Fine & Busch, 1998; Gomez-Batiste et al., 2002; van den Beuken et al., 2007; Portenoy et al., 1999; Zeppetella et al., 2000; Zeppetella, 2000; 2008). There are four possible reasons for the differences between the findings of the present study and those reported in previous research. First, different definitions (e.g., Haugen et al., in press; Portenoy & Hagen, 1990) and measures of breakthrough pain were used. Some use a breakthrough pain questionnaire, administered in a semi-structured interview (e.g., Portenoy & Hagen, 1990; Portenoy et al., 1999; Zeppetella et al., 2000). Others have used the *BPI* (Cleeland, 1991) (e.g., Montague & Green, 2009), a breakthrough pain diary (Bhatnagar et al., 2009) and a qualitative interview (Ashley et al., 2009). Some researchers did not report details of assessment tools used (e.g., Zeppetella, 2000; 2008). In addition to a range of measures of breakthrough pain, method of assessment of specific characteristics also differed. For example, frequency has been assessed as the number of breakthrough pains in 24 hours (e.g., Portenoy & Hagen, 1990; Portenoy et al., 1999), or an average over more than a year (Montague & Green, 2009). Similarly, duration is sometimes reported from onset to peak (e.g., Portenoy et al., Bhatnagar et al., 2010) or time until pain relief takes effect (Zeppetella, 2008). Different definitions and measures are likely to contribute to the wide variability in reported breakthrough pain characteristics. Second, differences in medical systems and treatment protocols may account for more frequent and longer

breakthrough pain in other countries, than reported in the present study. For example, in Australia, there is universal access to palliative care services, subsidised (medical, hospital and pharmaceutical) services, and easier access to opiate medications, which are not as readily available to the community in some other countries. Less access to these services may account for the higher intensity breakthrough pain, depression and lower quality of life reported among minority groups with lower incomes in the USA (Montague & Green, 2009). Third, patients with more problematic breakthrough pain characteristics and who were not coping, may not have been referred, or declined referral to the current study or Study 2. If this was the case, then breakthrough pain characteristics in these samples may be more severe than indicated by the results. Fourth, breakthrough pain may not be as frequent or as long lasting in Australian patients with advanced cancer as previously thought. Further research in larger samples may provide greater insight into the prevalence of breakthrough pain and its characteristics in Australia.

Breakthrough pain and adjustment

The present study confirmed that breakthrough pain characteristics are associated with poorer adjustment. More intense breakthrough pain was associated with lower level of coping. There was also a trend towards an association between higher breakthrough pain intensity and more symptoms of depression. These results are consistent with the trend towards poorer coping and higher breakthrough pain intensity found in Study 2. In previous research, higher breakthrough pain intensity has also been associated with depression (Portenoy et al., 1999; Montague & Green, 2009; Zeppetella et al., 2000) and with lower quality of life (Montague & Green). Although, relationships between breakthrough pain characteristics and level of

coping have not been previously reported, pain intensity has been associated with poorer coping among patients with cancer (e.g., Barkwell, et al., Turk et al., 1998). No relationships between duration and frequency of breakthrough pain and adjustment were detected in the present study, however, higher breakthrough pain frequency was associated with lower levels of coping in Study 2. Although frequent breakthrough pain was often reported in the literature, its relationship with adjustment has not. Previous research has reported that depression was associated with longer breakthrough pain duration (Portenoy et al., 1999). Failure to find the expected relationships between all breakthrough pain characteristics and adjustment in the present study, may possibly be explained by the lack of patients in the sample who were not coping and the lack of patients who were experiencing frequent and long-lasting breakthrough pain episodes. However, each of these characteristics was associated with poorer adjustment in present and past research and therefore these relationships are worthy of further exploration in other populations.

Meaning and adjustment

The present study has extended previous research by further exploration of meaning of pain among patients with advanced cancer, by making two discoveries. First, almost all patients in this study, and those in Study 2, endorsed multiple meanings of pain. Moreover, when given the opportunity, the same patients ascribed to meanings of pain other than the categories on the questionnaires (reported in the qualitative analyses, Chapter 5). This phenomenon was not reported in previous research (e.g., Barkwell, 1991; Ferrell & Dean, 1995; Liposwki, 1970; Park et al., 2008), but Chung (2000) found that meanings ascribed to pain could not easily be categorised. Therefore, qualitative methods are needed to reveal the range and complexity of

meanings of pain for patients with advanced cancer.

Second, the meanings of pain endorsed by patients in the present study were not consistent with those reported in previous research. In the present study, the most strongly endorsed were "challenge," "threat" and "loss." In addition, half the patients also endorsed the spiritual meaning category. This category was not been included in other quantitative measures of meaning of pain, even though spiritual matters are considered to be important by some researchers in palliative care (e.g., Lee, 2008; Strang, 1997; Taylor & Ersek, 1995). Patients in the Barkwell (1991) study endorsed three of eight meaning categories (enemy, punishment and challenge), however, most patients in Study 2 (which also used the Barkwell measure) most frequently endorsed the meanings "enemy", "loss" and "value". It is concluded that there are three reasons which may account for the differences in findings between the present study and previous research. The first is the patients' attribution of multiple meanings of pain, and the second, the instability of findings derived from small samples. However, a third reason may be that the present study is the only study which has examined meaning of pain in the context of breakthrough pain among patients with advanced cancer. Patients may ascribe different meanings to background pain and breakthrough pain.

Despite the difficulties encountered in capturing the construct, meaning of pain, the meaning "punishment" was associated with poorer coping and the meanings "loss" and "spiritual" were associated with more symptoms of depression. In addition, there was a trend towards an association between poorer coping and the meaning loss, and more symptoms of depression, and the meanings "punishment", "threat" and "challenge." Although a relationship between meaning of pain and

adjustment has generally been supported in the existing literature (Barkwell, 1991; Ferrell & Dean, 1995; Lee, 2008; Lipowski, 1970; Park et al., 2008), past findings were both consistent and inconsistent with these results. For example, the meaning of pain as a "loss" and a "punishment" were associated with poorer coping (Barkwell, 1991). However, the meaning "challenge" was associated with better coping among patients with advanced cancer (Barkwell, 1991). In contrast, the present study revealed a trend towards more symptoms of depression and the meaning "challenge." The differences in relationships between meanings and adjustment in the three studies may be explained by complex relationships between meanings of pain and adjustment. An aversive meaning (e.g., punishment) would be expected to have a negative relationship with adjustment, and a non-aversive meaning (e.g., value), a positive relationship. If patients ascribe to both aversive and non-aversive meanings of pain, then the influence on adjustment becomes more complex. Hence, the trend in the present study, towards more symptoms of depression and the non-aversive meaning "challenge," may be accounted for by the combined influence of aversive and non-aversive meanings. On the other hand, this phenomenon may be explained by the instability of findings derived from small samples. Exploration of meaning of pain and its relationship with adjustment using a qualitative approach may provide greater insight into the complexity of meaning of pain and its relationship with adjustment.

Perceived effectiveness of pain management strategies and adjustment

The present study extended previous research by exploring the relationship between perceived effectiveness of pain management strategies and adjustment. Most patients perceived their pain management strategies to be relatively effective. Moreover,

perceived effectiveness of pain management strategies was moderately to strongly associated with higher adjustment. These results are consistent with the findings of Study 2, pertaining to level of coping. In addition, it is consistent with findings from previous research. Higher pain management effectiveness was associated with lower levels of depression among patients with non-malignant disease (e.g., Dawson et al., 2002; Hwang, Chang & Kasimis, 2002; Kemp, Ersek & Turner, 2005). Despite a dearth of research regarding the adequacy of pain management (Cleeland et al., 1994; de Wit et al., 2001; Martin-Rodriguez, D'Amour, & Leduc, 2008), and satisfaction with treatment (e.g., Beck et al., 2010; Dawson et al., 2002; Hwang Chang, & Kasimis, 2002; Tang, Liu, Lin, & Chen, 2010; Ward, Donovan, & Max, 1998), there has been no previous research which reports relationships between perceived effectiveness of pain management strategies and coping. However, the moderate to strong direct relationships between pain management effectiveness and adjustment indicate that it is a good indicator of patient adjustment. Therefore the inclusion of even one question on pain management effectiveness is recommended in future research, among patients with advanced cancer.

Additional Findings of Interest

The present study also made two additional findings of relevance to future research. First, although the two aspects of adjustment were strongly correlated, they revealed different patterns of relationships with the predictors. Higher coping and fewer symptoms of depression were associated with effective pain management strategies. However, higher intensity of breakthrough pain was associated with lower levels of coping only. In addition, different meanings of pain were associated with each aspect of adjustment. Although only level of coping is explored in the qualitative study

(reported in Chapter 6), these results indicate that important relationships may be revealed by including these two aspects of adjustment in future research.

A second way that this study extends previous research is the discovery of inter-correlations between high breakthrough pain intensity, the meaning "punishment" and lower level of coping, and also lower breakthrough pain intensity, higher perceived effectiveness of pain management and higher coping. These are potentially important findings which may indicate mediation or moderation of the relationships between coping and breakthrough pain by the meaning "punishment," and also perceived effectiveness of pain management strategies. Thus, this possibility is worthy of exploration in future research.

Conclusion and Future Directions

The present study and also Study 2 have contributed to existing knowledge by reporting breakthrough pain characteristics (frequency, duration and intensity) in two separate Australian samples of patients receiving palliative care. These exploratory analyses have indicated that relationships exist between breakthrough pain characteristics, meaning of pain, perceived effectiveness of pain management strategies and two aspects of adjustment, and therefore these relationships are worthy of exploration in future research. In particular these two studies have highlighted the complexity of meaning of pain. Multiple meanings were endorsed and some meanings were inter-correlated. Two different measures of meaning of pain have been used and the results have found different meanings of pain, and different relationships with adjustment in Australian populations. It may be that quantitative assessment tools do not adequately capture meaning ascribed to pain. Therefore,

before further exploration of relationships between meaning of pain, breakthrough pain characteristics and adjustment are conducted, a qualitative study of meanings of pain will be undertaken to provide deeper insight into the range and complexity of meaning of pain.