PSYCHOLOGICAL FACTORS IN THE MANAGEMENT OF POST-OPERATIVE ACUTE PAIN: THE ROLE OF SELF-EFFICACY BELIEFS IN THE USE OF PATIENT CONTROLLED ANALGESIA

James Lewis Murray

Submitted as Volume 1 for the degree of Doctor of Clinical Psychology (D.Clin.Psy).

Research conducted within the Sub-Department of Clinical Health Psychology
at University College London.

Submitted May 1999

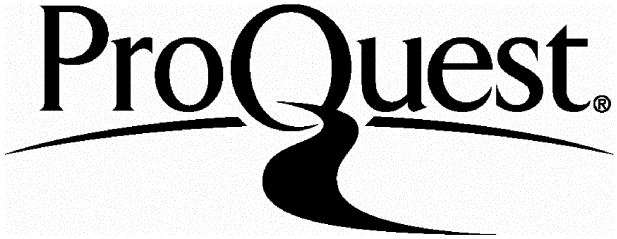
c James Lewis Murray

ProQuest Number: U644019

All rights reserved

INFORMATION TO ALL USERS
The quality of this reproduction is dependent upon the quality of the copy submitted.

In the unlikely event that the author did not send a complete manuscript
and there are missing pages, these will be noted. Also, if material had to be removed,
a note will indicate the deletion.



ProQuest U644019

Published by ProQuest LLC(2016). Copyright of the Dissertation is held by the Author.

All rights reserved.
This work is protected against unauthorized copying under Title 17, United States Code.
Microform Edition © ProQuest LLC.

ProQuest LLC
789 East Eisenhower Parkway
P.O. Box 1346
Ann Arbor, MI 48106-1346

635598

ABSTRACT

Patient controlled analgesia (PCA) was first discussed in the literature during the early 1970s, but it was not until the late 1980s and early 1990s that a number of reliable PCA systems became available. PCA has since been deployed throughout most of the developed world for the treatment of post-operative acute pain. As an alternative to traditional intramuscular injections and oral treatments, PCA has achieved rapid acceptance in medical centres as a tool for administering analgesic medication to post-operative patients. However, PCA equipment is expensive and this ultimately places constraints on its availability. Published research in the area has suggested that an understanding of the psychological factors that make PCA beneficial to patients is important for their post-operative recovery, and to allocate the system effectively. Close examination of the published literature in the area generated the following review questions: Is PCA effective?; Is patient satisfaction with PCA important?; Can anxiety affect pain management with PCA? and; Does control influence pain with PCA? Due to controversy and inconsistency in the literature, the purpose of the study contained in this academic thesis was to partially replicate previous findings, as well as assess the role of self-efficacy beliefs in post-operative pain management with PCA. Forty five women undergoing elective, non-malignant total abdominal hysterectomy (TAH) operations at a central London teaching hospital volunteered to participate. PCA with morphine sulphate as the analgesic drug was used as standard procedure for treating the post-operative pain of TAH patients. A longitudinal design was employed with each participant assessed on two occasions. Self-report questionnaires with known psychometric properties were used to assess generalised self-efficacy beliefs, state anxiety, emotional distress and pain expectations prior to surgery. The post-operative assessment conducted 24-36 hours after surgery included self-report questionnaires of pain, pain coping strategies, and PCA satisfaction. The total volume of morphine consumed by participants while using PCA was also recorded. Firstly, the results indicated that participants who experienced post-operative analgesic side effects reported significantly lower PCA satisfaction and used more maladaptive pain coping strategies than those without side effects. Secondly, after controlling for dimensions of pain, maladaptive pain coping strategies helped predict pain intensity scores. Thirdly, after controlling for pain, state anxiety helped predict the total volume of morphine consumed during PCA use. Finally, none of the pre and post-operative variables helped to predict PCA satisfaction scores as measured in this study. Although this study partially replicated the previous finding that state anxiety helped predict morphine consumption, there was no empirical support to suggest that self-efficacy beliefs helped to understand acute post-operative pain management with PCA. The results were discussed in terms of the review questions presented above. The discussion focused upon the clinical implications of patient education to reduce anxiety and maladaptive pain coping strategies, as well as encourage the autonomy and control that PCA allows. The limitations of this study and directions for future consideration were also discussed.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF APPENDICES

ACKNOWLEDGEMENTS

During the time that this project was being planned, researched and written, I was supported by many creative and helpful individuals. Dr. Lesley Glover from the Sub-Department of Clinical Health Psychology at UCL must be thanked for the academic supervision she provided which included her interest in the theme of pain management and her support during the various stages of the research process. Dr Lesley Bromley, Clinical Director of Anaesthetics at UCL Medical School and Middlesex Hospital, must be thanked for helping with the development of this project as well as her administrative and clinical support.

I would like to acknowledge the support provided by all of the Nurses on Prothroe-Smith ward at the Elizabeth Garrett Anderson Hospital for Women. They were all extremely helpful to me which ultimately made collecting data from their patients an easier task.

Finally, I express my gratitude towards the individual woman who acted as participants in this research. Their personal contributions have made it possible to answer the research questions under investigation and add to the growing body of knowledge in acute pain management.

I am in debt to the supervisors from the North Thames region who have made my clinical training a unique learning experience. I would also like to thank them for the support and feedback they provided when I was writing the case reports which are submitted along with this research project for the D.Clin.Psy degree. Thank you: Michael Worrel, Barbara Levin, Vincenzo Avilia, Victor Levenson, Kate Blakeley, Jenny Walters, and Dr. Belinda Hacking. I also acknowledge the support over the past three years from Dr. Shelly Channon my academic tutor, and Dr. Tony Roth my clinical tutor.

I recognise the encouragement and hospitality of my colleagues and fellow trainees at UCL. In particular, Donal D. Leddy and Darren R. George have made my time in London most entertaining. For her patience, love and support I thank J.T. Booth.

I would also like to thank Dr. Raymond Alfredo Rossi MacDonald from the Department of Psychology at the University of Strathclyde for his continued support with this and other research projects.

This research is dedicated to those who suffer from pain - regardless of the cause. For in the words of Albert Schweitzer, pain is a more terrible lord of humankind than even death itself.

I, James Murray, declare that this is an original thesis conducted under normal terms of supervision.

CHAPTER ONE

PRELUDE TO AN EMPIRICAL STUDY

1.1 Opening Remarks

This chapter includes a brief overview of the historical aspects of the clinical health psychology field as the general introduction to a thesis containing an empirical research project on acute pain management. Following these opening remarks, this chapter includes two sections: (1.2) beyond the biomedical model; and (1.3) organisation of this thesis as a summary of forthcoming chapters.

The recognition of clinical health psychology as a designated field of research and treatment is relatively recent. However, the basic concepts, ideas, and theories within this field have been discussed and debated for many years (Pitts, 1991). The relationship between mind and body and the effect of one upon the other has been a controversial topic for philosophers, physiologists and more recently psychologists (Gatchel & Baum, 1995). Hippocrates, the ancient Greek physician (circa 400 B.C.), proposed one of the earliest accounts of the delicate interrelationship that exists between mind and body (Dubos, 1995). These ideas were further developed by Galen (circa 200 A.D.), and are of historical interest because they illustrate the long standing view of a holistic approach, where biological factors interacted with and affected the mental or psychological characteristics of an individual (Murray, 1988). Perspectives of pain within the mind-body relationship have also been the subject of long standing debate. Aristotle (circa 350 B.C.) recognised pain as an emotional experience driving us towards or away from external objects (Sjostrom, 1995). Aristotle also asserted that influences upon the soul influence the body and vise versa (Murray, 1988).

The growth of physical medicine during the Renaissance, however, challenged and eventually discredited the importance of mind-body interactions. The idea that the mind influenced the body was regarded as unscientific and resulted in the relegation of the concepts of mind and soul to the areas of philosophy and religion. The French philosopher Rene Descartes (1595-1650) was instrumental in the move away from the holistic approach and the development of a dualistic viewpoint. The importance of Cartesian dualism was strengthened by the discovery in the nineteenth century of external agents of disease, such as bacteria and viruses. During this time psychological factors in health and illness were considered so vague and unreliable that they were ignored. The contributions of Wilhelm Wundt (1832-1920) who considered psychology to be the "science of the spirit", and Sigmund Freud's (1856-1939) study of psychosomatic disorders regenerated interest in mind-body relationships in Europe during the late nineteenth and early twentieth centuries (Murray, 1988). However, only the sensory qualities of pain were of prominent interest at this time, while affective qualities received less attention (Gatchel & Baum, 1995; Sjostrom, 1995).

The post-war years of this century have produced a resurgence of interest in the interactions between mind and body. In 1965, Melzack and Wall suggested that emotional factors may exert influence on pain transmissions. Furthermore, clinical health psychology with its interests in not only mental health but also the holistic union of mental and physical well-being has expanded in the past 30 years due to developments in research methodology and theoretical views. Due to these and other developments there is once again a growing focus upon an integrated and holistic approach to the mind-body relationship (Sheridan & Radmacher, 1992).

1.2 Beyond the Biomedical Model

The dominant paradigm of medical science is the biomedical model, which has as its focus the identification and treatment of organic causes of disease. The biomedical model views the body as a machine that is fixed by removing or replacing the ailing part, or destroying the foreign body that caused the problem, without considering the possibility of psychological impact (McClelland, 1985). It is the belief of medical science that health can be restored by physical and chemical interventions administered by health professionals. The biomedical model has, however, been challenged because its strategies seldom empower patients or enhance their adaptation to illness (Sobel, 1995). The challenges and problems associated with the traditional disease model of medical management have become even more dramatic with the current health-care trends of improving efficiency of services, controlling costs, monitoring access to health professionals and reviewing the effectiveness of patient care and service delivery.

The developments within health psychology over the past 30 years and its affiliation with clinical psychology has facilitated a new association between medicine and psychology, where psychologists actively participate in the management, prevention and treatment of medical problems (Wright, 1995). Psychological and social factors have been implicated in the development, progression, and consequences of both acute and chronic disease. Moreover, personality dispositions, affect, cognitions and behaviours all influence adaptation to disease and illness in ways that can have a profound impact on quality of life and the utilization of medical care (Sobel, 1995). Although clinical health psychology is a relatively new and expanding

field, it is of vital importance to medical science and the health-care system due to the growing awareness that health and illness have many dimensions (Gatchel & Baum, 1995; Sheridan & Radmacher, 1992). It is also important for the health-care system that clinical health psychologists function as scientist-practitioners who conduct research into both applied and theoretical areas to inform their work with clients and generally add to a growing body of knowledge. Incorporating psychological and social dimensions into the approach which focuses on biological factors of health and illness - *the biopsychosocial model* - can empower patients, enhance their adaptation to illness and hopefully improve upon quality of life concurrent with the trend towards cost effective patient care and delivery of medical services.

During the 1990s, Pain Management Teams have been developed to improve the provision of services to both chronic and acute pain patients. These Pain Management Teams have used a multidisciplinary staff base and are beginning to employ a biopsychosocial perspective to help understand the pain experiences of patients (McQuay & Moore, 1998). In acute pain management, good post-operative analgesia can increase patient comfort and encourage recovery, but finding the optimal pain relief strategy for each individual is a complex task (Owen & Plummer, 1997). The introduction and use of the patient controlled analgesia (PCA) delivery system has in recent years been promising for post-operative pain relief (Kehelt, 1994). Despite the advances in neuroanatomy, physiology and pharmacology, clinical health psychologists have begun to work with Acute Pain Teams helping to continue to improve post-operative pain management. To help achieve this the present study is an attempt to add to the growing body of knowledge concerning the psychological factors of PCA.

1.3 Organization of Thesis

The research contained within this thesis is concerned with psychological factors in the management of post-operative acute pain. The intention is not to continue the general philosophical debate of mind-body relationships, but to empirically investigate the role of psychological factors such as anxiety, coping strategies, emotional distress, satisfaction with pain relief and self-efficacy beliefs in the use of patient controlled analgesia (PCA) as a method of post-operative acute pain management. This study employed a longitudinal design with data collection before and after surgery from women admitted as inpatients for elective non-malignant abdominal hysterectomy operations. The hysterectomy is a procedure that causes post-operative pain, and women undergoing this surgery have been used as participants in other PCA research.

The research study presented in this thesis is organised into six chapters. Chapters One, Two, and Three contain the general theoretical introduction. Following this *Prelude to an Empirical Study*, Chapter Two provides an overview of the hysterectomy, and an introduction to the acute pain experience and theoretical models of pain. Chapter Three is an introduction to acute pain management with a focus on patient controlled analgesia (PCA) as a tool for post-operative care. This chapter summaries the motivation to undertake this research study, and presents a detailed review of the published literature associated with the psychological factors of PCA. Chapter Three also introduces the theoretical concept of self-efficacy beliefs in acute pain management, and concludes with a series of specific research questions empirically tested within this study. Chapter Four describes the research methodology including the participants, measurement instruments, and the procedure employed to

collect data for this study. Chapter Five presents detailed analyses of the collected data and results of the specific research questions raised in Chapter Three. Finally, Chapter Six contains a complete summary of this study's findings, a discussion of the clinical and theoretical implications, a summary of the important limitations of this research, in addition to a conclusion which focuses upon the recommendations for future consideration. The Reference Section follows Chapter Six and includes the journal articles, books and other manuscripts cited throughout the thesis. An Appendix Section containing notable aspects of the present research methodology completes the thesis.

CHAPTER TWO

HYSTERECTOMY AND ACUTE PAIN

The hysterectomy is a surgical procedure that involves removal of the uterus. It is an operation most frequently performed on women of reproductive age and is associated with acute post-operative pain (Grant & Cunningham, 1993). It is a relatively common procedure; a reported range of between 20% to 40% of western women have a hysterectomy (MacKay, Beischer, Pepperell & Wood, 1992). The number of hysterectomies being performed has increased in the past ten years and currently there are over 90,000 such operations annually within the NHS (Herod, Hodgett & O'Brien, 1997). Having a hysterectomy is welcomed by many women, especially if they have had years of painful menstruation and heavy bleeding. Although for many others the need for such an operation is unexpected (Boutwood & Campbell, 1987).

The purpose of this chapter is to discuss aspects of the hysterectomy and its acute post-operative pain in order to create a context for the empirical research within this thesis. This chapter therefore contains the following sections: (2.1) hysterectomy procedures; (2.2) psychological aspects of the hysterectomy; (2.3) acute pain experiences; (2.4) theoretical models of acute pain; (2.5) measurement of acute pain; and (2.6) acute pain treatment.

2.1 Hysterectomy Procedures

Hysterectomies are performed for various reasons. Specific indications for hysterectomies include: (1) painful, heavy and irregular periods which have failed to

respond to medical treatment; (2) severe recurrent or treatment resistant pelvic infections; (3) fibroids, which are non-cancerous growths of the uterus that can cause painful periods and put pressure on other pelvic organs including the bladder; (4) adenomyosis and endometriosis, conditions where the tissue lining the uterus grows elsewhere such as in the ligaments and muscle of the uterus or on the ovaries, causing pain during menstruation and during sexual intercourse; (5) prolapse of the womb, which may be due to damage during childbirth and may interfere with bladder and bowel functioning; and (6) cancer of the cervix, fallopian tubes, ovaries, or vagina. In most cases hysterectomy is an elective procedure and performed as a prophylactic measure to remove benign conditions and ultimately improve a women's quality of life. Very rarely is a hysterectomy performed as a life-saving emergency procedure (Boutwood & Campbell, 1987; Grant & Cunningham, 1993; MacKay et al., 1992).

There are different types of hysterectomy operations that vary according to the tissue removed and the mode of access to the uterus. A *subtotal hysterectomy* involves removal of the uterus body known as the corpus, but not the cervix. This procedure is currently less common due to potential development of cancer in the remaining cervix. The most common operation is the *total hysterectomy*, in which the entire uterus (both corpus and cervix) is removed. In medical terms a hysterectomy refers only to uterine removal, but to the lay public a "partial hysterectomy" means removal of the uterus only and a "complete hysterectomy" means removal of the fallopian tubes and ovaries as well. The latter procedure is known medically as a *salpingo-oophorectomy*. A total hysterectomy with bilateral salpingo-oophorectomy is removal of the uterus, both fallopian tubes and ovaries. A total hysterectomy with unilateral salpingo-

oophorectomy refers to the removal of the uterus and only one fallopian tube and ovary (Boutwood & Campbell, 1987; Grant & Cunningham, 1993).

The mode of access for a hysterectomy operation may be either vaginal or abdominal. A *vaginal hysterectomy* is removal of the uterus through the vagina and is usually performed when the uterus is prolapsed and protruding into the vagina. This is the method of choice when there is no evidence of pathology in the abdominal cavity, and has the advantage of less post-operative pain, no abdominal scar, and on average a shorter hospital stay. The *abdominal hysterectomy* is removal of the uterus through the abdomen, which provides better exposure to the pelvic region than the vaginal method. The abdominal incision and the associated post-operative discomfort and pain result in hospital stays of between four to seven days (Boutwood & Campbell, 1987; Grant & Cunningham, 1993). Most surgeons favour the abdominal procedure, and the ratio of abdominal to vaginal hysterectomies has been reported as high as six-to-one (MacKay et al., 1992). For the purpose of the study presented in this thesis only women scheduled for elective, non-malignant total abdominal hysterectomies with or without salpingo-oophorectomy were considered as potential participants.

2.2 Psychological Aspects of the Hysterectomy

Despite extensive research there remains a considerable amount of debate about the psychological significance of having a hysterectomy. Although the present research project was not directly investigating these general themes and has women participants undergoing a hysterectomy as an example of an acute pain experience, it is meaningful at this point to present a brief overview of findings in this area.

Over 100 years ago, Krafft-Ebling wrote that the hysterectomy was more frequently the cause of psychoses than any other major surgical operation (Khastgir & Studd, 1997). The risk of adverse psychological reactions to hysterectomy including depression, agitation, insomnia, anxiety, and reduced psychosexual functioning have been reported by numerous authors during this century and were reviewed by Gath, Cooper and Day (1982). In contrast to the reported adverse effects of hysterectomies, Patterson and Craig (1963) were amongst the first to conclude that hysterectomy is not a significant factor in the development of mental illness. In a review of the literature published up to and including the 1970s, Meikle, Brody and Pysh (1977) reported that 15 out of 21 studies claimed that hysterectomy was followed by undesirable psychological reaction, while the remaining six studies claimed no such effect. The conflicting findings of these earlier studies have been explained in terms of methodological problems, including: (i) the lack of standardised measurement instruments for psychological constructs; (ii) the lack of both pre and post-operative assessments; (iii) the use of heterogeneous patient samples; and (iv) the lack of appropriate control groups (Gath, Cooper & Day, 1982; Khastgir & Studd, 1997).

More recent studies have addressed the methodological limitations of previous research and have found that levels of psychiatric morbidity are higher in women having a hysterectomy than the general population of women, but lower than psychiatric patients (Gath, Cooper & Day, 1982). Although having a hysterectomy can be an emotional experience for many reasons, it is now well established that seldom does it leads to an episode of depression (Gath, Rose, Bond, Day, Garrod & Hodges, 1995). Moreover, Khastgir & Studd (1997) have concluded that women who have

suffered from years of heavy periods, as well as menstrual and pelvic pain will have an improvement in their illness-related emotional distress following a hysterectomy. These authors have also argued that high levels of psychiatric morbidity prior to the hysterectomy cannot be explained solely by operation-related anxiety but most be understood in terms of more long-standing psychological problems. In contrast to this, however, is Boutwood and Campbell's (1987) opinion that emotional distress such as anxiety is a common experience of women admitted for hysterectomy procedures.

Even though it is a medically effective and safe treatment, a stigma is still occasionally attached to the hysterectomy. The current scientific knowledge has helped to confront some of the misconceptions about the adverse psychological aspects of the hysterectomy. In a partial attempt to control for the psychological aspects of the hysterectomy within the present research study on post-operative pain management, exclusion criteria for potential participant's included those who had previously received treatment for mental health problems such as clinical depression and schizophrenia. In addition, the emotional distress and state anxiety of each participant was measured prior to their operation. The impact of emotional distress and state anxiety in regards to pain management are further discussed in the next chapter.

2.3 The Acute Pain Experience

Pain is one of the most complex experiences that everyone at one time or another will encounter (Rudy & Turk, 1991). The acute post-operative pain experienced by women undergoing total abdominal hysterectomies can be severe, and is one of the important aspects of the medical management following surgery. The International

Association for the Study of Pain (IASP) defined pain as "an unpleasant sensory and emotional experience associated with actual or potential tissue damage or is described in terms of such damage" (Merskey, Albe-Fessard, Bonica, Carmen, Dubner, Kerr, Lindblom, Mumford, Nathan, Noordenbos, Pagni, Renaer, Sternbach and Sunderland, 1979, p.250). Moreover, acute pain is of recent onset and of relatively short duration (France, 1989). Although pain is unquestionably a sensation, it is always perceived as unpleasant and hence is an emotional experience (Merskey et al., 1979; Skevington, 1996).

The acute pain experienced after a hysterectomy is caused by the horizontal and vertical incisions through the skin and abdominal muscles, and partial exploration of the exposed organs (Grant & Cunningham, 1993). This creates excitation of peripheral pain receptors, know as nociceptors, and the pain experience is initiated. The damaged tissue generates nociceptive (pain) signals to the brain, which in turn warn the patient that something is wrong and initiate behaviours aimed at controlling and possibly eliminating the pain. The body responds to tissue trauma and pain with hypothalamic stimulation, increased catecholamine and catabolic hormone secretion, and decreased secretion of anabolic hormones. The effects of these changes include increased metabolic rate, enhanced blood clotting, increased blood glucose, water retention, and impaired immune functioning (IASP, 1992). Pain sensations diminish as the damaged tissue heals (France, 1989). However, the sensory aspects of pain along with behavioural, cognitive and emotional factors, as well as their complex interactions, influence interpretation of the pain experience and the healing process (Park & Fulton, 1991).

2.4 Theoretical Models of Acute Pain

Throughout the years there has been a considerable amount of debate about the mind-body relationship with regards to pain, and now it is clinically well known that pain is a psychological state and not solely dependent upon physiological factors (Sjostrom, 1995). Medical practitioners have been stating for the past few decades that patients with similar tissue damage react differently to their conditions and to the same types of treatment (Rudy & Turk, 1991). In the latter half of the twentieth century there has been serious criticism towards models of pain focusing exclusively upon sensory and physiological factors. The specificity theory of pain from the 1950s suggested a direct relationship between the severity of an injury and the level of pain experienced, and the pattern theory of pain from the same decade with its idea of central summation of sensory nerves have both long been abandoned (Symonds, 1998).

The move away from the view that pain is solely a sensory phenomenon towards the view that pain is a perceptual experience was provided by Melzack and Wall in 1965. Their theory - *the gate control model of pain* - was designed to address the shortcomings of previous models and incorporated psychological aspects of the pain experience (Skevington, 1996). According to the gate control model, pain is not just an automatic sensory event but a very personal and variable experience influenced by cultural knowledge, the meaning of the situation, as well as attention and other cognitive activities. The gate control model proposed that besides the traditionally recognised dimension of nociception through the spinal cord, the perception of pain also involved the simultaneous integration of motivational, affect, and cognitive-evaluative components. This theory proposes that stimulation of the skin due to an

injury for example, initiates nerve impulses that are transmitted to the spinal cord. In the spinal cord there is a "gate" controlling incoming impulses which integrates this incoming information with details from the brain. The brain then provides information about the psychological state of the individual such as behavioural and emotional states, as well as information about previous pain experiences. The "gate" receives and combines all of this information and uses it to either "open" or "close". An open gate results in the perception of pain. Additional opening and closing of the "gate" is hypothesised to be dependent upon a combination of factors, including the individual's attention to the pain source, anxiety, emotional distress, coping ability, and the physical injuries to the body (Rudy & Turk, 1991; Symonds, 1998). The gate control theory has been one of the most influential working models of pain, and has therefore been the subject of considerable debate and criticism (Skevington, 1996).

Much of what Melzack and Wall suggested in 1965 has, however, been unsubstantiated. There has been no evidence to conclude that the "gate" system exists within the spinal cord, which receives and combines information and decides whether to open or close. It is only in theory that when the gate opens does the perception of pain result (Skevington, 1996). The gate control model seems appropriate for acute pain but fails to account for the considerable interaction of environmental influences, physical factors and pain perceptions over time. Thus, this model is insufficient for explaining the complexities of chronic pain states (Symonds, 1998). Although acute pain experiences are usually less complex than chronic pain states, there has recently been attention paid to the role of cognitions in both types of pain experiences. At an acute level, passive behavioural responses to the nociception stimulation of surgery for

example are often appropriate as they serve a protective function. The question is, however, what cognitions are related to these issues, and what influence do these in turn have on a patient's affect and other pain coping responses? An alternative theory known as the cognitive-biobehavioural model places strong emphasis on patients' interpretations of pain, their coping resources and their general situation, and how these influence the pain experience (Rudy & Turk,1991). A central theme within this model of pain is Bandura's construct of self-efficacy. The empirical study within this thesis has evaluated the construct of self-efficacy in relation to post-operative pain management with PCA. The theoretical aspects of self-efficacy and its application within pain management is examined in detail towards the end of Chapter Three.

2.5 Measurement of Acute Pain

As a complex and multidimensional sensation pain is always a personal and subjective experience, which makes it difficult to define as well as measure (Merskey et al., 1979; Rudy & Turk, 1991; Skevington, 1996). In 1990, the Royal College of Surgeons and College of Anaesthetists concluded that there are no objective measures of pain, only subjective measures. Since it is a subjective experience, it is only those individuals in pain that can determine its intensity, severity, and the adequacy of its relief (Campbell & Patterson, 1998). The measurement of pain has been of vital concern to clinicians and researchers for many years, but numerous methodological problems have been encountered in measuring both acute and chronic pain states. In the absence of an objective measure, the best methods involve self-report for pain patients (Macintyre & Ready, 1996). For adults, the three most commonly employed

methods of self-reported pain measurement include the categorical rating scale, the visual analogue scale, and the verbal numerical rating scale.

Categorical rating scales were the first type of instruments to measure pain and have been used for over 50 years. They employ lists of different words to describe pain experiences (McQuay & Moore, 1998). Patient's are asked to choose the most appropriate word to rate their pain. The lists usually have four or five words that reflect the intensity or magnitude of pain. An example of a five word list includes "no pain", "mild pain", "moderate pain", "severe pain" and "extreme pain". Each word is given a number so a patient's choice can be quantified. Within the example given "no pain" is 0, while "extreme pain" is 5. The most common categorical rating scale is the Present Pain Index (PPI) from the McGill Pain Questionnaire developed by Melzack (1975). Although a categorical rating scale is relatively easy to use, it is only a unidimensional measure of pain (Macintyre & Ready, 1996; Park & Fulton, 1991).

The visual analogue scale (VAS) is widely used and consists of a 100mm horizontal line with endpoints such as "no pain" on the left anchor and "worst possible pain" on the right anchor. There are no other cues or prompts on the line. Patients are asked to make a mark on the line which best represents their pain. The distance from the left anchor of "no pain" to the patient's mark is then quantified in millimetres (Macintyre & Ready, 1996; Park & Fulton, 1991).

The advantages of the VAS include they are quick to use and easy to score, are relatively simple to understand, they do not contain imprecise descriptive terms, they provide many points from which to choose, they have ratio properties, and are well suited to statistical analysis (Campbell & Patterson, 1998; Park & Fulton, 1991). One

of the main disadvantages of the VAS is that it too is unidimensional, and is often only used to assess the amount of pain or its intensity. The second main disadvantage of using the VAS is that some patients may have difficulty understanding or performing the task of marking the line (Macintyre & Ready, 1996; McQuay & Moore, 1998). The VAS has been a valid and reliable measure within the field of chronic pain, but its use within post-operative pain has not been as rigorously studied (DeLoach, Higgins, Caplan & Stiff, 1998). These authors have stated that post-operative perceptual-cognitive impairments experienced by those who have undergone anaesthesia can degrade the relationship between the VAS and the subjective pain experience. However, they have concluded that the VAS seems to be a valid measure of immediate post-operative pain even though a single VAS score can have an imprecision of plus or minus 20mm. Campbell and Patterson (1998) have also concluded that the VAS is now widely used for acute pain as it provides a sensitive indication to the intensity of this subjective experience.

Verbal numerical rating scales (VNRS) are similar to the VAS and are regarded as an alternative to, or complementary with such scales. Patients are asked to imagine a scale where "0 equals no pain", and "10 equals the worst pain possible". They are then asked to give a number on this scale between 0 and 10 that would best represent their pain. VNRS are very quick and easy to use, they do not require any equipment, and rely only upon a patient's verbal response. Problems with VNRS can occur, however, if there is a language barrier or if there are difficulties in imagining the scoring system. The VNRS has traditionally been used on surgical wards by nursing staff to assess patient's acute post-operative pain (Macintyre & Ready, 1996; McQuay

& Moore, 1998). DeLoach et al., (1998) reported correlation coefficients of 0.95 for VAS scores with those of an 11 point (0-10) verbal numerical rating scale for post-operative pain patients.

Other methods of pain measurement in addition to the three self-report types mentioned do exist, for example behavioural reactions to pain, global subjective efficacy ratings of pain treatment, and various physiological responses to pain. These are not however used in the present study. The visual analogue scale was employed as a measure of pain expectations and is further discussed in Chapter Four within the research methodology. The McGill Pain Questionnaire (MPQ) was employed as a multidimensional measure of pain and is also discussed in Chapter Four. The MPQ is currently widely used in both acute and chronic pain states and includes a VAS, a categorical rating scale (the PPI), as well as a list of words that described the sensory and emotional qualities of pain (Melzack, 1987). As a complex and personal sensation pain remains a difficult concept to measure for a variety of reasons. The self-report measures of pain employed in the present research were used as instruments to help quantify participant's subjective pain experiences.

2.6 Acute Pain Treatment

Adequate pain management following surgery is essential for a quick and uncomplicated recovery. Moreover, it should be unnecessary for acute pain patients to have to endure severe pain in hospital, or contact health professionals due to continuing pain following hospital discharge. Good post-operative analgesia will increase patient comfort and minimize the possibility of psychological distress

(Macintyre & Ready, 1996; Park & Fulton, 1991). The majority of acute pain is managed solely with medication including aspirin, paracetamol, non-steroidal anti-inflammatory drugs (NSAIDs), and opioids such as morphine sulphate (McQuay & Moore, 1998). The Department of Health reported that in England during 1995 there were over 50 million primary-care prescriptions for these pain relieving medications (Government Statistic Services, 1996).

Opioid drugs are the first-line treatment for severe acute pain. In particular, morphine is widely used for the management of post-operative pain. A variety of routes of morphine administration exist, including intravenous, intramuscular, subcutaneous, and oral. Irrespective of the route, opioids can cause severe side effects such as nausea, vomiting, constipation, sedation, pruritus, urinary retention, and respiratory depression (Park & Fulton, 1991). The key principle in opioid use is to provide pain relief or analgesia. The lowest blood concentration of the drug that produces analgesia is known as the minimum effective analgesia concentration (MEAC). Below this amount a patient will not experience pain relief. Above this point there will be an increased amount of pain relief and an increased possibility of side effects. The range of blood levels of opioid drugs where analgesia is achieved without significant side effects is frequently referred to as the *analgesic corridor.* If a patient asks for more pain killers, it can be assumed that their minimum effective analgesia concentration has not been maintained, which is a signal of inadequate pain provision (McQuay & Moore, 1998). Suboptimal pain relief is often associated with delivery of too small an amount of the opioid, too long between doses, and not enough attention given to patient pain reports. Furthermore, many myths are associated with

opioid drug pain management that have resulted in poor pain relief for many patients. These include beliefs that pain is not harmful to patients, pain can obscure the signs of surgical complications, and acute pain patients will become addicted to opioids (Macintyre & Ready, 1996).

Approaches to the successful management of pain are now being directed towards not only the sensory aspects but also emotional, cognitive and other psychological factors which influence the patient's response to pain (Park & Fulton, 1991). Despite advances in neuroanatomy, physiology and pharmacology, there is still no simple and consistent cure for many pain syndromes (Rudy & Turk, 1991). Patients undergoing acutely painful surgical procedures can be provided with information concerning pain coping strategies, but indepth psychological interventions are difficult to administer due to limited ward space/privacy and the side-effects of general anaesthesia, as well as being far too time consuming and expensive to be practical (Williams & Kinnery, 1991). There has been a gradual increase in recognising the need for better acute pain management from within a *biopsychosocial* perspective. In the past few years the International Association for the Study of Pain, the Royal College of Surgeons of England and the College of Anaesthetists, and the American Society of Anesthesiologists have all published reports aimed at improving the treatment of acute pain. In summary, these organisations have called for the creation of acute pain teams that are multidisciplinary, with a focus on continuous audit activity and research (Macintyre & Ready, 1996). As mentioned in Chapter One, clinical health psychologists are now employed directly with medical professionals on Acute Pain Teams to work with patients before an operation by providing education about pain

problems, and to help improve post-operative pain management (Symonds, 1998). As this thesis is focusing upon the use of the PCA as a method of providing post-operative pain relief, the procedural aspects of the PCA and the related psychological issues from the literature are reviewed and discussed in the next chapter.

CHAPTER THREE

PATIENT CONTROLLED ANALGESIA (PCA) FOR ACUTE PAIN MANAGEMENT

The purpose of this chapter is to present an overview of the PCA system and a review of the related acute pain management literature in an attempt to develop a context for the empirical research in this thesis. To achieve this the following sections are included: (3.1) general principles of PCA; (3.2) the motivation to pursue the present research; (3.3) literature review of psychological factors and PCA, with five separate subsections; (3.4) introduction to self-efficacy beliefs in pain management; and (3.5) research questions under investigation.

3.1 General Principles of PCA

The theoretical models and acute pain treatments presented in the previous chapter have generated many discussions, but researchers, medical doctors and patients have documented that traditional therapies of intermittent intramuscular injections (IMI) and fixed-rate oral analgesics provide poor post-operative pain control (Owen & Plummer, 1997). In a 1971 report from the journal *Anaesthesia and Analgesia*, Sechzer described a system in which a patient could control the amount of an intravenous analgesic drug necessary to relieve their post-operative pain. In this report, Sechzer (1971) coined the term patient controlled analgesia (PCA) which was a drug delivery system aimed at overcoming factors associated with suboptimal pain relief. During the 1970s and 1980s PCA systems were tested by researchers and the techniques were

refined, but it was not until 1989 and the early 1990s that a number of reliable PCA systems became readily available. The PCA has since been deployed throughout most of the developed world as acute pain teams have formed to improve the treatment of post-operative pain (Macintyre & Ready, 1996). As an alternative to traditional IMI and oral treatments, the PCA has achieved rapid acceptance in medical centres (Egan & Ready, 1994).

An example of a modern bedside PCA system is the *Lifecare PCA/Infuser 4200* which consists of a plastic case (measuring 25cm x 15cm x 10cm) containing a standard syringe as a drug reservoir that can be viewed through the tamper-resistant cover. It also includes a tiny electronic pump to move the drug from syringe to patient by way of a clear plastic intravenous tube, and a small display area with recordings of the patient demand/dose ratio, the volume of drug administered and volume remaining in the syringe. Connected to the PCA device is a handset with an easy-to-press button that when pressed by the patient will activate the pump and administer a single dose of analgesic medication. The rate of analgesic drug delivered is controlled by how often the patient presses the button. In general, the more frequently the button is pressed, the more analgesic the PCA system delivers. It has been hypothesised that a patient using an intravenous PCA system would make a demand when the level of analgesic drug in their blood fell below the minimum effective analgesic concentration (MEAC), and that their pain would be controlled when their blood concentration was above the MEAC (Owen & Plummer, 1997; Welchew, 1995).

There are four key issues for the anaesthetist utilising PCA as a device to manage

post-operative patients acute pain. These include the drug of choice, the volume of the bolus dose (demand dose size), the lock out interval, and side effects. As mentioned in Chapter Two, the opioid morphine sulphate is frequently employed for the treatment of severe acute pain and it is the most commonly used opioid for intravenous PCA. The volume of morphine needed to achieve the MEAC will vary between individual patients, but it is usually convenient practice to use a standard volume of the analgesic for each PCA request, which is known as a bolus dose. McQuay and Moore (1998) have suggested that a bolus dose size (the demand dose size) of morphine should be within the range of 0.5mg to 1.5mg. Owen and Plummer (1997) have, however, suggested that a bolus dose size of 0.5mg was too small for adequate pain relief for most people, while a dose size of 2mg was associated with increased side effects. These authors recommend a bolus dose of 1mg for morphine with intravenous PCA as this provides the best pain relief without adverse effects. They conclude that a patient's blood level of morphine can be kept within the analgesic corridor at this dose size.

The lockout interval prevents a patient from receiving a dangerously high dose of morphine over a specific period of time. Once the patient has pressed the PCA button, it takes a finite time for the morphine to be delivered from the pump to the blood, enter the CNS, and exert its effect. A lockout interval of at least five minutes is used with PCA because it is essential that the effects of a demand dose be realised before the patient administers a second dose (Welchew, 1995). Finally, undesirable side effects such as nausea, vomiting, and sedation associated with morphine can limit analgesic consumption and pain relief. Heath and Thomas (1993) suggest that patients

view side effects like emetic sequelae as important as pain relief itself. Whilst PCA is effective for controlling post-operative pain, keeping the bolus dose to the smallest that produces an adequate degree of analgesia is essential (McQuay & Moore, 1998).

3.2 The Motivation to Pursue this Research

Although the PCA has become a widely used as tool for administering analgesic medication to post-operative pain patients, it does not guarantee effective pain relief and it cannot eliminate post-operative pain (Kehlet, 1994; Owen & Plummer, 1997). There is both controversy and inconsistency in the literature published in the past ten years on the use of PCA for post-operative pain. Despite advances in neuroanatomy, physiology and pharmacology, there is a need for clinical health psychologists to work within acute pain teams in a multidisciplinary manner to help improve post-operative pain management. As mentioned in Chapter One it is the general aim of the research study contained in this thesis to contribute to the growing knowledge in this area by investigation the role of psychological factors including self-efficacy beliefs and PCA satisfaction in post-operative acute pain management.

With the trend towards providing cost effective patient care and efficient delivery of medical services, the added value of psychological information can possibly enhance selection of patients for PCA use, and factors associated with patient satisfaction. The direct cost of providing post-operative analgesia by PCA is greater than that of traditional methods (Owen & Plummer, 1997). This expense places serious constraints upon PCA availability (Thomas, Heath, Rose, & Flory, 1995). As Maynard (1987) suggests, when scarcity is accepted, attention should be focused on the principles that

are used to deliver medical services. Thomas et al. (1995) go on to argue that an understanding of the factors which make PCA beneficial is vital in allocating the system effectively. Furthermore, Hall and Salmon (1997) have invited researchers to continue examining patient's use of PCA in an attempt to help resolve some of the current controversies and inconsistencies in the area.

3.3 Psychological Factors and the Use of PCA: A Literature Review

It has been recognised that there are large individual differences in the dosage requirements needed to achieve the minimum effective analgesia concentration and ultimately provide relief from acute pain (McQuay & Moore, 1998). It has also been suggested that because of these individual differences, patients should be able to titrate their analgesic medication with PCA to an effective blood concentration and achieve a clinical outcome of pain relief. Perhaps, however, pain relief is not the only clinical outcome following surgery. The psychological differences of patients, in addition to their individual differences in dosage requirements have been considered as important factors in the use of PCA (Perry, Parker, White & Clifford, 1994). There are, unfortunately, only a limited number of published studies that have specifically investigated the role of psychological factors in the use of PCA for post-operative pain management. The following literature review presents a discussion of the published findings organised into four review questions which include: (3.3.1) is PCA effective?; (3.3.2) is patient satisfaction with PCA important? (3.3.3) can anxiety affect pain management with PCA?; and (3.3.4) does control influence pain with PCA? This section concludes with (3.3.5) a summary of the literature review.

3.3.1 Is PCA Effective?

In a meta-analysis of 15 randomised control trials of PCA published between 1987 and 1990, Ballantyne, Carr, Chalmers, Dear, Angellilo and Mosteller (1993) reported that four out of 12 studies demonstrated statistically significant improvements in analgesic efficacy during PCA therapy. Eight of the trials reported no difference in patient pain scores between PCA and conventional therapy, while none favoured conventional therapy over PCA for post-operative pain. Based on the results of their meta-analysis, Ballantyne et al. (1993) concluded that there is a trend towards superior pain relief with PCA. When used correctly this method can produces continuous matching of analgesic drug volume to the fluctuating needs of patients, and avoids the problem of missing the analgesic corridor often associated with conventional pain therapy.

One of the studies of PCA effectiveness reviewed by Ballantyne et al. (1993) was published by Wasylak, Abbott, English and Jeans (1990). They studied 38 women (mean age of 42 years) admitted for hysterectomy operations and randomly assigned them to one of two pain management groups. The first consisted of participants who received a standard protocol of intramuscular injections (IMI) of morphine, while the second group used standard intravenous PCA to administer morphine following surgery. This study measured post-operative pain with the short-form version of the McGill Pain Questionnaire (MPQ) they reported that the PCA group participants had significantly lower pain scores as measured by the MPQ compared to IMI group participants over time from the recovery room to the two-week post-discharge assessment. These authors also reported that the two groups did not differ

significantly on the total volume of morphine consumed in the post-operative period. One final result from this study was that the PCA group participants' post-operative recovery period prior to discharge was significantly less (by 0.29 days) compared to the IMI group participants.

In a more recent study of PCA effectiveness, Thomas, Heath, Rose & Flory (1995) partially replicated and added to the findings of Wasylak et al. (1990). Thomas and colleagues studied 110 women (mean age of 52 years) admitted for elective abdominal hysterectomy and randomly assigned them to either PCA or IMI post-operative pain management groups with both groups receiving morphine as the analgesic drug. Participant's post-operative pain was assessed on three occasions, at 6, 18 and 24 hours after surgery using the 15 pain descriptive terms from the short form version of the McGill Pain Questionnaire (MPQ). The numerical average of these three MPQ pain scores was employed as each participant's total pain score. They also obtained the total volume of morphine administered for each participant of the two pain management groups. Their results confirmed that PCA was more effective in reducing total pain scores, as was previously suggested by Wasylak et al. (1990). The mean total pain scores as measured by the MPQ for the PCA group was 21.6, while the IMI group's mean total MPQ score was 40.7. The difference between these two mean scores was statistically significant. The PCA group participants used on average 53mg of morphine which was significantly less then the 79mg of morphine consumed on average by IMI group participants during the post-operative period to manage pain. This contrasts the finding from the Wasylak et al. (1990) study where no such difference in morphine volume was found. The findings that PCA reduced post-

operative pain and also decreased the total volume of the analgesic drug needed by participants during post-operative recovery permitted Thomas and colleagues to conclude that compared to IMI treatment, PCA was an effective method of controlling acute pain.

3.3.2 Is Patient Satisfaction with PCA Important?

In the meta-analysis of PCA trials published by Ballantyne et al. (1993), it was reported that there was a trend for PCA to be better than conventional therapy for reducing post-operative pain. However, patient satisfaction with PCA did not occur exclusively because their pain was effectively controlled. This is a potential confound for PCA as an effective tool, because it suggests that pain relief (or elimination) cannot alone be used to determine success of this analgesia delivery system. Although only three of the trials in the meta-analysis actually measured patient satisfaction, Ballantyne et al. (1993) concluded that improvements in PCA satisfaction were possibly the result of the patient's ability to control their pain relief. Of course, pain relief is an essential element of post-operative patient care, but beyond individual differences in analgesic drugs needed to achieve pain relief, psychological factors such as personal control may be an important ingredient of the clinical success of PCA. Ballantyne and colleagues called for additional research to further investigate aspects of PCA satisfaction.

The psychological and pharmacological factors associated with patient satisfaction with PCA were investigated and published by Jamison, Taft, O'Hara and Ferrante in 1993. This study employed 68 women (mean age of 45 years) undergoing abdominal

hysterectomy with intravenous PCA for post-operative pain management as participants. The researchers measured the participants level of pain 24 hours and 72 hours after surgery with a 11 point categorical rating scale ranging from "0 = no pain" to "10 = worst possible pain". PCA satisfaction was also measured 24 and 72 hours after surgery, using a 7 point Likert-type rating scale ranging from "1 = very dissatisfied" to "7 = very satisfied".

This study reported that preoperative anxiety (measured with a 5 point Likert-type response scale ranging from "1 = not at all" to "5 = extremely") and pain intensity were both significant predictors of PCA dissatisfaction after 24 hours. This suggested that higher preoperative anxiety scores and higher pain intensity scores were associated with high PCA dissatisfaction 24 hours after surgery. Neither of these two variables significantly predicated PCA dissatisfaction 72 hours after surgery. The impact of participant anxiety on pain and its management is further discussed in the next subsection (3.3.3) of this chapter. Jamison et al. (1993) stated that although ratings of PCA satisfaction improved by the third day, this may be attributed to reduced side effects following withdrawal of PCA. A hypothesis generated from this research concerning PCA satisfaction but not as of yet tested is based upon the impact of analgesic side effects. If participants experienced side effects they may be less satisfied with the PCA, and ultimately have consumed more of the analgesia than those would did not experience any side effects. This issue is considered once again in the concluding section of this chapter where the specific research questions under investigation in the present study are presented.

Taylor, Hall and Salmon (1996) also discussed the issues of PCA satisfaction,

analgesic side effects and personal control in a qualitative study. They interviewed 26 abdominal surgery patients (19 women, 7 men; mean age of 47 years) to identify recurring themes in their experience with PCA. In general, the views expressed were varied but the majority of patients found PCA a positive method of post-operative pain relief. Side effects were, however, commonly reported. Nausea and vomiting were particulary troublesome for participants and appeared to be an important complication of PCA satisfaction. Taylor et al. (1996) reported that the participants' comments did not support the previously mentioned opinion of Ballantyne et al. (1993) that control by patients over their pain was advantageous and a major cause of PCA satisfaction. Only one of the 26 patients interviewed by Taylor and colleagues mentioned directly the importance of control with their PCA. When this was discussed with other participants, Taylor et al. (1996) concluded that the value of personal control with PCA was only an improvement over having to wait for nursing attention.

Egan and Ready (1994) argued that pain relief with PCA whether measured by a simple visual analogue scale (VAS) or by a more elaborate self-report measure like the MPQ may intuitively be expected to contribute to PCA satisfaction, but may only be a part of the equation. These researchers assessed 711 general surgical patients using PCA and 205 general surgical patients using epidural opioid analgesia (EOA) with regards to satisfaction of their post-operative pain therapy. They employed a 0-10cm VAS of satisfaction with "0 = very dissatisfied" to "10 = very satisfied" as respective end points. In general, they found that EOA participants were significantly more satisfied (mean VAS score of 9.0, with a standard deviation of 1.5) than PCA participants (mean VAS score of 8.6, with a standard deviation of 1.8). However, they

did not measure post-operative pain, or investigate issues of EOA and PCA effectiveness.

A subset of 50 participants randomly selected from each of the two groups underwent further evaluation to help identify specific aspects of their satisfaction and dissatisfaction. For this purpose Egan and Ready (1994) designed a post-operative pain therapy satisfaction questionnaire based upon an earlier qualitative survey. This scale was composed of an eight item subscale associated with satisfaction with the provision of pain therapy, and an nine item subscale associated with themes that might be expected to contribute to dissatisfaction. Although this questionnaire was designed to operationalize the construct of satisfaction with post-operative pain therapy, Egan and Ready (1994) did not report numerical values for this instrument as a summated rating scale. They reported the percentage of participants from the two groups who endorsed each of the 17 items. The PCA participants' satisfaction results included: (1) over 80% responded that this method "worked quickly" and "provided personal control"; (2) 40% responded PCA "gave effective relief while resting" and "no need for painful injections"; while (3) under 20% of PCA participants responded to the following satisfaction items, "gave me a clear mind", "no distressing side effects", "effective relief when moving or coughing", and "provides relaxation". The PCA participants' dissatisfaction results included: (4) 44% responded that there was "pain after surgery before the method became effective"; (5) between 25% and 35% responded "causes side effects", "insomnia" and "sedation"; while (6) less than 12% responded "fear of addiction", "too much responsibility for own care", "poor overall pain relief", "dependence upon other for care", and "the method worked slowly". Only

22% of their PCA sample found no reasons to be dissatisfied with their provision of pain relief. Unfortunately, these researchers did not measure post-operative pain and they were unable to relate their results of PCA satisfaction to pain intensity, the volume of analgesia consumed or the general efficacy of PCA compared to epidural analgesia. In conclusion, patient satisfaction with PCA remains and important issue for research and is an important theme of the present study. Specific themes such as side effects, volume of analgesia consumed, and psychological variables including personal control in relation to PCA satisfaction are in need of further analyses.

3.3.3 Can Anxiety Affect Pain Management with PCA?

The association between anxiety and pain has been well documented in the literature and it has been frequently reported that anxiety accompanies acute pain states (Heath & Thomas, 1993). Despite thorough exploration of this relationship, the source or cause of anxiety with regards to pain has been disputed (France, 1989). Research has consistently demonstrated significant correlations (degree of association) between preoperative anxiety and post-operative pain. In general, Heath and Thomas (1993) report that moderate preoperative anxiety levels are associated with optimal recovery from surgery. This is largely because patients with low preoperative anxiety do not engage in cognitive preparations and become frustrated when confronted with the reality of their post-operative discomfort. Patients in high preoperative anxiety are reported to have unrealistic fears that remain following surgery. This general hypothesis has not always, however, been supported by empirical findings (Munafo, 1998). It is beyond the scope of this thesis to present an overview of general research

findings in anxiety and post-operative pain, as the focus of the present study is on PCA and pain management. For a general overview of the research finding in the field of anxiety and pain management please refer to Munafo (1998).

The study published by Jamison et al. (1993) presented above in section 3.3.2 reported that preoperative anxiety measured with a 5 point Likert-type response scale was a significant predictors of PCA dissatisfaction measured 24 hours after surgery. These researchers found that preoperative anxiety made a unique and significant contribution to the variance in PCA dissatisfaction scores. They concluded that this finding emphasized the importance of psychological variables in the use of PCA.

The distinction between *state anxiety* and *trait anxiety* forwarded by Spielberger and colleagues has helped to further understand the relationship with acute surgical pain. State anxiety is a transient condition which varies in intensity and fluctuates over time depending upon the circumstances. Trait anxiety on the other hand is a personality disposition that predisposes individuals to experience anxiety. The Spielberger State/Trait Anxiety Inventory (STAI) has been employed in a variety of studies to help clarify the relationship between anxiety and post-operative pain (Spielberger, Gorsuch, Lushene, Vagg & Jacobs, 1983).

Gill, Ginsberg, Muir, Sykes and Williams (1990) employed the STAI state anxiety scale in their study of the psychological factors in PCA use for 80 adults (44 women, 36 men) who underwent a variety of orthopaedic surgeries. They reported that higher state anxiety scores were significantly related to greater pain as measured by the MPQ and a VAS. They also found that state anxiety scores were not significantly related to the total volume of analgesia consumed by patients. Gill et al. (1990) concluded that

patients with greater anxiety rate their pain as higher, and make more PCA demands in response to their heightened anxiety, especially during the lockout interval when the drug is not available.

The STAI was also used by Thomas et al. (1995) to assess participants prior to surgery. They reported a mean state anxiety scores of 44.3, with a standard deviation of 13.4 and a range of 20-76 for their 110 participants from the IMI and PCA groups. Thomas et al. (1995) also reported that state anxiety made a significant contribution to the total volume of morphine consumed by IMI and PCA participants, accounting for 23% of the variance in their scores. This indicated that higher state anxiety scores predicted higher volume of morphine consumed during the post-operative period. An additional result from this study was that state anxiety made a significant contribution to the prediction of total post-operative pain scores, accounting for 46% of the variance in pain reported by PCA participants only. This suggested that higher state anxiety was predictive of greater post-operative pain scores (Thomas et al., 1995).

Perry et al. (1994) assessed preoperative anxiety in 99 women (mean age of 46 years) admitted for elective abdominal hysterectomy. They employed the STAI to measure both state and trait anxiety, the MPQ and a VAS to assess pain 24 and 48 hours after surgery. Their results suggested that state anxiety was a significant predictor of post-operative pain measured with the VAS 24 hours after surgery and accounted for 22% of the variance in scores. They concluded that the positive correlation between preoperative state anxiety and post-operative pain from their results support other research findings, and suggests that interventions may be helpful to reduce anxiety for extremely worried surgical patients.

3.3.4 Does Control Influence Pain with PCA?

The effectiveness of PCA, preoperative anxiety and emotional distress, coping strategies, the degree of personal control, and patient satisfaction with their method of pain relief are all important and interactive determinants of acute pain experiences (Heath & Thomas, 1993). The conclusions of Ballantyne et al. (1993) that improvements in post-operative pain relief could be dependant upon not only patient satisfaction with PCA but also their ability to control their pain relief has been seriously considered. Hospitalization and subsequent gynaecological surgery are stressful events which women often have no control over. Stress in this context is compounded by acute post-operative pain. Under these circumstances, offering patients some control over their pain in the form of an analgesia delivery system can potentially relieve their anxiety and emotional distress (Welchew, 1995).

Johnson, Ferrante, Magnani and Rocco (1988) measured the construct of locus of control with the Multidimensional Health Locus of Control Scale in 40 women (mean age of 48 years) undergoing hysterectomy to determine if this construct was associated with PCA effectiveness. They reported that patients with an external locus of control had significantly higher post-operative pain scores than patients with an internal locus of control. They concluded that the external locus of control participants did not like taking control and were therefore unable to use PCA to take control of their pain. Jamison et al. (1994) also measured locus of control with the Multidimensional Health Locus of Control Scale, but they did not employ this variable in their analysis or mention any of the findings in their results or discussion sections. In the study by Perry et al. (1994), the concept of control over analgesia was measured post-

operatively with a three point scale including "1 = unimportant", "2 = somewhat important", and "3 = very important". They reported that patients who felt that control over analgesia was relatively more important used significantly more morphine while on PCA. Locus of control is further discussed in section 3.4 of this chapter with reference to self-efficacy beliefs and pain management.

The affective, behaviourial and cognitive coping strategies that individuals employ to help control the negative aspects of acute pain can have an influence upon post-operative adjustment and recovery (Heath & Thomas, 1993). The published literature on coping with chronic pain is well developed but there are few studies that have investigated the occurrence of spontaneous coping strategies for acute post-operative pain with PCA. In the Thomas et al. (1995) study presented above, behaviourial coping style was measured using Miller's Behaviourial Style scale prior to surgery. They reported that coping helped to predict total pain scores, and that it made a significant contribution accounting for 19% of the variance in these scores. This indicated that for both the IMI and PCA groups preoperative behaviourial coping strategies such as a strong preference for information was predictive of higher post-operative pain scores. These authors also reported that this style of preoperative coping predicated 21% of the variance in total volume of morphine consumed. Although interesting, these findings appear to be in contrast to the results of other studies which have concluded that certain types of coping strategies can alleviate post-operative pain and help recovery (Pick, Pearce & Legg, 1990; Heath & Thomas, 1993). In contrast to the findings of Thomas et al. (1995), Gill et al. (1990) found that patients with higher scores on the rational thinking factor of the Coping Strategies

Questionnaire reported significantly lower pain scores on the MPQ.

Individuals experiencing pain employ a wide variety of strategies and some people cope well with their pain, while others experience high levels of distress. The distinction made between adaptive (positive or active) coping strategies and maladaptive (negative or passive) coping strategies has helped to further understanding of the influence of control on pain management (Brown, Nicassio & Wallston, 1989). Active coping refers to the use of adaptive or positive strategies in an attempt to control pain or function in spite of pain. Examples of adaptive coping for acute pain include relaxing and not bothering about the pain, ignoring the pain, and thinking of things to help distract the pain. The use of various adaptive pain coping strategies following surgery can reduce pain, uncertainty, and feelings of distress (Skevington, 1996). In contrast, passive coping refers to the use of maladaptive or negative strategies that allow one to be adversely affected by the pain or concede the control of one's pain to others. Examples of maladaptive coping strategies for acute pain include worrying that the pain will never end, worrying about how long the pain will last, and focusing attention on the location and intensity of the pain. From an empirical study of the cognitive coping skills used by post-operative patients, Pick, Pearce and Legg (1990) concluded that both pain intensity and distress measured 2 days after surgery were positively correlated with the use of negative (maladaptive) coping strategies. There is, unfortunately, only a limited amount of research concerning the adaptive and maladaptive coping strategies employed by hysterectomy patients using PCA. As an adaptive behaviourial coping strategy, the use of PCA may in fact be influenced by the cognitive strategies that patients use to control their pain experiences.

3.3.5 Summary of literature review

Although PCA has been described as an effective method of providing post-operative analgesia, the reasons why it is effective are currently the subject of considerable debate. This controversy surrounding PCA is based upon the limited number of empirical studies investigating the psychological factors associated with its use, and the lack of consistency in these findings. Hall and Salmon (1997) have called for a continued examination of patient's use of PCA to help resolve some of the current conflicts.

One of the important themes discussed in the published literature is that post-operative use of PCA can help manage a patient's pain, but factors beyond just effective pain relief alone are associated with PCA satisfaction. Ballantyne et al. (1993) suggested that personal control over analgesia was a factor in PCA satisfaction, but the qualitative findings from Taylor et al. (1996) did not support this conclusion. Johnson et al. (1988) reported that participants with an external locus of control had significantly higher post-operative pain scores than those with an internal locus of control. Jamison et al. (1993) failed to discuss their measurement of locus of control, but did report that higher preoperative anxiety and higher post-operative pain intensity were both significant predictors of PCA dissatisfaction. Perry et al. (1994) concluded that high preoperative state anxiety was a significant predictor of increased post-operative pain. Gill et al. (1990) concurred with Perry and colleagues, and added that rational thinking as a coping strategy was associated with lower pain scores. While Thomas et al. (1995) concluded that patients with high preoperative state anxiety experienced great post-operative pain, consumed more morphine with PCA, and that

those who indicated before surgery a preference for information as a behaviourial coping strategy reported higher post-operative pain scores.

The present study was designed to partially replicate and go beyond the findings of this published research. The inconsistencies in the literature have arisen partly because of methodological differences in the various studies, including the use of dissimilar measures of the various constructs under investigation, such as pain intensity and anxiety. Moreover, the empirical assessment of psychological factors such as pain coping strategies and PCA satisfaction have been curiously absent from many of published research papers. Additionally, previous studies have failed to discuss their findings in terms of the gate control theory of pain, or any other theoretical framework. To answer the call for additional research on the use of PCA forwarded by Hall and Salmon (1997), the present study focuses upon outcome variables that have been partially explored by previous research including post-operative pain, PCA satisfaction, and volume of morphine consumed by participants using PCA. The unique contribution of the present study is that it goes beyond the limited theoretical framework of the published research by investigating the role played by self-efficacy beliefs in the use of PCA.

3.4 Self-Efficacy Beliefs in Pain Management

A considerable amount of human functioning is facilitated by a personal sense of control. Effective personal functioning in particular is not just about knowing what to do and being motivated to do it, because people often fail to perform effectively or at an optimal level even though they know what to do and possess the required skills to

do it (Schwarzer, Babler, Kwiatek, Schroder & Zhang, 1997). Albert Bandura (1997) defined efficacy as a generative capability in which cognitive, social, emotional and behaviourial skills are organised and effectively orchestrated to serve a variety of purposes. As a core element of social-cognitive theory, Bandura's (1986) construct of self-efficacy is a person's judgment of their ability to organise and execute a course of action required to attain a designated performance. Bandura has argued that "self-referent thought activates cognitive, motivational, and affective processes that govern the translation of knowledge and abilities into proficient action" (Bandura, 1997, page 37). Perceived self-efficacy is, therefore, concerned not with the number of skills a person has, but with what they believe they can do with the skills they have under a variety of circumstances.

Within a broad biopsychosocial perspective, and a cognitive-biobehavioural model, self-efficacy beliefs have contributed to the understanding of pain and its management. Attention deployment, cognitive appraisals and fear arousal can all influence pain perceptions, but the theory of self-efficacy states that these processes can depend on an individual's belief in their ability to cope with the painful stressor. This theory maintains that increasing an individual's self-efficacy beliefs can promote their resourcefulness and persistence in applying pain tolerance strategies at their disposal. It also enhances their mobilization of cognitive resources to divert attention from pain, and reduces distressing anticipations that can produce anxiety which exacerbates pain (Bandura, 1986; Williams & Kinney, 1991). Bandura (1991) asserts that self-efficacy is associated with relief from pain in three ways. Firstly, those who are confident in their belief that they can relieve their pain are more likely to seek out the necessary

information and skills to achieve this, and to keep trying them. Secondly, self-efficacious feelings can reduce the distressing expectations that create aversive reactions, including physical tension, which can aggravate discomfort. And thirdly, those who believe that they can control their pain are more likely to view unpleasant sensations as benign. In short, self-efficacy beliefs have direct implications for the management of both chronic and acute pain (Skevington, 1996).

The results of numerous studies of experimentally-induced acute pain have suggested that the more self-efficacious people judge themselves to be, the less pain they experienced in cold pressor tests, and the higher their pain threshold and pain tolerance (Bandura, 1997). The importance of perceived self-efficacy beliefs in pain management has also been corroborated by research of clinical acute pain. Bastone and Kerns (1995) reported that stronger self-efficacy assessed preoperatively predicted the use of less pain medication during recovery from coronary artery surgery. Oetker-Black and Kauth (1995) found that increased self-efficacy was significantly associated with increased adaptive coping strategies for persons undergoing knee-replacement surgery. These researchers concluded that patients with low self-efficacy beliefs were in need of education to increase their confidence in their ability to cope with the post-operative pain. In a brief review of the literature, Skevington (1996) concludes that self-efficacy does affect a person's ability to cope with clinical acute pain, and that these findings have implications for acute pain management using PCA.

Although Rotter's locus of control construct has been assessed in terms of PCA use, Bandura's construct of self-efficacy beliefs has not been assessed or discussed with regards to PCA for acute pain management. Even though perceived self-efficacy

and locus of control are sometimes mistakenly viewed as the same phenomenon, Bandura (1997) argues that they are conceptually distinct. He states that beliefs about whether a person can produce certain actions (self-efficacy) are different from beliefs about whether certain actions affect outcomes (locus of control). The primary concern of locus of control is a person's belief in the casual relationship between action and outcome, and not with personal efficacy. Bandura (1997) does, however, seriously consider the role played by outcome expectations in his theory. The anticipation or expectation of unpleasant consequences such as pain sensations after surgery can influence a person's pain coping strategies (Williams & Kinney, 1991). In an attempt to control for pain expectations in the present study, participants were asked to estimate on a 100mm visual analogue scale how much pain they expected to be in 24 hours after their operation. The measurement of pain expectations and perceived self-efficacy beliefs are presented in detail in the next chapter on research methodology. In the absence of a domain specific self-efficacy scale for post-operative acute pain and PCA use, the present research measured generalised self-efficacy beliefs with the addition of two pain related efficacy questions. Bandura (1997) discussed the generality of self-efficacy beliefs which can range from efficacious judgements across a wide range of activities or be specific to certain domains of functioning. Schwarzer and colleagues have developed a perceived self-efficacy beliefs measurement instrument which operationalizes this construct as a general dimension of the personality. The objective of the present research as previously suggested was to determine the role of perceived self-efficacy beliefs in the use of PCA for acute pain management.

3.5 Research Questions Under Investigation

Based upon the review of the published literature and the motivation for additional investigations within this field, one general and four specific research questions were investigated. The general research question was an attempt to partially replicate the qualitative findings of Taylor, Hall and Salmon (1996). What were the prevalent contents of participants' responses to two open-ended questions asked to them before their operation? The first questions concerned personal preparation for surgery, while the second concerned their thoughts and feelings about PCA use. This qualitative data gathering procedure allowed participants the opportunity to express their own views in their own words.

The four specific research questions under investigation involved self-efficacy beliefs, emotional distress, state anxiety and pain expectations measured quantitatively prior to the hysterectomy operations of invited participants. Post-operative pain, pain coping strategies, PCA satisfaction, and the volume of morphine consumed when using PCA were measured quantitatively after surgery. These variables were used to provide solutions to the following specific research questions:

Research Question One: A test of the hypothesis generated by the research of Jamison et al. (1993) concerning analgesic side effects. What impact do side effects such as nausea and vomiting have on the post-operative measurement of pain, pain coping strategies, PCA satisfaction, and volume of morphine consumed? It was hypothesised that participants who reported nausea and vomiting would be less satisfied with the PCA, experience greater post-operative pain, and consume more of the analgesic drug

than those who did not report side effects.

The three remaining specific research questions were concerned with the hypothesis that if self-efficacy beliefs measured before surgery were an important aspect of PCA use, then this construct would help predict post-operative outcome measures.

Research Question Two: As partial replication of the various findings by Gill et al. (1990), Perry et al. (1994), and Thomas et al. (1995), what variables of those measured including self-efficacy beliefs help to predict post-operative pain scores?

Research Question Three: As a partial replication of Thomas et al. (1995), what variables including self-efficacy beliefs help to predict volume of morphine consumed by participants?

Research Question Four: As an extension of the research by Egan and Ready (1994), and a partial replication of the findings of Jamison et al. (1993), what variables including self-efficacy beliefs help to predict PCA satisfaction?

CHAPTER FOUR

RESEARCH METHODOLOGY

4.1 Research Setting

Women admitted to a gynaecology ward within a large teaching hospital located in central London were considered potential participants. There were seven Consultant Gynaecological Surgeons attached to the ward, which had 15 inpatient beds and 10 day-surgery beds. There were between four and seven hysterectomy operations performed here on average each month. The hospital where the data was collected had an affiliation with the University College London Hospitals NHS Trust, who granted ethical approval for this research.

4.2 Research Participants

Fifty six women admitted for elective, non-malignant abdominal surgery over a ten month period were invited to participate in this study. This was 90% of the women admitted to the ward for a hysterectomy during this time, which was considered a quasi random sample. Fifty one of the women invited to take part provided informed consent for participation in this study. Six women did not want to take part in this study when the invitation was given. One women spoke only Spanish, a second women stated that she disliked answering questionnaires, and the other four women did not give specific reasons for not participating.

The 51 women who provided informed consent had not previously used a PCA system for post-operative pain, they were not receiving treatment for mental health problems such as depression and schizophrenia, and they did not suffer from chronic

painful conditions such as rheumatoid arthritis. Of these 51, four were unwilling to provide post-operative information because they were not feeling well at the time. Two other women provided only pre-operative information, as they experienced complications after surgery and did not use the PCA during the post-operative recovery period. The pre-operative information obtained from these six women was therefore not used in the statistical analyses of the research questions. Completed pre-operative and post-operative questionnaire data was therefore provided by 45 participants.

Of these 45 women, 18 (40%) had a total abdominal hysterectomy (TAH) only, 24 (53%) had a total abdominal hysterectomy and bilateral salpingo-oophorectomy (TAH and BSO), while 3 (7%) had a total abdominal hysterectomy and unilateral salpingo-oophorectomy (TAH and USO). The average age of the 45 participants was 48 years, with a standard deviation of 8 years and they ranged from 34 to 69 years of age. Twenty nine (64%) of participants were married, 27 (60%) had children, and 14 (31%) reported that they had undergone other surgical procedures in the past ten years. With only one exception, each participant received a 1mg bolus dose of morphine per PCA request as a standard post-operative procedure. Only one participant received a 0.5mg bolus dose of morphine per PCA request.

4.3 Apparatus and Measurement Instruments

All of the women invited to participate in this study were provided with an Information Letter (appendix B) outlining the general details and specific procedure of the research, as well as guaranteeing confidentiality. In addition, all participants received a Confidential Consent Form (appendix C) used to document their

participation in the study. The pre and post-operative measurement instruments described below were organised into questionnaire booklets in self-report format for each participant. The measurement instruments used to collect information from participants during the pre-operative interview included: (1) Generalised Self-efficacy Scale; (2) Centre for Epidemiological Studies Depression Scale; (3) The State Anxiety Scale of the Spielberger State-Trait Anxiety Inventory; (4) Visual Analogue Scale (VAS) of Pain Expectations; and (5) Two open-ended questions. The measurement instruments used to collect information from participants during the post-operative interview included: (1) McGill Pain Questionnaire; (2) Acute Pain Response Questionnaire; and (3) Patient Controlled Analgesia Satisfaction Questionnaire. The PCA delivery systems used on the gynaecology ward were manufactured by Abbott Laboratories, model *Lifecare PCA/Infuser 4200.* This delivered upon request by the patient the prescribed bolus dose of morphine, with a lock out period of 5 minutes as a standard post-operative procedure.

4.3.1 Pre-operative Measurement Instruments

(1) Generalised Self-Efficacy Scale

An English version of the ten item Generalised Self-efficacy Scale (GSES; appendix D) was used to measure the construct of self-efficacy at the level of a general personality disposition (Schwarzer, 1993). The original German version of the GSES was developed by Schwarzer and colleagues in the 1980s and it has been widely used in numerous languages including French, Spanish, Chinese, Czech and Slovak. The English version of the GSES has typically yielded internal consistency alpha

coefficients of between .75 and .90 (Schwarzer et al., 1997). These authors reported that the GSES is not only reliable but has also proved valid in terms of both convergent validity and discriminant validity. Moreover, the GSES has been described as parsimonious. Principal components analyses replicated using diverse samples have suggested one general factor for this measurement instrument (Schwarzer et al., 1997). As used in the present research, the GSES was in self-report form with easy-to-follow instructions. For the ten items each participant was asked select only one of the following statements which best described how they generally behave: 1 ="not at all"; 2 = "barely true"; 3 = "moderately true"; and 4 = "exactly true".

In the absence of a domain specific self-efficacy questionnaire concerned with post-operative pain and use of the PCA, two questions dealing with this were added to the GSES. They appear as items 11 and 12 of appendix D and included: "I feel confident about controlling my own pain", and "I feel able to take on the responsibility for my own pain management". These two specific self-efficacy questions were based on items from the Self-efficacy Scale for pre-operative Patients developed by Oetker-Black and Kauth (1995). Both of these questions were scored with the identical response range of 1 = "not at all" to 4 = "exactly true" used with the ten GSES items. The responses to the 12 items were then summated for each participant, which generated a total GSES score reflecting the strength of their generalised self-efficacy beliefs. The higher the score, the greater the participant's generalised sense of self-efficacy (Schwarzer, 1993, 1997).

(2) Centre for Epidemiological Studies Depression Scale

The Centre for Epidemiological Studies Depression Scale (CES-D; appendix E) is a self-report index of current depressive symptoms derived from previously validated depressions scales (Radloff, 1977). Each of the CES-D's original 20 items was selected to represent the major symptom components of depression that have been identified in clinical and factor analytic studies (Kohout, Berkman, Evans, & Cornoni-Huntley, 1993). The four components of depressive symptomatology represented by the CES-D include (i) positive affect, (ii) negative affect, (iii) somatic symptoms, and (iv) interpersonal relations (Fifield, Reisine, Sheehan, & McQuillan, 1996; Radloff, 1977). The original 20 item CES-D was designed for use in large scale survey research involving the general public, and has been employed to investigate depressive symptoms in more specific groups including the elderly, and individuals with rheumatoid arthritis (Blalock, DeVellis, Brown, & Wallston, 1989). These authors stated that the original 20 item CES-D has excellent psychometric properties, which concurs with Radloff's (1977) conclusion that the CES-D has a high degree of reliability as shown by the reported alpha coefficient of .85 as a measure of internal consistency.

For the purpose of this research, an 11 item version of the CES-D was used to measure the emotional distress of the participants (Kohout et al., 1993). The term *emotional distress* was chosen for use with the CES-D in this study because it does not imply a diagnosis of depression (Fifield et al., 1996). Due to problems with sensitivity and specificity of self-report depression questionnaires, the CES-D cannot be used as an assessment instrument for identifying clinically depressed participants (Zimmerman

& Coryell, 1994). Participants were asked to select one of three possible responses for each of the 11 CES-D questions which best described how they were feeling during the past seven days. These responses were quantified on a 3-point scale, where 1 = "hardly ever" (one day or fewer from the past seven), 2 = "some of the time" (two or three days from the past seven), or 3 = "most of the time" (four or more days from the past seven). Two of the 11 items were reversed scored (items 5 and 8) so that a greater frequency was associated with lower scores. Each participant's responses to the 11 CES-D items were added together to create a summated rating scale that was an index of their emotional distress. This produced CES-D scores with a possible range of between 11 and 33, with higher scores representative of greater emotional distress.

(3) State Anxiety Scale

The 20 item State Anxiety Scale (SAS; appendix F) of the Spielberger State-Trait Anxiety Inventory (STAI, Form Y) was used to assess participant's preoperative anxiety (Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983). These authors declared that although the items have face validity as measures of *anxiety*, this term was not used in administering the scale. They suggested that the scale be referred to as the *Self-Evaluation Questionnaire* in order to limit the influence on participants created by the term *anxiety* (Spielberger et al., 1983). The instructions for the SAS asked each participant to carefully read the 20 statements that other people have used to describe themselves, and then indicate how they themselves were feeling "right now...at this moment" with one of four possible answers for each of the 20 statements. These answers were quantified as: 1 = "not at all"; 2 = "somewhat"; 3 = "moderately

so"; and 4 = "very much so". Ten of the SAS items were considered anxiety-present questions, while the remaining ten were considered anxiety-absent questions. This latter group of questions (items 1, 2, 5, 8, 10, 11, 15, 16, 19, 20) were reversed, so responses 1, 2, 3, or 4 were scored 4, 3, 2, or 1, respectively. These instructions conformed to the administrations guidelines suggested by Spielberger et al., (1983), and were identical to those employed by Thomas et al., (1995). The SAS was a summated rating scale where total state anxiety scores for each participant were obtained by adding the quantified responses for the 20 statements. The SAS had a possible range between 20 and 80, with higher SAS total scores suggesting greater state anxiety at the time of testing. The average state anxiety score for working women between the ages of 19 and 49 years was reported to be 36, with a standard deviation of 11. Spielberger et al., (1983) have reported that the State Anxiety Scale of the STAI (Form Y) has acceptable psychometric properties, including a alpha coefficient equal to .93 as a measure of internal consistency for adult aged women.

(4) Visual Analogue Scale of Pain Expectation

A 100mm visual analogue scale (VAS: appendix G) was used to measure each participant's expectation of their post-operative pain intensity. The VAS was chosen to measure the dimension of pain intensity largely because it is subjective, has been widely employed, was quick and simple to administer (Campbell & Patterson, 1998). Participants were asked to mark with an X on the VAS the amount of pain they expected to be in for up to 48 hours after the operation. The VAS had an anchor of "no pain" at 0mm end, and an anchor of "worst pain possible" at the 100mm end.

Each participant's VAS pain expectancy score was calculated in millimetres as the distance their X mark was from the 0mm anchor of "no pain". This yielded a VAS score that ranged from 0 - 100 for each participant. Although the VAS of pain expectancy was not a multidimensional measure of pain, it did conform to the psychometrically validated procedure used by Lackner, Carosella, and Feuerstein (1996) to assess pain expectations in persons with chronic back pain.

(5) Two Open-Ended Questions

The last page of the pre-operative questionnaire booklet (appendix G) included the pain expectation VAS, and two open-ended questions used to generate qualitative information. These questions were: (1) "What things have you done to prepare yourself for this operation? (For example, have you talked with other women who have recently had a hysterectomy?"); and (2) "What are your general thoughts and feelings about using patient controlled analgesia?" These questions were based upon those used by Taylor, Hall and Salmon (1996), and were utilised to allow participants the opportunity to express their own views in their own words in an attempt to discover themes not covered in the self-report questionnaires.

4.3.2 Post-operative Measurement Instruments

(1) McGill Pain Questionnaire

A short-form version of the McGill Pain Questionnaire (SF-MPQ; appendix H) was used as a multidimensional measure of post-operative pain (Melzack, 1987). The

SF-MPQ is an abbreviated version of the original MPQ developed by Melzack (1975). The MPQ is a widely used test with acceptable psychometric properties including test-retest reliability, discriminant and construct validity (Keefe, 1982; Melzack, 1975). In post-operative pain patients, the SF-MPQ was significantly correlated (r = .86) to the original MPQ (Melzack, 1987). The SF-MPQ consists of three components: (1) 15 descriptive words as an index of pain quality; (2) a Present Pain Intensity index; and (3) a visual analogue scale. These three components of the SF-MPQ appeared together on one page of the questionnaire booklet in self-report format with easy-to-follow instructions.

The 15 descriptive words of pain quality included 11 related to the sensory qualities of pain and four related to the affective qualities of pain. Each of these 15 descriptive words were rated by each participant on a pain intensity scale as 0 = "none", 1 = "mild", 2 = "moderate", and 3 = "severe". The sum of the intensity ratings of these 15 words was then calculated and formed the first component of the SF-MPQ, with scores that ranged between zero and 45 for each participant. The Present Pain Intensity (PPI) index and the visual analogue scale (VAS) are unidimensional measures of pain that formed part of the original MPQ (Melzack, 1987). They both provided data concerned only with the pain intensity and were not concerned with the qualities of the pain. On the PPI component of the SF-MPQ, each participant was asked to rate the intensity of their post-operative pain by choosing only one of six possible terms. These responses were quantified as follows: 0 = "no pain"; 1 = "mild pain"; 2 = "discomforting pain"; 3 = "distressing pain"; 4 = "horrible pain"; and 5 = "excruciating pain". Scores on the PPI index ranged between zero and 5 for

each participant. Participants were then asked to indicate on the 100mm VAS between the anchors of "no pain" and "worst possible pain" what amount of pain they experienced following their operation. This final component of the SF-MPQ yielded a VAS pain intensity score that ranged between zero and 100 for each participant.

(2) Acute Pain Response Questionnaire

The 19 item Acute Pain Response Questionnaire (APRQ: appendix I) was employed to assess the cognitive strategies used by participants to cope with their post-operative pain (Pick, Pearce, & Legg, 1990). The APRQ was adapted by these authors from the Pain Response Questionnaire described by Pearce (1986) for use with chronic pain populations. The APRQ contained two subscales. The first subscale included eight coping strategies that were considered adaptive and likely to reduce post-operative pain and its duration. The second subscale consisted of the remaining 11 items, which were considered maladaptive coping strategies and likely to increase pain and its duration. Although the original PRQ contained items associated with behaviourial coping strategies (e.g. "Do you take time off work?"), these were considered inappropriate for acute pain patients and thus omitted from the APRQ (Pick et al., 1990).

The APRQ was designed as a self-report measure and included easy-to-follow instructions that asked each participant to circle either a "yes" or "no" response to indicate whether or not they had been thinking or doing each of the 19 items since their operation. The presentation of individual items on the questionnaire alternated between adaptive and maladaptive type questions. The responses to the 19 items were

quantified as 1 for "yes" and 0 for "no". Each participant's responses to the eight adaptive items were summated to yield a APRQ adaptive subscale score. Their responses to the 11 maladaptive items were also summated to yield a APRQ maladaptive subscale score. Unfortunately, Pick et al., (1990) did not perform a factor analysis to confirm the item structure of the two APRQ subscales . These authors did, however, reported that the internal consistency as measured by Cronbach's alpha coefficient was equal to .83 for the maladaptive subscale, and .52 for the adaptive subscale. The internal consistency of the APRQ adaptive subscale indicated the presence of a large amount of measurement error according to the recommendation of Nunnally and Bernstein (1994). Although the findings associated with this subscale were treated with caution, Pick et al., (1990) stated that the APRQ can nevertheless provide important information concerning the cognitive coping strategies used by acute pain patients.

(4) Patient Controlled Analgesia Satisfaction Questionnaire

The 17 item PCA satisfaction questionnaire (PCA-SQ; appendix J) was used to determine each participant's satisfaction and dissatisfaction with aspects of this method of pain relief. This questionnaire was designed by Egan and Ready (1994) based upon the results of a qualitative survey of post-operative patients. These authors included within the PCA-SQ eight items associated with satisfaction with the provision of pain relief, and nine items associated with dissatisfaction of post-operative PCA use. When Egan and Ready (1994) employed the PCA-SQ, their participants were instructed to select three of the eight items associated with PCA satisfaction, and three of the nine

items associated with PCA dissatisfaction. These authors reported only the frequency of items endorsed for PCA satisfaction and dissatisfaction and provided no psychometric properties for the use of this questionnaire. For use in the present study, participants were asked to indicate "yes" or "no" for each of the 17 PCA-SQ items. Participant response's were then quantified as 1 = "yes" and 0 = "no" for the 8 satisfaction items, and 0 = "yes" and 1 = "no" for the 9 dissatisfaction items. A summated rating scale reflecting each participant's total PCA satisfaction score were then created for use in the analyses. Higher scores indicated greater satisfaction with PCA as a method of post-operative pain relief.

4.4 Procedure

Ethical approval for this research was granted by the joint UCL/UCLH Ethical Committee (Appendix A). This organisation then arranged an Honourary Research Contract for this D.Clin.Psy candidate. Before data collect was initiated, the Nursing staff on the ward were given a seminar that outlined this study with a discussion of the procedure for interviewing women who received their care. The admissions office of the hospital was used to obtain weekly lists of women scheduled for their hysterectomy operation. Admission of potential participants the day prior to surgery was confirmed by telephone contact with the Nursing staff. Confirmation that each potential participant was undergoing a total abdominal hysterectomy was done by reviewing their hospital files prior to the preoperative assessment.

Following the admission interview conducted by the Nursing staff when the patient arrived the day prior to surgery, this D.Clin.Psy candidate in the role of researcher was

introduced to each potential participant. This preoperative assessment between researcher and participant included a brief verbal summary of the study and the specific details outlined on the Information Letter. The women who agreed to participate then signed the Confidential Consent Form, and answered demographic questions concerning their age, marital status, previous operations, and number of children. They were then left alone to completed the pre-operative questionnaire booklet that contained the measurement instruments in self-report format with easy-to-follow-instructions. Once each participant had completed their questionnaire booklet, any unanswered items were discussed to avoid missing data. Participants were then reminded of the post-operative assessment to be completed after they had finished using the PCA.

As standard procedure for the post-operative recovery period, all of the participants were connected through an intravenous line to their PCA system and monitored by the nursing staff and the Anaesthetist. Twenty-four through 36 hours following their operation at which the time they had finished using the PCA and had started on oral analgesics, each participant was asked to complete the post-operative questionnaire booklet. Participants were once again instructed to answer each and every item within the questionnaire booklet. Once each participant had finished with their questionnaire booklet, unanswered items were discussed to once again avoid missing data.

The volume of anaesthetic consumed by each participant while using the PCA, and whether they experienced any nausea or vomiting as side effects was recorded by the nursing staff in the participant's hospital files. This information was then transferred to the front page of the post-operative questionnaire booklet following its completion

by each participant. All of the women involved in this research were thanked for their co-operation and participation, and reminded that all information would be kept strictly confidential. Finally, the researcher wished each participant a swift recovery from their operation.

4.5 Statistical Analyses

The software package SPSS (version SPSS/PC+5.01) was used to manage and analysis the collected quantitative data. Internal consistency as an index of reliability for the measurement instruments were calculated, descriptive statistics were computed, and Pearson product-moment correlations were used to determine bivariate relationships. These were all used as preliminary data screening procedures. Multivariate statistics including discriminant function analysis and multiple regression analyses were then used to provide solutions to the four specific research questions presented in Chapter Three.

CHAPTER FIVE

DATA ANALYSES AND RESULTS

5.1 Internal Consistency of Measurement Instruments

The internal consistency of the three preoperative summated rating scale questionnaires and the three post-operative summated rating scale questionnaires was calculated using Cronbach's coefficient alpha. The 12-item *Generalised Self-efficacy Scale* (GSES) had a Cronbach alpha coefficient equal to .87. The 20-item state anxiety scale of the *Spielberger State/Trait Anxiety Inventory* has a Cronbach alpha coefficient equal to .89. The 11-item *Centre for Epidemiological Depression Scale* (CES-D) as a measure of emotional distress had a Cronbach alpha coefficient equal to .71. The 15-item qualities of pain index of the *McGill Pain Questionnaire* (MPQ) had a Cronbach alpha coefficient equal to .92. The 17-item *PCA Satisfaction Questionnaire* had a Cronbach alpha coefficient equal to .74. The 11-item maladaptive subscale of the *Acute Pain Response Questionnaire* (APRQ) had a Cronbach alpha coefficient equal to .83, while the 8-item adaptive subscale of the APRQ had a Cronbach alpha coefficient equal to .21. All of the measurement instruments with the exception of the adaptive subscale of the APRQ had an acceptable degree of internal consistency (alpha above .70) as an index of reliability. The low internal consistency of the adaptive subscale of the APRQ represents an index of error variance of greater than 90 percent. This was an unsatisfactory level of random measurement error. This subscale was considered an unreliable measure and was therefore not employed in any of the subsequent analyses (Nunnally & Bernstein, 1994).

5.2 Descriptive Statistics

The mean volume of morphine consumed during PCA use for all 45 participants (44 women who received a 1mg bolus dose and one women who received a 0.5mg bolus dose) was 35.44mg. This ranged from 4mg to 108mg, with a standard deviation of 25.84mg. Although the distribution of this variable was positively skewed, the skewness (1.2) and the kurtosis (0.97) did not significantly affect the normality of the distribution. Data transformations were not necessary for this variable of volume of morphine consumed by participants during PCA use. Of the 45 participants who provided complete preoperative and post-operative questionnaire data, 20 (44%) reported experiencing either nausea or vomiting as side effects during PCA use.

Table 1 presents the mean, standard deviation, range, skewness and kurtosis of the summated rating scales used prior to surgery to measure self-efficacy beliefs, state anxiety, and emotional distress. Table 1 also presents the descriptive statistics of the visual analogue scale of preoperative pain expectations. All of these variables were normally distributed (no significant skewness or kurtosis) and data transformations were not necessary.

Table 1: Descriptive Statistics of Preoperative Variables

Variable	Mean	S.D.	Range	Skewness	Kurtosis
Self-efficacy	36.71	5.81	28-51	.44	-.51
State Anxiety	41.96	10.64	20-68	-.09	-.06
Emotional Distress	17.04	3.42	11-26	.42	.59
VAS Pain Expectation	55.89	25.81	3-99	-.22	-.74

Table 2 presents the mean, standard deviation, range, skewness and kurtosis of the summated rating scales used after surgery to measure maladaptive pain coping strategies and PCA satisfaction. Table 2 also presents the descriptive statistics of the qualities of pain index, the present pain index and the visual analogue scale from the MPQ. The distribution of the qualities of pain index was positively skewed and affected by a significant degree of kurtosis. To generate a normal distribution for this variable the logarithmic transformation was applied to the data. This resulted in the creation of a new variable known as the log of the qualities of pain index of the MPQ, with a skewness equal to -0.02 and kurtosis equal to 0.51. The mean of this new variable was 0.91, the standard deviation was 0.34 and scores ranged from zero to 1.58. Although the present pain index was also affected by a significant degree of kurtosis no data transformations were applied to this variable for reasons discussed in the next section on the correlation coefficients. As seen in Table 2, the distribution of scores for the measures of maladaptive pain coping strategies and PCA satisfaction were normal.

Table 2: Descriptive Statistics of Post-operative Variables

Variable	Mean	S.D.	Range	Skewness	Kurtosis
Qualities of Pain	10.91	9.30	1-38	1.7	2.1
Present Pain Index	1.76	1.00	0-5	.38	1.9
VAS of Pain	31.44	23.91	0-96	.95	.48
Maladaptive Coping	3.24	3.02	0-11	.73	-.32
PCA Satisfaction	11.71	2.79	4-17	-.75	-.27

The number of participants who responded either yes and no to the 17 items of the PCA Satisfaction Questionnaire is presented in Table 3. All but one of the participant's answered yes to the item concerning PCA provided personal control. Also, the majority (89%) of participants answered "no" to the item concerning PCA provided poor overall pain relief.

Table 3: Participants' Responses to the 17 PCA Satisfaction Questionnaire Items

	Yes	No
1. The PCA worked quickly?	38 (84%)	7 (16%)
2. Provided personal control?	44 (98%)	1 (2%)
3. Gave effective relief when resting?	40 (89%)	5 (11%)
4. No need for painful injections?	35 (78%)	10 (23%)
5. Gave me a clear mind?	26 (58%)	19 (42%)
6. There were no distressing side effects?	20 (44%)	25 (56%)
7. Effective pain relief when moving or coughing?	22 (49%)	23 (51%)
8. Provided me with relaxation?	34 (76%)	11 (24%)
9. The PCA caused side effects?	20 (44%)	25 (56%)
10. There was pain after surgery before the PCA became effective?	26 (58%)	19 (42%)
11. Insomnia?	29 (64%)	16 (36%)
12. I felt like I was under sedation?	21 (47%)	24 (53%)
13. Poor pain relief overall?	5 (11%)	40 (89%)
14. Dependence on other for care?	12 (27%)	33 (73%)
15. The method worked slowly?	10 (22%)	35 (78%)
16. Fear of addiction?	2 (4%)	43 (96%)
17. Too responsible for my own care?	10 (22%)	35 (78%)

5.3 Correlation Coefficients

Pearson product-moment correlation coefficients were calculated to determine the relationships between the total scores from the measurement instruments used before and after surgery, as well as their relationships with the total volume of morphine consumed by participants during PCA use. The present pain index and the VAS of pain intensity from the MPQ had a statistically significant ($p < .001$) correlation coefficient equal to $r = .73$. This bivariate correlation suggested a multicollinear relationship based upon the criteria of Tabachnick and Fidell (1989). As multicollinearity causes both logical and statistical problems, these two components of the MPQ were considered to be measurements of the same construct and were collapsed together by addition of the two scores to generate one measure of pain intensity. This pain intensity score as a component of the MPQ had a mean of 33.20, a standard deviation of 24.65, and a range from zero to 100. The distribution of participants scores on this measure of pain intensity approached normality and was not significantly affected by skewness (0.94) or kurtosis (0.50).

Table 4 presents a matrix of the bivariate correlation coefficients between the nine variables under investigation. The highest significant correlation coefficient ($r = .62$, $p < .001$) was a positive relationship between the log of qualities of pain scores and the pain intensity scores, both based on data from the MPQ. This indicated that higher pain intensity scores were significantly associated with an increase in the intensity of sensory and affective qualities of participant's pain. Pain intensity scores were also significantly correlated ($r = .60$, $p < .001$) with maladaptive pain coping strategies. This suggested that greater pain intensity was significantly associated with increased

reports of maladaptive coping. Emotional distress was significantly correlated (r = .54, p <.001) with state anxiety. This indicated that higher emotional distress was significantly associated with higher state anxiety before surgery. Volume of morphine consumed by participants during PCA use was significantly correlated with state anxiety (r = .45, p<.001), pain intensity scores (r = .43, p<.01), log of pain quality scores (r =.45, p<.001) and maladaptive coping strategies (r = .43, p<.01). This suggested that greater volume of morphine consumed was significantly associated with increased preoperative state anxiety, as well as increased post-operative pain intensity and intensity of pain qualities, and maladaptive coping strategies.

Table 4: Matrix of Pearson Correlation Coefficients

	SELF	ANX	EMST	PVAS	COPE	LOGP	IN-P	SAT
SELF	1.0							
ANX	-.305	1.0						
EMST	-.169	**.536****	1.0					
PVAS	-.066	.204	.126	1.0				
COPE	-.086	.128	.206	-.011	1.0			
LOGP	-.082	.191	.173	.105	.352	1.0		
IN-P	.022	.205	.180	.071	**.604****	**.624****	1.0	
SAT	.054	.115	-.063	.034	-.264	-.130	-.233	1.0
VOL	-.002	**.448***	.181	.133	**.429***	**.447***	**.433***	-.141

*** = p <.01 ** = p <.001**

SELF = self-efficacy beliefs; ANX = state anxiety; EMST = emotional distress; PVAS = pain expectations; COPE = maladaptive coping strategies; LOGP = log of pain qualities; IN-P = pain intensity; SAT = PCA satisfaction; VOL = volume of morphine consumed during PCA.

5.4 Qualitative Findings

Twenty eight of the 45 participants provided qualitative information in the form of statements to the two open-ended questions that were asked at the end of the preoperative questionnaire booklet. The principal researcher and a Chartered Psychologist independently categorised the content of these qualitative statements. Eleven categories were established by both raters, which represented 100% inter-rater reliability. Participants' statements were not mutually exclusive to only one category. The 11 categories and the number of participants who contributed qualitative information for each category are presented in Table 5.

Table 5: Categories of Qualitative Data

Category	Number (%)
1. Discussed the hysterectomy with others.	23 (82%)
2. Positive beliefs about PCA.	10 (36%)
3. Read about the procedure and recovery.	6 (21%)
4. Prepared physically for surgery.	6 (21%)
5. PCA eliminates dependence upon others.	6 (21%)
6. PCA gives patients a sense of control.	4 (14%)
7. Anxiety and worry about pain.	3 (11%)
8. Family as an important form of support.	3 (11%)
9. Did not prepare for surgery.	2 (7%)
10. PCA removes feelings of helplessness.	1 (3.5%)
11. PCA and satisfaction	1 (3.5%)

The following are illustrative examples from each of the 11 categories of qualitative information provided by 28 of the 45 participants. **Discussed the hysterectomy with others**: A 49 year old women wrote, "I talked to my sister who had a hysterectomy last year". **Positive beliefs about PCA**: A 40 year old participant stated that, "I feel that it <PCA> is likely to be a good form of treatment". **Read about the procedure and recovery**: A 47 year old women wrote, "I have spoken to other women, but their answers have all been varied, some for it and others against it, some say it's painful, others disagree. But I have read up on the operation and how to best recover." **Prepared physically for surgery**: A 63 year old women wrote that she had, "Talked to others about the procedure - taken vitamins and tried to get into the best possible physical condition". **PCA eliminates dependence upon others**: A 42 year old women wrote, "A very helpful way to manage my own pain without the dependence upon others". **PCA gives patients a sense of control**: A 44 year old participant stated that, "PCA seems a good idea as the patient is able to control their pain without needles or injections". **Anxiety and worry about pain**: A 45 year old women stated, "I'm worried in general, but that is natural". While a 52 year old women wrote that, "PCA sounds good, it's the pain that is scary". **Family as an important form of support**: A 42 year old women wrote, "my family has been great about this whole thing and my husband has been very supportive". **Did not prepare for surgery**: A 43 year old women wrote, "No preparations". While a 48 year old participant stated, "I did nothing before coming here". **PCA removes feelings of helplessness**: A 46 year old participant wrote, "It takes away the feeling of helplessness caused by asking for assistance from others. Also, it will be administered

faster if controlled by the patient instead of waiting for someone else to administer pain relief". Finally, a 49 year old participant was the only one to mentioned **PCA and satisfaction**. She wrote, "Having seen this <PCA> in use when my niece was in hospital, I feel that as long as implemented correctly it should be a very satisfactory pain relief system".

5.5 Analyses of Specific Research Questions

A discriminant function analysis and a series of hierarchical multiple regression analyses were used as statistical tools to provide solutions to the four specific research questions presented in section 3.5 of Chapter Three. With a sample size of 45 participants with no missing data, the ratio of variables to cases within the following analyses did not extend beyond the minimum of 1 to 5 (9 variables to 45 cases) as suggested by Tabachnick and Fidell (1989). Evaluation of the data in accordance with the assumptions of multivariate statistics led to the generation of two new variables. The first was the log of pain qualities index, while the second was pain intensity scores. Using a $p < .001$ criterion for Mahalanobis distance, no univariate or multivariate outliers among the cases were identified.

5.5.1 What Post-operative Variables Discriminate Participants with Side Effects?

A direct discriminant function analysis was performed to generate a solution to research question one concerning analgesic side effects. This analysis was performed to determine which of the post-operative variables were predictors of membership in two groups. The first group represented participants (N = 20) who reported nausea or

vomiting as analgesic side effects, while the second group represented participants (N = 25) who did not report post-operative side effects. The five post-operative predictor variables were: (1) pain intensity scores, (2) the log of the qualities of pain index of the MPQ, (3) total scores from the maladaptive subscale of the APRQ, (4) total scores from the PCA satisfaction questionnaire, and (5) total of volume of morphine consumed during PCA use.

This analysis yielded a statistically significant discriminant function that maximally separated the two groups: $\underline{X}^2$ (5) = 24.04, $\underline{p}$ = .0002. As presented in Table 6, the correlations of the predictors with the discriminant function suggests that PCA satisfaction and maladaptive coping strategies were variables that significantly distinguished participants who reported post-operative nausea or vomiting from those participants who did not. These results indicate firstly, that participants who reported nausea or vomiting after the operation had significantly lower PCA satisfaction scores (mean = 9.75, s.d. = 2.38) than the other participants (mean = 13.28, s.d. = 2.01). Secondly, this analysis demonstrated that maladaptive coping strategy scores were significantly higher for participants who reported nausea or vomiting (mean = 4.95, s.d. = 3.73) than the other participants (mean = 2.12, s.d. = 2.10). In addition, Table 6 shows that although the total volume of morphine consumed was not a statistically significant variable in this analysis, the $\underline{F}$ value for this between group difference approached significance ($\underline{p}$ = .08). The mean volume of morphine consumed by participants reporting nausea or vomiting was 42.90mg, while participants from the other group had a mean of 29.40mg.

Table 6: Discriminant Functional Analysis of Post-operative Side Effects

Predictor Variable	Correlation of Predictor with the Discriminant Function	Univariate F (1,43)
Pain Intensity	.913	1.124
Log of Pain Qualities	-.374	0.332
Maladaptive Pain Coping	-.301	4.42*
PCA Satisfaction	-.179	29.07**
Total Volume of Morphine Consumed	-.092	3.14

* = $p < .05$ ** = $p < .001$

Using sample proportions as prior probabilities, this discriminant function correctly classified 78% of the 45 participants. Fifteen of the 20 (75%) participants who reported nausea or vomiting, and 20 of the 25 (80%) of the other participants were correctly classified. The eigenvalue was 0.81 for this discriminant function. Although the overall classification rate of 78% does not fully explain the nature of the group difference, the canonical correlation of .68 indicates that PCA satisfaction and maladaptive pain coping strategies as measured in this study helped to significantly discriminate participants with and without nausea and vomiting as side effects.

5.5.2 What Variables Predict Post-operative Pain?

To generate a solution for research question two concerned with predictors of post-operative pain scores, two separate hierarchical multiple regression analyses were conducted. The first analysis used pain intensity scores as the criterion variable, and the log of pain qualities index served as the criterion variable in the second analysis.

These analyses evaluated the predictive effects of variables entered at four separate steps. The first step for the analysis of pain intensity scores included preoperative pain expectations and the log of pain qualities index. Whereas the first step for the analysis of the log of pain qualities index included preoperative pain expectations and pain intensity scores. Step 1 was used to statistically control for the other dimensions of pain prior to the entry of the other variables in the three remaining steps that were identical for both analyses. Based upon the theoretical considerations, self-efficacy beliefs were entered early into the equations at step 2. Step 3 for both analyses included preoperative scores of emotional distress and state anxiety. Step 4 introduced post-operative scores of maladaptive coping and PCA satisfaction, as well as total volume of morphine consumed into each equation.

Table 7 presents the findings from the first analysis with pain intensity scores as the criterion variables. At step 1, preoperative pain expectations and the log of pain qualities index accounted for 36% of the variance in pain intensity scores. Of these two step 1 variables, the log of pain qualities index proved to be a significant, positive (*beta* = .44) predictor of pain intensity (t (42) = 5.15, $p < .001$). The entry of self-efficacy beliefs into the equation at step 2 yielded a non-significant F value associated with the change in R^2. The variables entered at step 3 also yielded a non-significant F value associated with the change in R^2, and did not help predict pain intensity scores. The entry of maladaptive coping strategies, PCA satisfaction and total volume of morphine consumed at step 4 accounted for an additional 12% of the variance in pain intensity scores. Of these variables, maladaptive coping strategies proved to be a significant, positive predictor of pain intensity (t (36) = 3.34, $p < .002$).

Table 7: Hierarchical Multiple Regression Analysis for Predictors of Pain Intensity

Variables	Step	R^2 (adj)	F^a (df)	R^2 change	F^b change
PreVAS Pain Qualities	1	.3900 (.361)	13.43* (2, 42)	____	____
Self-Efficacy	2	.3956 (.341)	8.95* (3, 41)	.0056	0.379 (1, 41)
Distress Anxiety	3	.4100 (.335)	5.42** (5, 39)	.0144	0.476 (1, 39)
Pain Coping PCA Sat Volume	4	.5881 (.479)	6.43* (8, 36)	.1781	5.19** (1,36)

* = $p < .0001$ ** = $p < .005$

a = F test of the overall significance of regression equation including all predictor variables entered up to that point in the analysis; b = F test of the change in R^2 accounted for by the entry of independent variables at that step of the equation; PreVAS = preoperative pain expectations; Pain Qualities = log of pain qualities; Self-efficacy = self-efficacy beliefs; Distress = emotional distress; Anxiety = state anxiety; Pain Coping = maladaptive pain coping strategies; PCA Sat = PCA satisfaction; Volume = volume of morphine consumed.

After step 4, with all of the predictor variables in the equation, $R = .77$, F (8, 36) = 6.43, $p < .0001$. This analysis indicates that after controlling for other dimensions of pain, maladaptive pain coping strategies helped to predict pain intensity scores. Based upon the positive standardised regression coefficient for this variable (*beta* = .418), higher maladaptive pain coping strategy scores were associated with pain intensity scores as measured in this study. Finally, there was no evidence to suggest that self-efficacy beliefs helped to predict post-operative pain intensity scores.

Table 8 presents the findings from the second analysis with the log of pain qualities index as the criterion variables. At step 1, preoperative pain expectations and pain intensity scores accounted for 36% of the variance in the log of pain qualities index. Of these two step 1 variables, pain intensity proved to be a significant, positive

predictor of the log of pain qualitites index (t (42) = 5.15, $p < .001$). The entry of the other variables at step 2, 3 and 4 yielded non-significant F values associated with the change in R^2. After step 4, with all of the predictor variables in the equation, R = .68, F (8, 36) = 3.70, $p < .003$. This analysis demonstrates that none of the preoperative or post-operative variables with the exception of pain intensity scores helped to predict the log of pain qualities index. As in the previous regression analysis, the positive standardised regression coefficient was positive (*beta* = .62), indicating that higher pain intensity scores were associated higher values on the log of pain qualities index. Finally, there was no evidence to suggest that self-efficacy beliefs helped to predict the log of pain qualities index as measured in this study with the MPQ.

Table 8: Hierarchical Multiple Regression Analysis for Predictors of Pain Qualities

Variables	Step	R^2 (adj)	F^a (df)	R^2 change	F^b change
PreVAS Pain Intensity	1	.3933 (.364)	13.62* (2, 42)	____	_____
Self-Efficacy	2	.4015 (.327)	9.17* (3, 41)	.0082	0.560 (1, 41)
Distress Anxiety	3	.4034 (.327)	5.28** (5, 39)	.0019	0.063 (1, 39)
Pain Coping PCA Sat Volume	4	.4512 (.329)	3.70** (8, 36)	.0478	1.045 (1, 36)

* = $p < .0001$ ** = $p < .005$

a = F test of the overall significance of the regression equation including all predictor variables entered up to that point in the analysis; b = F test of the change in R^2 accounted for by the entry of variables at that step of the equation; PreVAS = preoperative pain expectations; Pain Intensity = pain intensity scores; Self-efficacy = self-efficacy beliefs; Distress = emotional distress; Anxiety = state anxiety; Pain Coping = maladaptive pain coping strategies; PCA Sat = PCA satisfaction; Volume = volume of morphine consumed

5.5.3 What Variables Predict Morphine Volume Consumed During PCA Use?

To generate a solution for research question three, a hierarchical multiple regression analysis was conducted with total volume of morphine consumed during PCA use as the criterion variable. This analysis evaluated how variables entered into the equation at four separate steps helped predict the total volume of morphine consumed by participants. The first step in the analysis included preoperative pain expectations, the log of pain qualities index, and pain intensity scores. This first step was used to statistically control for dimensions of pain prior to the entry of the other variables in the three remaining steps. Based upon the theoretical considerations, self-efficacy beliefs were entered early into the equation at step 2. Step 3 included preoperative scores of emotional distress and state anxiety. Step 4 introduced post-operative scores of maladaptive coping and PCA satisfaction into the equation.

Table 9 presents the findings from this analysis. At step 1, preoperative pain expectations, the log of pain qualities index, and pain intensity scores accounted for 19% of the variance in the total volume of morphine consumed. None of these three step 1 variables made a significant, independent contribution to changes in morphine volume used. The entry of self-efficacy beliefs into the equation at step 2 yielded a non-significant F value associated with the change in R^2. The variables of emotional distress and state anxiety entered at step 3 accounted for an additional 11% of the variance in the total volume of morphine consumed. Of these step 3 variables, state anxiety proved to be a significant, positive predictor of morphine volume consumed ($t(38) = 2.95$, $p < .005$). The addition of maladaptive coping strategies and PCA satisfaction at step 4 yielded a non-significant F value for the change in R^2, so neither

of these contributed to the prediction of this criterion variable.

After step 4, with all of the predictor variables in the equation, R = .65, F (8, 36) = 3.35, p < .006. This analysis indicates that after the entry of pain variables, preoperative state anxiety levels helped to predict the volume of morphine consumed during PCA use. Based upon the positive standardised regression coefficient for this variable (*beta* = .443), higher levels of state anxiety as measured in this study were associated with an increased post-operative morphine consumption. Once again, there was no evidence to suggest that self-efficacy beliefs helped to predict variance in this criterion variable.

Table 9: Hierarchical Multiple Regression Analysis for Predictors of Morphine Volume Consumed During PCA Use

Variables	Step	R^2 (adj)	F[a] (df)	R^2 change	F[b] change
PreVAS Pain Intensity Pain Qualities	1	.2429 (.190)	4.39* (3, 41)	____	____
Self-Efficacy	2	.2455 (.170)	3.25* (4, 40)	.0026	0.136 (1, 40)
Distress Anxiety	3	.3913 (.300)	4.07* (6, 38)	.1459	4.55* (1, 38)
Pain Coping PCA Sat	4	.4268 (.300)	3.35** (8, 36)	.0355	1.14 (1, 38)

* = p < .01 ** = p < .006

a = F test of the overall significance of the regression equation including all predictor variables entered up to that point in the analysis; b = F test of the change in R^2 accounted for by the entry of independent variables at that step of the equation; PreVAS = preoperative pain expectations; Pain Intensity = pain intensity scores; Pain Qualities = the log of pain qualities index; Self-efficacy = self-efficacy beliefs; Distress = emotional distress; Anxiety = state anxiety; Pain Coping = maladaptive pain coping strategies; PCA Sat = PCA satisfaction.

5.5.4 What Variables Predict PCA Satisfaction?

To generate a solution for research question four, a hierarchical multiple regression analysis was conducted with PCA satisfaction as the criterion variable. Consistent with the previous analyses, this regression calculation evaluated how variables entered into the equation at four separate steps helped predict PCA satisfaction. The first step in the analysis included preoperative pain expectations, the log of pain qualities index, and pain intensity scores. Self-efficacy beliefs were again entered early into the equation on step 2, while step 3 included emotional distress and state anxiety scores. Step 4 introduced maladaptive coping and total volume of morphine consumed into the regression equation. After step 4, with all of the predictor variables in the equation, $R = .36$, $F(8, 36) = 0.65$, which was a non-significant result. This analysis demonstrates that none of the preoperative or post-operative variables including self-efficacy beliefs helped to predict PCA satisfaction as measured in this study.

CHAPTER SIX

GENERAL DISCUSSION AND CONCLUSIONS

Due to inconsistencies and controversies in the published literature, the aim of this research was to add to the growing body of knowledge in the area by investigating the role of psychological factors including self-efficacy beliefs in post-operative acute pain management with PCA. The results presented in the previous chapter for the qualitative data and the four specific research questions under investigation have generated interesting findings. Although this study has partially replicated the results of previous research, there was no empirical support for the hypothesis raised in section 3.5 of Chapter Three that self-efficacy beliefs contributed to the understanding of PCA for acute post-operative pain management in hysterectomy patients. The purpose of this final chapter is to present a detailed discussion of the findings in relation to themes previously presented in this thesis. To achieve this the following sections are included: (6.1) summary of the results; (6.2) clinical implications; (6.3) theoretical implications; (6.4) limitations of this study; (6.5) directions for future research; and as a conclusion (6.6) closing remarks.

6.1 Summary of the Results

In order to summarise the findings of this study, the descriptive and qualitative data as well as the solutions to the specific research questions under investigation are discussed in terms of the four review questions originally presented in the literature review (section 3.3) of Chapter Three. These include (6.1.1) is PCA effective?, (6.1.2) is patient satisfaction with PCA important?, (6.1.3) can anxiety affect pain management

with PCA?, and (6.1.4) does control influence pain management in PCA? This section ends with (6.1.5) a summary of the findings.

6.1.1 Is PCA Effective?

The findings of previous research have concluded that compared to traditional intramuscular injections, PCA is an effective method of providing post-operative analgesia (Ballantyne et al., 1993; Thomas et al., 1995; Wasylak et al., 1990). The present study did not compare PCA with other methods of post-operative pain relief, but participants' responses to the 17 items of the PCA satisfaction questionnaire contribute to the understanding of why PCA has been effective. As presented in Table 3, the vast majority of participants reported that PCA did not provide poor overall pain relief. In addition, the vast majority of participants reported that PCA gave effective relief when resting, while only half of participants responded that PCA provided effective pain relief when moving or coughing. It is interesting that more than two thirds of participants responded that PCA worked quickly, while just over half of the participants reported that there was pain after surgery before the PCA became effective. These findings suggest that for the participants in this study, PCA provided successful pain relief overall and when they were at rest. However, only half of the participants found PCA to be effective for pain relief when they were moving or coughing. Although more than half of the women assessed in this study experienced pain after surgery before PCA became effective, the majority found that PCA began to work quickly. While these findings add to the understanding of PCA effectiveness, it must be remembered that 20 participants experienced analgesic side effects during

PCA use. The results of research question one that tested the impact of nausea and vomiting as side effects suggested that there was a statistical difference that approached significance between the mean total volume of analgesia consumed during PCA use for participants with and without post-operative side effects. Although this difference was not statistically significant, it is of clinical importance. For PCA to be a consistently effective method of providing post-operative acute pain relief, patient blood levels of the opioid drug morphine should be kept within the analgesic corridor where pain relief is achieved without the experience of side effects. Previous research has found PCA to be effective for post-operative pain, but additional research is needed to help determine specific reasons for its effectiveness.

6.1.2 Is Patient Satisfaction with PCA Important?

Pain relief is an essential element of post-operative patient care. However, beyond the individual differences in analgesic drugs needed to achieve pain relief, patient satisfaction with PCA has been described as an important theme. The results of research question one from this study suggest that PCA satisfaction scores were a statistically significant predictor variable of membership in two groups. The first group consisting of 20 participants who reported post-operative side effects had significantly lower PCA satisfaction scores compared to the 25 participants in the second group who did not report side effects. This finding supported the hypothesis generated by the research of Jamison et al. (1993) that post-operative side effects would reduce participant's satisfaction with PCA. This quantitative result concurred with the qualitative findings of Taylor et al. (1996) who reported that nausea and

vomiting were important complications of PCA satisfaction.

Research question four with PCA satisfaction scores as the criterion variable in a multiple regression analysis failed to partially replicate the findings of Jamison et al. (1993). These researchers concluded that PCA satisfaction scores measured with a 7-point Likert-type scale were predicted by preoperative anxiety and post-operative pain intensity. The non-significant result for research question four suggests that the preoperative and post-operative variables as well as volume of morphine consumed by participants did not help to predict the variance in PCA satisfaction scores as measured in this research. Although PCA satisfaction scores helped to significantly discriminate participants with and without side effects, the present results are somewhat inconclusive because they were unable to empirically identify predictors of PCA satisfaction. In addition, only one of the participants who provided preoperative qualitative information mentioned PCA and satisfaction. The only specific conclusion generated from research question four of this study is that PCA satisfaction is a complex concept.

The idea forwarded by Egan and Ready (1994) that successful pain relief may intuitively contribute to PCA satisfaction was not supported by the results of the present research. PCA satisfaction scores did not significantly predict post-operative pain in the regression analyses of research question two. Moreover, pain intensity and the log of pain quality scores failed to significantly predict PCA satisfaction scores in the regression analysis of research question four. The responses provided by participants to the 17 items of the PCA satisfaction questionnaire designed by Egan and Ready (1994) that were discussed in the previous subsection have helped to further

understand the complex concept of satisfaction with PCA. In a paper published just this year, Chumbley, Hall and Salmon (1999) attempted to go beyond measuring the concept of PCA satisfaction by identifying what they referred to as aspects of patient's experience with PCA. These authors chose not to ask patients about their satisfaction with PCA largely because of the complexity of the concept, and because patients' answers can include evaluations of aspects of their care unrelated to PCA. In short, the validity of the concept of patient satisfaction appears to be in question (Williams, 1994). Chumbley et al. (1999) concluded that scores of patient satisfaction are often used to evaluate the adequacy of treatment, but unfortunately they may be an insensitive index of patients' views. Once again, the findings of the present study in relation to PCA satisfaction are somewhat inconclusive. A discussion of the present limitations as well as directions for future research with regards to this concept are presented in sections 6.4 and 6.5 of this chapter.

6.1.3 Can Anxiety Affect Pain Management with PCA?

In contrast to the findings of Gill et al. (1990), Perry et al. (1994) and Thomas et al. (1995), there was no evidence within the present study to suggest that state anxiety was a significant predictor of post-operative pain. State anxiety scores did not emerge as a statistically significant predictor variable within the results of the two separate regression analyses for research question two with pain intensity scores and the log of pain qualities index as criterion variables. The qualitative data provided before surgery was consistent with these quantitative findings, as only 3 (11%) participants mentioned anxiety and worry about the potential for post-operative pain. The inability of this

study to partially replicate previous findings may be due to differences in post-operative pain scores. Thomas et al. (1995) reported a mean of 21.6 for the qualities of pain index of the MPQ-SF for their PCA participants, while in the present study prior to being transformed due to a significant degree of kurtosis the mean qualities of pain index score was 10.91 for the 45 participants. The mean scores for the Thomas et al. (1995) study was the average of post-operative pain assessments conducted at 6, 18 and 24 hours after surgery, while post-operative pain in the present study was measured only once 24-36 hours after surgery. The multidimensional nature of pain and the lack of consistency with procedures employed in its measurement may help explain the failure with this study to partially replicate the previous findings that anxiety is associated with post-operative pain.

The results for research question three do, however, partially replicate the findings of Thomas et al. (1995) that state anxiety scores help predict total volume of morphine consumed by participants. The entry of state anxiety and emotional distress in step 3 of this regression equation made a significant contribution to the prediction of total volume of morphine consumed, following the entry of dimensions of pain in step 1 and self-efficacy beliefs in step 2. State anxiety as measured by the STAI helped to predict 11% of the variance in morphine volume consumed by the participants. This was, however, lower than the 23% of variance accounted for by Thomas et al., (1995). This difference may in part be explained by the inclusion of both IMI and PCA participants in the Thomas et al. (1995) study. An additional explanation may be related to differences in the total volume of morphine consumed. In the present study, the mean volume of morphine consumed by participants during PCA use was 35.44mg.

This was considerably lower than the two separate means reported by Thomas et al. (1995). Their PCA participants consumed on average 53mg of morphine, while their IMI participants consumed on average 79mg of morphine.

The mean total STAI state anxiety score for the 45 participants in the present study was 41.96, which was similar to mean of 44.3 reported by Thomas et al. (1995) for their 110 participants. When compared to the normative STAI state anxiety score of 36 for women between 19 and 49 years of age provided by Spielberger et al. (1983), the present sample of hysterectomy patients had higher scores but were within the normal range. The potentially stressful aspects of hospital admission for surgery may have caused this increase in state anxiety of the participants. Heath and Thomas (1993) have reported that moderate levels of preoperative anxiety are associated with optimal recovery from surgery. As reduced pain is one of the goals of effective post-operative patient care and an important element of recovery, the results of the present study cannot conclude that anxiety predicts post-operative pain. A conclusion that can, however, be derived from the result of research question three is that greater preoperative state anxiety levels were predictive of higher post-operative morphine consumption. Munafo (1998) argues that failure to demonstrate a clear relationship between anxiety and post-operative pain is due to an inadequate conception of anxiety as a homogeneous construct. If anxiety is composed of affective, cognitive and behaviourial components as Munafo (1998) suggests, it may be possible for anxiety to produce behaviours such as PCA dose activation in an attempt to respond to pain. Distinguishing the components of anxiety is difficult, but the behaviourial aspects of anxiety may be viewed as strategies used by patients to deal with their pain.

6.1.4 Does Control Influence Pain with PCA?

Offering patients some control over their post-operative pain in the form of an analgesia delivery system such as PCA can potentially influence their recovery from surgery (Heath and Thomas, 1993; Welchew, 1995). Only 4 participants mentioned directly the importance of control within the qualitative findings of this study. Although this information was gathered prior to surgery and therefore before PCA use, it is consistent with the post-operative qualitative data reported by Taylor et al. (1996). In contrast to this was the finding presented in Table 3, that after using it all but one of the 45 participants responded that PCA provided personal control. This finding is consistent with those of Egan and Ready (1994) who reported that over 80% of participants found PCA provided personal control.

The role played by maladaptive cognitive coping strategies in the present study were emphasised in the results of research question one and two. Maladaptive coping strategies were one of two significant variables that helped discriminate participants with from those without post-operative side effects in research question one. This indicated that those who experienced post-operative side effects were more likely to employed maladaptive strategies to cope with their acute pain. It is not suggested here that the use of maladaptive strategies helped to cause post-operative side effects, but that these ways of thinking about pain were more common in participants who reported analgesic side effects. The first regression analysis of research question two established that maladaptive cognitive coping strategies made a unique contribution to the prediction of pain intensity scores. This is consistent with the conclusions of Pick et al. (1990) that high levels of pain intensity elicit more apparently negative or

maladaptive thoughts. Although the relation between pain intensity and maladaptive coping responses in acute pain is unclear, an alternative explanation was that negative (maladaptive) thoughts may intensify the experience of pain following a hysterectomy.

6.1.5 A Summary of the Findings

The concept of self-efficacy beliefs as measured in this study failed to emerge as a significant predictor variable in the analyses of post-operative pain, volume of morphine consumed, and PCA satisfaction. These results are unable to empirically support the conclusion of Skevington (1996) that self-efficacy beliefs affect acute pain experiences and that self-efficacy beliefs have implications for pain management with PCA. As a core element of Bandura's social-cognitive theory, self-efficacy beliefs have not contributed to the understanding of pain management with PCA in this study.

There was empirical support for the hypothesis generated by Jamison et al. (1993) that those who experience post-operative side effects were less satisfied with PCA and employed negative or maladaptive cognitive methods to cope with pain. It was speculated that they possibly relied too much on their analgesia, which caused nausea and vomiting due to high blood concentrations. Maladaptive cognitive coping responses was also a significant predictor of pain intensity scores. As a partial replication of the findings of Thomas et al. (1995), state anxiety scores measured prior to surgery were a significant predictor of the total volume of morphine consumed by participants during PCA use.

6.2 Clinical Implications

With the trend towards providing cost effective patient care and efficient delivery of medical services, the general aim of this research was to further understand the psychological factors which make PCA beneficial in order to help allocate this method of post-operative pain relief. The presents results failed to demonstrate that the preoperative variables including self-efficacy beliefs, emotional distress, state anxiety and pain expectations helped to predict participants post-operative pain and PCA satisfaction. Therefore, no evidence is available from this study to help determine what patients would find PCA an optimal method of pain relief prior to its use. There is evidence, however, to support the use of psychological interventions focused on preoperative state anxiety and responses used during the pain experience as coping strategies. Education for patients undergoing surgery can enhance the effectiveness of their treatment (Mahler & Kulik, 1990). More specifically, Thomas et al. (1995) have concluded that anxiety and poor coping skills can be improved by preoperative education, which in turn may influence their recovery. From the qualitative findings of the present study it appears that some women did attempt to prepare for their hysterectomy by talking with others, reading about the procedure and recovery, as well as physically preparing for surgery. The impact of these personal forms of preparation is unclear, but formal education programmes designed to advise surgical patients about post-operative recovery have been successfully used.

Preoperative education may have a number of clinical effects. Education can provide reassurance with regards to patients' fears concerning PCA use including the risk of overdose, addiction and the loss of patient-nurse contact. This may also

improve the management of analgesic side effects. Post-operative nausea and vomiting are expensive for the health service in terms of length of time in hospital for patients to recover (Tramer, Phillips, Reynolds, McQuay, & Moore, 1999). Education can be used to reduce patient anxiety, encourage the autonomy and control that PCA allows, and increase patients' ability to actively participate in recovery (Griffin, Brennan, & McShane, 1998; Scott & Hodson, 1997). To achieve these effects, intensive preoperative tuition that includes an overview of the use of PCA, and the potential impact of anxiety and stress on recovery has been recommended (Griffin et al., 1998). Moreover, education about adaptive cognitive coping strategies and relaxation techniques for use during the immediate post-operative period have also been recommended (Scott & Hodson, 1997; Symonds, 1998). Relaxation techniques from a cognitive-behaviourial framework have been used successfully to help patients cope more effectively with a surgical situation (Laframboise, 1989). In addition to relaxation, cognitive methods such as attention control, dissociation and distraction strategies could be presented to patients to help them respond in an adaptive manner to their acute pain.

Information sheets and educational videos could be employed on surgical wards to educate patients upon admission. Although PCA information sheets are often provided to patients, it is essential that they contain specific details of the PCA to be used. Based upon the ideas of Griffin et al. (1998), PCA information sheets should include the following sections: (i) How to use PCA, with a summary of dose size and the lock-out interval, (ii) You're in control with PCA, (iii) How to deal with sudden or unexpected pain sensations, (iv) How to anticipate discomfort, (v) How to promote

healing and rapid recovery, (vi) What makes PCA safe, and (vii) Side effects, with a summary of the analgesic corridor. Nursing staff on surgical wards are instrumental in the implementation of preoperative information. Their knowledge of PCA use, in addition to their skills in the assessment of patient anxiety and post-operative coping responses can be beneficial in terms of patient recovery (Rundshagen, Schnabel, Standl, & Schulte, 1999). The clinical implications presented may have an effect upon levels of anxiety and post-operative coping skills that help reduce pain and discomfort, but it is not known how these influence patient satisfaction with PCA.

6.3 Theoretical Implications

Within a broad biopsychosocial perspective and a cognitive-biobehavioural model, the theory of self-efficacy beliefs has contributed to the understanding of pain and its treatment in previous research (Bandura, 1997; Bastone & Kerns, 1995; Oetker-Black & Kauth, 1995; Skevington, 1996; Williams & Kinney, 1991). As mentioned elsewhere in this discussion, there was no empirical evidence that self-efficacy beliefs as measured in the present study contributed to the understanding of post-operative pain, morphine consumption, and patient satisfaction with PCA. The construct validity of self-efficacy beliefs in pain management cannot be challenged just because self-efficacy beliefs failed to predict post-operative outcome measures in the present study. A sizeable number of studies across different clinical populations have indicated that patient's real or perceived ability to control aversive symptoms and to perform certain actions successfully are important mediators of psychological improvement in treatment programs (Bandura, 1997).

6.4 Limitations of this Study

The findings of this study must be viewed with caution due to measurement, procedural, statistical and medical themes that could be construed as limitations of the research. The measurement of generalised self-efficacy beliefs with the addition of two pain related efficacy questions employed in the present study had an acceptable degree of reliability, but it was not a specific measure of post-operative PCA use. The validity of the content of this questionnaire may have affected the lack of support for Bandura's theory of self-efficacy beliefs. The measurement of PCA satisfaction with the 17 item questionnaire designed by Egan and Ready (1994) may have been inappropriate. Operationalising patient satisfaction with PCA is a complex and difficult task. A total score for each participant's PCA satisfaction was derived from responses to the 17 items of this questionnaire. As satisfaction within a medial context is difficult to evaluate, a total score that reflects a position on a continuum from non-satisfied to highly satisfied was unsuitable, and a limitation of this study. Based upon the conclusions of Chumbley et al. (1999) and Williams (1994), the construct validity of this measure of patient satisfaction with PCA appears to be in question.

An additional measurement limitation of this research was the low alpha coefficient obtained for the adaptive coping strategies subscale of the Acute Pain Response Questionnaire. Although this finding was consistent with Pick et al. (1990) who designed this measure, the high degree of measurement error reflects an inadequacy of the questionnaire. This is an important limitation as it would have been interesting to test the adaptive post-operative coping skills of the participants.

Other measurement issues as limitations of this research include the failure to

measure the length of time participant's stayed on the ward as inpatients after their surgery. This would have provided an interesting objective measure of surgical recovery. A summary of the ratio between the number of PCA demands and the number of successful PCA bolus doses received would have provided additional information about the participant's use of PCA. In addition, a VAS of PCA satisfaction would have provided a multiple measure of this complex construct. The absence of post-operative qualitative data within this study seriously affects the ability of this research to extend previous findings.

A variety of procedural limitations have affected the result of this study. A small sample size of only 45 participants were recruited from a surgical ward of one hospital. Although this was a homogeneous sample of women undergoing hysterectomies, a sample size of over 100 participants recruited from numerous gynaecological wards at multiple locations across London would have been an improvement. It was also a limitation to measure post-operative pain only once at 24-36 hours after surgery. As discussed by Thomas et al. (1995), an improvement of the present procedure would have been to measure pain at 6, 18, and 24 hours after surgery.

The small sample size of only 45 participants restricted the number of variables that were entered into each of the regression equations. The order of entry of the predictor variables in research questions two, three, and four could be questioned. As stated in Chapter Five, pain variables were entered at step 1 to statistically control for dimensions of pain. Self-efficacy beliefs were entered at step 2 based upon the priority given to these theoretical considerations. Step 3 included the preoperative

measurement of state anxiety and emotional distress that were entered before the step 4 post-operative variables of maladaptive coping, PCA satisfaction, and total volume of morphine consumed. With a sample size of over 200 participants, stepwise regression analyses could have been employed to go beyond the limitations caused by the order of entry. A final statistical limitation of this research was the use of a $p < .001$ criterion for determining the outliers among the participants. A less stringent probability criterion of $p < .05$ may have helped to identify significant univariate or multivariate outliers.

There are also medical limitations within the present study. Although every participant was undergoing the same total abdominal hysterectomy procedure with or without a salpingo-oophorectomy, seven different Consultant Gynaecological Surgeons performed the operations. Each of these Consultants had a different approach to their patients' post-operative recovery that may have affected the post-operative outcome measures of pain, PCA satisfaction, and morphine consumption. It was not documented during data collection which of the participants were currently receiving hormone replacement therapy. Moreover, the frequency with which other drugs were prescribed and taken by participants in this study was not recorded. Even though the post-operative data was collected upon completion of PCA use when treatment with oral analgesia started, it was possible that antiemetic drugs and other pain relieving drugs such as voltarol (diclofenac sodium) were administered in suppository form.

Directions for Future Research

It is important that additional research is pursued to answer Hall and Salmon's

invitation for continued examination of PCA use in an attempt to help resolve some of the current controversies and inconsistencies in the area. Future studies should continue to evaluate the themes of the review questions previously discussed in this thesis and go beyond them to include the following: (1) Why is PCA effective?; (2) What factors of a patient's experience with PCA are important?; (3) Does anxiety affect pain management with PCA? and; (4) Does control influence pain management in PCA? Additional research must go beyond the limitations of the present study by employing measurement instruments with reliability and validity, using more rigorous and consistent procedures, as well as being attentive to both medical and statistical confounds.

Four additional studies are described here for other researchers to pursue at some time in the future. The first is an extension of the present study. It important to once again evaluate the theory of self-efficacy beliefs in PCA use with a combination of the generalised measure employed here and a domain specific PCA and pain management self-efficacy beliefs measurement instrument. The following items may be helpful in the design of this domain specific questionnaire. (1) I am confident that I understand how to use the PCA system. (2) I feel confident about controlling my pain with the PCA system. (3) I feel able to take on the responsibility for my own pain management with the PCA system. (4) I feel sure that after surgery I will remember how best to use the PCA system. (5) I will be able to distract my mind away from the pain when using the PCA system. (6) I have confidence in the safety of the PCA system. (7) It is important to me that I have control over my pain management by using PCA. (8) I am confident that I can ask the Nurses for help if problems occur with the PCA system.

(9) I feel confident that the PCA system is the best pain control method for me. (10) I realise pain after surgery is natural and that it is up to me to control it as best I can.

The second additional research idea is also a partial extension of the present study. As the concept of PCA satisfaction is complex and difficult to operationalise, a qualitative research design using semi-structured interviews after surgery may help further understand what Chumbley et al. (1999) have recently described as patients' experience with PCA. The following items could be a starting point for this research. (1) How did you feel about using PCA? (2) How long did it take you to learn to use your PCA? (3) How was your pain relief with PCA? (4) How much control did the PCA give you? (5) What made you press the PCA button? (6) How safe did you feel using PCA? (7) How did PCA compare to your expectations? (8) Of the information you were given about PCA what was helpful and not helpful?

The third and fourth studies for future consideration involve the use of educational tuition and acute pain coping strategies discussed within the clinical implications. It would be interesting to examine the between group differences in post-operative pain, morphine consumption, and patients experience of PCA for one group of hysterectomy patients who have been provided with a standard information sheet about PCA and a second group who have watched a 15 minute demonstration video of PCA use. The final study involves a test of a psychological intervention focused upon post-operative distraction techniques. As a between group study, one group would act as a control with only standard PCA for pain relief, a second group with PCA and relaxation techniques, and a third group with PCA and tuition for cognitive techniques such as ignoring the pain, shifting attention away from the pain, thoughts of pleasant

memories, and reassurance that the pain will soon go away.

6.6 Closing Remarks

The recognition of clinical health psychology as a designated field of research and treatment is relatively recent. The contributions of clinicians and academics from within this expanding field have encouraged a biopsychosocial perspective and helped facilitate a move towards multidisciplinary patient care within the NHS. As mentioned in Chapter One, the roles played by clinical health psychologists are important to medical sciences and the health-care system due to the growing awareness that health and illness have many dimensions (Sheridan & Radmacher, 1992; Gatchel & Baum, 1995). The acknowledgment in a recent government White Paper entitled, *The New NHS: Modern - Dependable* (Department of Health, 1997) that well managed teams are a means of encouraging clinical effectiveness is welcome support for the multidisciplinary Acute Pain Teams. Psychologists functioning as scientist-practitioners within this context can assist with clinical audits and implications based upon research evidence in the development of clinical governance (Baker & Firth-Cozens, 1998). PCA as an improved treatment method for post-operative pain has generally been praised by both service users and providers. However, additional research is warranted to help further address its success, and overcome the inconsistencies in the published literature. The long standing debate about mind-body relationships will no doubt continue, but some of the findings from this study do help illustrate the importance of the interrelationship between the mind and the body during an acute pain experience.

REFERENCES

Baker, R., & Firth-Cozens, J. (1998). Evidence, quality of care and the role of psychology. *The Psychologist*, 11 (9), 430-432.

Ballantyne, J.C., Carr, D.B., Chalmers, T.C., Dear, K., Angellilo, I.F., & Mosteller, F. (1993). Post-operative patient controlled analgesia: Meta analysis of initial randomised control trials. *Journal of Clinical Anesthesiology*, 5, 182-193.

Bandura, A. (1991). Self-efficacy mechanisms in physiological activation and health promoting behaviour. In J. Madden (Ed.), *Neurobiology of Leanring, Emotion and Affect.* New York: Raven Press.

Bandura, A. (1986). *The Social Foundations of Thought and Action: A Social-Cognitive Theory.* New Jersey: Prentice-Hall.

Bandura, A. (1997). *The Exercise of Control.* New Jersey: Prentice-Hall.

Barlow, J.H., Williams, B., & Wright, C.C. (1997). The reliability and validity of the arthritis self-efficacy scale in a UK context. *Psychology, Health & Medicine*, 2, 3-17.

Bastone, E.C., & Kerns, R.D. (1995). Effects of self-efficacy and perceived control after coronary artery bypass graft surgery. *Annals of Behavioural Medicine*, 17, 324-330.

Blalock, S.J., DeVellis, R.F., Brown, G.K., & Wallston, K.A. (1989). Validity of the Centre for Epidemiological Studies Depression scale in arthritic populations. *Arthritis and Rheumatism*, 32, 991-997.

Boutwood, A., & Campbell C. (1987). Hysterectomy. *Women's Health Concern Leaflet*, 1/87, 1-4.

Brown G.K., Nicassio, P.M., & Wallston, K.A. (1989). Pain coping strategies and depression in rheumatoid arthritis. *Journal of Consulting and Clinical Psychology*, 57, 652-657.

Campbell, W.I., & Patterson, C.C. (1998). Quantifying meaningful changes in pain. *Anaesthesia*, 53, 121-125.

Chumbley, G.M., Hall, G.M., & Salmon, P. (1998). Patient controlled analgesia: An assessment by 200 patients. *Anaesthesia*, 53, 216-221.

Chumbley, G.M., Hall, G.M., & Salmon, P. (1999). Why do patients feel positive about patient controlled analgesia? *Anaesthesia*, 54, 372-392.

Department of Health (1997). *The New NHS: Modern - Dependable.* London: The Stationery Office.

DeLoach, J.L., Higgins, M.S., Caplan, A.B., & Stiff, J.L. (1998). The visual analog scale in the immediate post-operative period: Intrasubject variability and correlation with a numeric scale. *Anaesthesia and Analgesia*, 86, 102-106.

Dubos, R. (1995). Mirage of Health. In, B.Davey, A. Gray & C. Seale (eds) *Health and Disease: A Reader* (second edition). Buckingham: Open University Press.

Egan, K.J., & Ready, L.B. (1994). Patient satisfaction with intravenous patient controlled analgesia or epidural morphine. *Canadian Journal of Anaesthesia*, 41, 6-11.

Fifield, J., Reisine, S., Sheehan, T.J., & McQuillan, J. (1996). Gender, paid work and symptoms of emotional distress in rheumatoid arthritis patients. *Arthritis and Rheumatism*, 39, 427-435.

France, R.D. (1989). Psychiatric aspects of pain. *The Clinical Journal of Pain*, 5 (supp. 2), S35-S42.

Gath, D., Cooper, P., & Day, A. (1982). Hysterectomy procedures and psychiatric disorder: I. Levels of psychiatric morbidity before and after hysterectomy. *British Journal of Psychiatry*, 140, 335-342.

Gath, D., Rose, N., Bond, A., Day, A., Garrod, A., & Hodges, S. (1995). Hysterectomy and psychiatric disorder: Are levels of psychiatric morbidity failing? *Psychological Medicine*, 27, 277-283.

Gatchel, R.J., & Baum, B. (1995). *An Introduction to Health Psychology* (Second Edition). New York: Random House.

Gill, K.M., Ginsberg, B., Muir, M., Sykes, D., & Williams, D.A. (1990). Patient controlled analgesia in post-operative pain: The relationship of psychological factors to pain and analgesic use. *The Clinical Journal of Pain*, 6, 137-142.

Grant, N.F., & Cunningham, F.G. (1993). *Basic Gynaecology and Obstetrics.* Connecticut; Appleton and Lage.

Griffin, M.J., Brennan, L., & McShane, A.J. (1998). Preoperative education and outcome of patient controlled analgesia. *Canadian Journal of Anaesthesia*, 45, 943-948.

Government Statistical Services (1996). *Perscription Cost Analysis for England 1995*: Department of Health.

Hall, G.M., & Salmon, P. (1997). Patient controlled analgesia - who benefits? *Anaesthesia*, 52, 401-402.

Heath, M.L. & Thomas, V.J. (1993). *Patient-Controlled Analgesia: Confidence in Post-Operative Pain Control.* Oxford: Oxford University Press.

Herod, J.J.O., Hodgett, S.G., & O'Brien, P.M.S. (1997). Hysterectomy and HRT. In J.W. Studd & L. Edwards (eds), *Hysterectomy and HRT.* London: RCOG Press.

Jamison, R.N., Taft, K., O'Hara, J.P., & Ferrante, F.M. (1993). Psychosocial and pharmacological predictors of satisfaction with intravenous patient controlled analgesia. *Anaesthesia and Analgesia,* 77, 121-125.

Johnson, L.R., Ferrante, F.M., Magnani, B.J., & Rocco, A.G. (1988). Psychological modifers of PCA efficacy. *Anaesthesia,* 13, 52S.

Keefe, F.J. (1982). Behavioural assessments and treatment of chronic pain: Current status and future directions. *Journal of Consulting and Clinical Psychology,* 50, 896-911.

Kehlet, H. (1994). Post-operative pain relief - what is the issue? *British Journal of Anaesthesia,* 72, 375-377.

Khastgir, G., & Studd, J.W.W. (1997). A survey of patients' attitude, experience and satisfaction with hysterectomy, oophorectomy and hormone replacement by oestradiol and testosterone implants. *Obstetrics and Gynaecology,* 25, 217-225.

Kohout, F.J., Berkman, L.F., Evans, D.A., & Cornoni-Huntley, J. (1993). Two shorter forms of the CES-D depression symptoms index. *Journal of Aging and Health,* 5, 179-193.

Lackner, J.M., Carosella, A.M., & Feuerstein, M. (1996). Pain expectations, pain, and functional self-efficacy expectancies as determinants of disability in patients with chronic low back pain. *Journal of Consulting and Clinical Psychology,* 64, 212-220.

Laframboise, J.M. (1989). The effect of relaxation training on surgival patients' anxiety and pain. In S.G. Funk & E.M. Tornquist (Eds), *The Management of Pain, Fatigue and Nausea.* London: MacMillian Press.

Macintyre, P.E. & Ready, L.B. (1996). *Acute Pain Management: A Practical Guide.* London: W.B. Saunders Ltd.

MacKay, E.V., Beischer, N.A., Pepperell, R.J., & Wood, C. (1992). *Illustrated Textbook of Gynaecology* (second edition). London: Bailliere Tindall.

Mahler, H.M., & Kulik, J.A. (1990). Preference for health care involvement, perceived control and surgical recovery: A prospective study. *Social Science Medicine,* 31, 743-751.

Maynard, A. (1987). Logic in medicine: An economic perspective. *British Medical Journal,* 295, 1537-1541.

McClelland, D.C. (1985). The social mandate of health psychology. *American Behavioural Science*, 28, 451-467.

McQuay, H., & Moore, A. (1998). *An Evidence-Based Resource for Pain Relief.* Oxford: Oxford University Press.

Meikle, S., Brody, H., & Pysh, F. (1977). An investigation into the psychological effects of hysterectomy. *Journal of Nervous and Mental Diseases*, 164, 36-41.

Melzack, R., & Wall, P.D. (1965). Pain mechanisms: A new theory. *Science*, 150, 971-979.

Melzack, R. (1987). The short-form McGill Pain Questionnaire (SF-MPQ). *Pain*, 30, 191-197.

Merskey, H., Albe-Fessard, D.G., Bonica, J.J., Carmen, A., Dubner, R., Kerr, F.W.L., Lindblom, U., Mumford, J.M., Nathan, P.W., Noordenbos, W., Pagni, C.A., Renaer, M.J., Sternbach, R.A., & Sunderland, S. (1979). International Assocaition for the Study of Pain sub-committee on taxonomy. *Pain*, 6, 249-252.

Munafo, M.R. (1998). Perioperative anxiety and post-operative pain. *Pschology, Health and Medicine*, 3 (4), 429-433.

Murray, D.J. (1988). *A History of Western Psychology* (second edition). New Jersey: Prentice Hall.

Notcutt, W.G., & Morgan, R.J.M. (1990). Introducing patient controlled analgesia for post-operative pain control into a district hospital. *Anaesthesia*, 45, 401-406.

Nunnally, J., & Bernstein, I.H. (1994). *Psychometric Theory* (Third Edition). New York: McGraw-Hill.

Oetker-Black, S.L., & Kauth, C. (1995). Evaluating a revised self-efficacy scale for preoperative patients. *American Organisation of Registered Nurses Journal*, 62, 244-250.

O'Hara, M., Kohout, W., & Wallace, R.B. (1985). Depression among the rural elderly. *Journal of Nervous and Mental Diseases*, 173, 582-589.

Owen H., & Plummer, J. (1997). Patient controlled analgesia: Current concepts in acute pain management. *CNS Drugs*, 8, 203-218.

Park, G., & Fulton, B. (1991). *The Management of Acute Pain.* Oxford: Oxford University Press.

Patterson, R.M., & Craig, J.B. (1963). Misconceptions concerning the psychological effects of hyserectomy. *American Journal of Obstetrics and Gynecology*, 85, 104-111.

Perry, F., Parker, R.K., White, P.F., & Clifford, A. (1994). Role of psychological factors in post-operative pain control and recovery with patient controlled analgesia. *The Clinical Journal of Pain*, 10, 57-63.

Pick, B., Pearce, S., & Legg, C. (1990). Cognitive responses and the control of post-operative pain. *British Journal of Clinical Psychology*, 29, 409-415.

Pitts, M. (1991). Pain: Psychological Aspects. In M.Pitts and K. Phillips (eds), *The Psychology of Health.* London: Routledge.

Radloff, L.S. (1977). The CES-D Scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement*, 1, 385-401.

Rudy T.E., & Turk, D.C. (1991). Psychological aspects of pain. *International Anesthesiology Clinics*, 20 (1), 9-21.

Rundshagen, I, Schnabel, K., Standl, T., & Schulte, J. (1999). Patients' versus Nurses' assessments of post-operative pain and anxiety during PCA. *British Journal of Anaesthesia*, 82 (3), 374-378.

Schwarzer, R., Babler, J., Kwiatek, P., & Schroder, K. (1997). The assessment of optimistic self-beliefs: Comparison of the German, Spanish, and Chinese versions of the General Self-efficacy Scale. *Applied Psychology: An International Review*, 46 (1), 69-88.

Schwarzer, R., & Jerusalem, M. (1993). The measurement of perceived self-efficacy: Psychometric scales for cross-cultural research. In J. Weinman, S. Wright, & M. Johnston (1996), *Measures in Health Psychology: A User's Portfolio.* Windsor: NFER-Nelson.

Scott, N.B., & Hodson, M. (1997). Public perceptions of post-operative pain and its relief. *Anaesthesia*, 51, 279-281.

Sechzer, P.H. (1971). Studies in pain with analgesia-demand system. *Anaesthesia and Analgesia*, 50, 1-10.

Sheridan, C.L., & Radmacher, S.A. (1992). *Health Psychology: Challenging the Biomedical Model.* New York: John Wiley Sons.

Sjostrom, B. (1995). *Assessing Acute Postoperative pain: Assessment Strategies and Quality in Relation to Clinical Experience and Professional Role.* Goteborg, Sweden: Acta Universitatis Gothoburgensis.

Skevington, S.M. (1996). *Psychology of Pain.* Chichester: John Wiley & Sons.

Sobel, D.S. (1995). Rethinking medicine: Improving health outcomes with cost-effective psychosocial interventions. *Psychosomatic Medicine*, 57, 234-244.

Spielberger, C.D., Auerbach, S.M., Wadsworth, A., Dumm, T.M., & Taulbee, S.M. (1973). Emotional reactions to surgery. *Journal of Consulting and Clinical Psychology*, 40, 33-38.

Spielberger, C.D., Gorsuch, R.L., Lushene, R., Vagg, P.R., & Jacobs, G.A. (1983). *Manual of State/Trait Anxiety Inventory: Self Evaluation Questionnaire.* California: Clinical Press.

Studd, J., & Edwards, L. (1997). *Hysterectomy and HRT.* London: RCOG Press.

Symonds, T. (1998). Pain: Psychological Aspects. In M. Pitts and K. Phillips (eds), *The Psychology of Health.* London: Routledge.

Tabachnick, B.G., & Fidell, L.S. (1989). *Using Multivariate Statistics* (Second Edition). New York: Harper Collins.

Taylor, N.M., Hall, G.M., & Salmon, P. (1996). Patient's experiences of patient controlled analgesia. *Anaesthesia*, 51, 525-528.

Thomas, V., Heath M., Rose, D., & Flory, P. (1995). Psychological characteristics and the effectiveness of patient controlled analgesia. *British Journal of Anaesthesia*, 74, 271-276.

Tramer, M.R., Phillips, C., Reynolds, D., McQuay, H.J., Moore, R.A. (1999). Cost effectiveness of ondansetron for post-operative nausea and vomiting. *Anaesthesia*, 54, 226-234.

Wasylak, T.J., Abbott, F.V., English, M.J.M., & Jeans, M-E. (1990). Reduction in post-operative morbidity following patient controlled morphine. *Canadian Journal of Anaesthesia*, 37, 726-731.

Welchew, E. (1995). *Patient Controlled Analgesia: Principles and Practice Series.* London: British Medical Journal Publishing Group.

Williams, S.L., & Kinnery, P.J. (1991). Performance and non-performance strategies for coping with acute pain: The role of perceived self-efficacy, expected outcomes, and attention. *Cognitive Therapy and Research*, 15, 1-19.

Wright, S. (1995). Health psychologists make an important contribution to care. *British Medical Journal*, 311, 948.

Zimmerman, M., & Coryell, W. (1994). Screening for major depression in the community: A comparison of measures. *Psychological Assessment*, 6, 71-74.

APPENDIX A

UCL HOSPITALS

The University College London Hospitals

Research and Development Directorate
9th Floor, St Martin's House
140 Tottenham Court Road, London W1P 9LN
Fax. 0171-380 9937

Clinical Research Administrator:
Simon Robinson, Tel. 0171-380 9833
Administrative Assistant:
Philip Diamond, Tel. 0171-380-9833

Director: Professor R L Souhami
Tel. 0171-380 9940

Office/Ethics Committees Administrator:
Iwona J Nowicka, Tel. 0171-380 9579
Assistant Director of Finance R&D:
Liesa Jones, Tel. 0171-380 9833/9579

Dr L Glover
Clinical Psychologist and Academic Tutor
Sub-Department of Clinical Health Psychology
UCL
Gower Street

01 April 1998

Dear Dr Glover

Study No: **98/0030** *(Please quote in all correspondence)*
Title: **The psychological aspects of post-operative pain management with the use of patient controlled analgesia**

The above application is now approved by the Trust and you may go ahead with your research.

Yours sincerely

RL Souhami
Director of R&D

cc. Dr J Murray

University College London Hospitals is an NHS Trust incorporating The Eastman Dental Hospital, The Hospital for Tropical Diseases, The Middlesex Hospital, The National Hospital for Neurology & Neurosurgery, The United Elizabeth Garrett Anderson Hospital and Hospital for Women, Soho, and University College Hospital.

Sub-Department of Clinical Health Psychology

UNIVERSITY COLLEGE LONDON

GOWER STREET LONDON WC1E 6BT

General Enquiries: 0171-380 7897
Clinical Tutor Team: 0171-391 1258
UCL: 0171-380 7050
Code from overseas: +44 171
Fax: 0171-916 1989

Dear Participant,

This is a confidential information letter that outlines a research project titled: **The Psychological Aspects of Post-Operative Pain Management with the use of Patient Controlled Analgesia (PCA).** The Sub-Department of Clinical Health Psychology from University College London is carrying out this study which is looking into the experiences patients' have using the Patient Controlled Analgesia (PCA) system, which helps manage the pain following an operation. This is an invitation for you to be included as a participant in this study which is being carried by Dr Lesley Glover and Dr James Murray who are both Psychologists at the University College London. This study has the full co-operation of Dr Lesley Bromley, who is the Head of the Department of Anaesthetics at the University College London Hospital, which includes the Elizabeth Garrett Anderson Hospital. All proposals for research using human participants are reviewed by an ethics committee before they can proceed. This study was reviewed by the Joint UCL/UCLH Committees on the Ethics of Human Research.

Participation in this study includes answering questions from a series of questionnaires in the hospital before your operation and again 24-48 hours after your operation. These questionnaires focus upon the beliefs, feelings and behaviours about pain, how people are coping, and reasons for satisfaction with the Patient Controlled Analgesia (PCA) system of pain management. If you agree to participate we will ask you to sign a consent form which gives us your permission to be included in this study. You will then be interviewed by Dr James Murray, which should take no more than 20 minutes before and again after the operation. We will also look at your hospital file to collect information on the amount of pain medication used during your hospital stay. We guarantee that all the information associated with this study will be kept strictly confidential. If you have used a PCA system before, or if your currently taking medication for any mental health problems please let us know.

You do not have to take part in this study if you do not want to. If you decide to take part you may withdraw at any time without having to give a reason. Your decision whether to take part or not will in no way affect your care and management in any way. The reason you have been invited to participate in this study is so we can help understand the psychological issues of post-operative pain management. If we gain more information about why the Patient Controlled Analgesia system is beneficial to our patients and their reasons for satisfaction and dissatisfaction with this system, it may be extremely helpful in treating future patients. There are few if any areas of potential distress involved in this research as we will simply be asking you for information. If you feel that any of the issued raised in this study are distressing, please feel free to discuss them with Dr James Murray during the interview, or telephone Dr Lesley Glover on 0171-504-5985 at your convenience. We thank you for your interest and will look forward to your participation because it is really important that as many people as possible take part in this study.

Sincerely,

James Murray Lesley Glover

Dr James Murray and Dr Lesley Glover

Sub-Department of Clinical Health Psychology

UNIVERSITY COLLEGE LONDON

GOWER STREET LONDON WC1E 6BT

General Enquiries: 0171-380 7897
Clinical Tutor Team: 0171-391 1258
UCL: 0171-380 7050
Code from overseas: +44 171
Fax: 0171-916 1989

APPENDIX C

CONFIDENTIAL CONSENT FORM FOR PARTICIPANTS

TITLE OF RESEARCH PROJECT:

THE PSYCHOLOGICAL ASPECTS OF POST-OPERATIVE PAIN MANAGEMENT WITH THE USE OF PATIENT CONTROLLED ANALGESIA.

The following questions about this project are important for you to think about. If you feel that you have enough information about this research and agree to take part in this study, please sign below.

(1) Have you read the information sheet about this research?
(2) Have you had an opportunity to ask questions and discuss this study?
(3) Have you received satisfactory answers to all your questions?
(4) Have you had enough information about this study?
(5) Which doctor have you spoken to about this research?
(6) Do you understand that you are free to withdraw from this study at any time without having to give a reason, and without affecting your future medical care?
(7) Finally, do you agree to take part in this study?

Remember that all information given during this study will be kept strictly confidential. Thank you very much for your time and co-operation.

I,.....
give my informed consent to participate in this research. I have read the information letter which was given to me by Dr James Murray and Dr Lesley Glover, and know that this research involves answering questions before and after my operation..

Signature.....

Date.....

Signed below by Dr James Murray and Dr Lesley Glover

JLM S.E. (pre-op)

This booklet contains four pages, with different types of questions on each page. Please follow the instructions and answer each and every question as quickly and honestly as you can. Remember that there is no RIGHT OR WRONG answer. Thank you once again for participating in this research and after the operation you will be asked to complete a similar questionnaire booklet. For the twelve questions below please tick the ONE BOX which best describes how you generally behave, using the following scale:

1 = NOT AT ALL TRUE
2 = BARELY TRUE
3 = MODERATELY TRUE
4 = EXACTLY TRUE

	1	2	3	4
1. I can always manage to solve difficult problems if I try hard enough.				
2. If someone opposes me, I can find means and ways to get what I want.				
3. It is easy for me to stick to my aims and accomplish my goals.				
4. I am confident that I could deal efficiently with unexpected events.				
5. Thanks to my resourcefulness, I know how to handle unforeseen situations.				
6. I can solve most problems if I invest the necessary effort.				
7. I can remain calm when facing difficulties because I can rely on my coping abilities.				
8. When I am confronted with a problem, I can usually find several solutions.				
9. If I am in a bind, I can usually think of something to do.				
10. No matter what comes my way, I'm usually able to handle it.				
11. I feel confident about controlling my own pain.				
12. I feel able to take on the responsibility for my own pain management.				

JLM CES-D (pre-op)

Please tick the ONE response which best describes your feelings during the past WEEK for each of the 11 questions below, using the following scale:

1 = HARDLY EVER

2 = SOME OF THE TIME

3 = MOST OF THE TIME

	1	2	3
1. I didn't feel like eating and my appetite was poor.			
2. I felt depressed.			
3. I felt that everything I did was an effort.			
4. My sleep was restless.			
5. I was happy.			
6. I felt lonely.			
7. People were unfriendly.			
8. I enjoyed life.			
9. I felt sad.			
10. I felt that people disliked me.			
11. I could not get "going".			

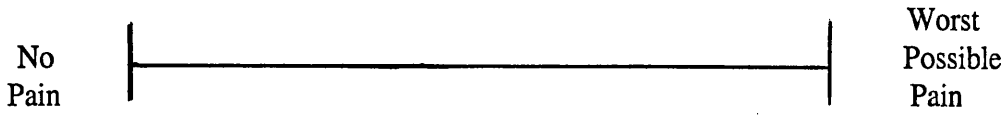
JL Murray, AX-Pre

A number of statements which people have used to describe themselves are given below. Please read each statement and then tick the appropriate box following the statement to indicate how you feel *right now*, that is, *at this moment* using the following scale:

1 = NOT AT ALL
2 = SOMEWHAT
3 = MODERATELY SO
4 = VERY MUCH SO

	1	2	3	4
1. I feel calm.				
2. I feel secure.				
3. I am tense.				
4. I feel strained.				
5. I feel at ease.				
6. I feel upset.				
7. I am presently worrying over possible misfortunes.				
8. I feel satisfied.				
9. I feel frightened.				
10. I feel comfortable.				
11. I feel self-confident.				
12. I feel nervous.				
13. I am jittery.				
14. I feel indecisive.				
15. I am relaxed.				
16. I feel content.				
17. I am worried.				
18. I feel confused.				
19. I feel steady.				
20. I feel pleasant.				

Please mark with an X on the following line (which goes from No Pain to Worst Possible Pain) the amount of pain you EXPECT TO BE IN 24-48 HOURS AFTER YOUR OPERATION.



The last 2 questions are more general and it is hoped that these will give you the opportunity to add to the more specific questions that have just been answered. Please write your comments in the space provided, or on the back of this page if you need more room. We thank you for your co-operation with this research and will look forward to meeting with you after the operation to get more information on how you are doing.

1. What things have you done to prepare yourself for this operation? (Have you talked with other women who have recently had a hysterectomy?)

2. What are your general thoughts and feelings about using patient controlled analgesia?

1. The 15 words presented below are used to describe various aspects of PAIN. For all of these words please tick one of the boxes (none, mild, moderate or severe pain) which best describe the pain you are experiencing now.

	None	Mild	Moderate	Severe
Throbbing				
Shooting				
Stabbing				
Sharp				
Cramping				
Gnawing				
Hot-Burning				
Aching				
Heavy				
Tender				
Splitting				
Exhausting				
Sickening				
Fearful				
Punishing				

2. Please circle one of the following 6 words which best summarises the **INTENSITY OF PAIN** which you are feeling right now.

No Pain	Mild Pain	Discomforting Pain	Distressing Pain	Horrible Pain	Excruciating Pain

3. Please mark with an X on the following line (which goes from No Pain to Worst Possible Pain) the AMOUNT OF PAIN YOU ARE FEELING NOW.

No Pain ——————————————————— Worst Possible Pain

These questions concern how you are currently managing with your pain. Please circle either YES or NO to indicate whether or not you have been thinking or doing each of the 19 items which appear below since your operation.

1. Worry about what might be causing the pain.	Yes	No
2. Reassure yourself that the pain will soon go.	Yes	No
3. Worry about whether the pain will get worse.	Yes	No
4. Relax and not bother about the pain.	Yes	No
5. Feel tense and worried because the pain has returned.	Yes	No
6. Think about something pleasant rather than concentrating on the pain.	Yes	No
7. Find your attention focused on the pain.	Yes	No
8. Reassure yourself that some pain is to be expected after an operation.	Yes	No
9. Worry about how long the pain will last.	Yes	No
10. Think of the pain as some other kind of sensation such as numbness.	Yes	No
11. Think the pain is awful and feel it overwhelms you.	Yes	No
12. Ignore the pain.	Yes	No
13. Think the pain is never going to go away.	Yes	No
14. Think of things to do to help distract you from pain.	Yes	No
15. Worry about not being able to do things you had planned, such as TV, read, or enjoying your visitors.	Yes	No
16. Tell yourself that you can overcome the pain.	Yes	No
17. Feel that you cannot stand it anymore.	Yes	No
18. Worry that the pain means the operation has not been successful.	Yes	No
19. Worry that the pain will become unbearable before you can have the next dose of pain medication.	Yes	No

These questions concern your satisfaction and dissatisfaction with the postoperative patient controlled analgesia (PCA). Please circle either YES or NO to indicate whether you agree or disagree with the 17 questions which appear below.

1. The PCA worked quickly?	Yes	No
2. Provided personal control?	Yes	No
3. Gave effective relief when resting?	Yes	No
4. No need for painful injections?	Yes	No
5. Gave me a clear mind?	Yes	No
6. There were no distressing side effects?	Yes	No
7. Effective pain relief when moving or coughing?	Yes	No
8. Provided me with relaxation?	Yes	No
9. The PCA caused side effects?	Yes	No
10. There was pain after surgery before the PCA became effective?	Yes	No
11. Insomnia?	Yes	No
12. I felt like I was under sedation?	Yes	No
13. Poor pain relief overall?	Yes	No
14. Dependence on other for care?	Yes	No
15. The method worked slowly?	Yes	No
16. Fear of addiction?	Yes	No
17. Too responsible for my own care?	Yes	No

We thank you once again for your participation in this research. If there are comments you would like to make on any aspect of the use of the patient controlled analgesia, or feel that the questionnaires used in this study did not cover certain features of your experience, please write them below or on the back of this page. Was there any thing about this study that you disliked?, found distressing?, or could be improved? All comments are welcome and would be helpful to the researchers and future studies in the area of pain control.