Cancer is a ubiquitous disease that continues to be associated with high mortality rates despite ongoing research. An estimated 6.35 million new cases of cancer are diagnosed worldwide annually, half of which originates in developing nations (Bonica & Ekstrom, 1990). Rao and Ganesh, (1998) reported that the total number of cancer patients in India is estimated to be around 0.609 million (0.315 million male and 0.294 million female). Overall, cancer cure rates have not changed markedly over past four decades: the overall 5 year survival rates for patients diagnosed with cancer in U. S is still only about 40 to 50% (American Cancer Society 1989) and as a result of inadequate early detection, is less than one third worldwide (Bonica & Ekstrom, 1990).

Pain may be defined as "an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage" (International Association for the Study of Cancer Classification of Chronic Pain, 1987). Together with anorexia and fatigue, pain is the most common symptom associated with cancer (Walsh, 1984). Pain intensity is not proportional to the type or extent of tissue damage but may be influenced at many sites within the nervous system. The perception of pain depends on the complex interactions between nociceptive and non-nociceptive impulses in ascending pathways, in relation to the activation of descending pain-inhibitory systems. This framework provides the basis for a comprehensive, multimodal approach to the assessment and treatment of patients with pain and fits with the clinical observation that there is no single approach to effective pain management. Instead, individualized pain management should take into account the stage of disease, concurrent medical conditions,
characteristics of pain, and psychological and cultural characteristics of the patient. It also requires ongoing re-assessment of the pain and treatment effectiveness (AHCPR Publication No. 94-0592: March 1994). Current studies of cancer pain in adult patients typically report on prevalence, cause, measurement, and medical and surgical management. This focus prevails despite the observation that the cancer pain experience cannot be totally explained by the degree of pathology (Dalton & Feuerstein, 1988). Studies of cancer pain have addressed psychological and environmental factors infrequently, with only limited studies focusing on the broad range of potential bio behavioral factors that may be helpful in explaining the development, exacerbation and maintenance of cancer pain (Dalton & Feuerstein, 1988). This chapter consists of the current literature on cancer pain prevalence, influence of psychological factors on cancer pain and the effectiveness of psychological management. The studies pertaining to the above domains have been reviewed and organized into four major sections.

Section I: Prevalence of cancer pain

Section II: Treatment related issues of Cancer pain

Section III: Influence of Psychological factors on Cancer Pain

Section IV: Effectiveness of Psychological treatments in Cancer Pain Management

2.1. Section I: Prevalence of cancer pain

Cancer affects all aspects of patients' lives. One aspect of cancer that has received much attention from health care providers and cancer patients themselves is cancer pain (Falloon, 2008). Despite the abundant literature on this topic, accurate prevalence estimates
of pain in cancer patients are not available. Up to 70% of cancer patients are expected to experience pain during their illness (Fallon, 2008).

Van Everdingen et al. (2007) investigated the prevalence of pain in cancer patients according to the different disease stages and types of cancer in a meta analytic study. Pooled prevalence rates of pain were calculated for four subgroups: (i) studies including patients after curative treatment, 33% [95% confidence interval (CI) 21% to 46%]; (ii) studies including patients under anticancer treatment: 59% (CI 44% to 73%); (iii) studies including patients characterized as advanced/metastatic/terminal disease, 64% (CI 58% to 69%) and (iii) studies including patients at all disease stages, 53% (CI 43% to 63%). Of the patients with pain more than one-third graded their pain as moderate or severe. Pooled prevalence of pain was >50% in all cancer types with the highest prevalence in head/neck cancer patients (70%; 95% CI 51% to 88%).

2.1.1. The prevalence of pain at all stages and in early disease

Hearn and Higginson, (2003) reviewed twenty seven studies on the prevalence of pain in the general adult cancer population (i.e., studies usually at a varying stage of presentation. These gave a combined weighted mean prevalence of pain 40%, ranging from 18%–100%.

The prevalence of pain at the time of diagnosis is not frequently reported in many of the studies. Vuorinen, (1993) reported that 35% of newly diagnosed patients had experienced pain in the past 2 weeks. In another study Daut and Cleeland, (1982) found that 18%–49% of patients had had pain as an early symptom of the disease. Similar
findings were reported in a study conducted by Ger, Ho, Wang, Cherng et al. (1998) among newly diagnosed cases in which 38% had experienced pain.

2.1.2. Prevalence of pain in advanced cancer

It became apparent that although cancer pain is prevalent at all stages of the disease and may often be the first symptom of cancer, it is more common in advanced and terminal cancer. The prevalence of pain in terminally ill was estimated in some studies. Ward (as cited in Hearn, Higginson, 2003 P. 19-37) and Parkes (as cited in Hearn, Higginson, and 2003 P.32) reported pain prevalence of 62% - 64%. The last four weeks of the terminal patients have been identified as significantly painful by 86% of patients Bucher (as cited in Hearn, Higginson, 2003 P.32).

Daut and Cleeland, (1982) found that more pain is usually associated with metastatic than nonmetastatic disease. 64% of those patients with metastatic breast cancer had pain as compared to 40% of patients with no metastatic disease, a pattern that is consistent throughout cancer types. This may be related to stage of disease.

2.1.3. Tumour specificity of Cancer pain prevalence

The prevalence of cancer pain varies according to the site of the tumour as reported by several studies. While the reported prevalence of pain for patients with advanced multiple myeloma and advanced sarcoma was 100%, only 42% of the patients with ovarian cancer reported pain (Portenoy, 1994). Though cancers of the blood are reported to be less painful, wide variations in terms of the pain prevalence among the subtypes have been identified with only 5% of the patients experiencing pain in leukemia and a range
between 20% to 87% in lymphoma (Foley, 1979). However these studies have been criticized with reference to their poor generalizability as they are based on single studies.

2.1.4. Prevalence of Severity of pain

Cancer pain affects 17 million people worldwide. Its prevalence increases with extent of disease. Its type, location, and intensity vary with tumour type, spread of disease, and disease treatments (Hearn & Higginson, 2003). Surveys indicate a pain prevalence of 28% among patients with newly diagnosed cancer (Vuorinen, 1993), 50–70% among patients receiving active anticancer therapy (Portenoy, 1992, 1994) and 64–80% among patients with far advanced disease (Caraceni & Portenoy 1999; Coyle 1990; Twycross, 1982).

2.1.5. Prevalence of cancer pain syndromes

Cancer pain often occurs at multiple sites. A prospective survey of 2266 cancer patients referred to a pain service demonstrated that 30% of patients presented with one pain syndrome, 39% with two pain syndromes, and 31% with three or more pain syndromes (Zeppetella, O’Doherty, Collins as cited in Mahony, 2003 p.38.) The duration of cancer pain varies, but it can extend to several months or years Petzke, Radbruch, Zech (as cited in Mahony, 2003 p.38.). Transient flares of pain, or breakthrough pains, occur in approximately half the patients with cancer pain and are often associated with patient dissatisfaction with pain control. Breakthrough pain may be associated with the presence of baseline neuropathic pain Greer, Mor (as cited in Mahony, 2003 p.38.)

Caraceni and Portenoy, (1999) conducted IASP Task Force survey to explore the characteristics of Cancer pain syndromes. It was found that the factors that were
univariately associated with higher pain intensity included the presence of breakthrough pain, somatic pain or neuropathic pain, age younger than 60 years, and lower performance status score. A multivariate model suggested that the presence of breakthrough pain, somatic pain, and lower performance status were the most important predictors of intense pain. Pains that were inferred by the treating clinician to be nociceptive and due to somatic injury occurred in 71.6% of the patients. Pains labeled nociceptive visceral were noted in 34.7% and pains inferred to have neuropathic mechanisms occurred in 39.7%. In a broad classification, the major pain syndromes comprised bone or joint lesions (41.7% of patients), visceral lesions (28.1%), soft tissue infiltration (28.3%), and peripheral nerve injuries (27.8%). Twenty-two types of pain syndromes were most prevalent. Large differences in the diagnosis of breakthrough pain by clinicians of different countries suggest that this phenomenon is either defined or recognized differently across countries. These data confirm, in segment of the cancer population experiencing severe pain, in different parts of the world, that cancer pain characteristics, syndromes and pathophysiology are very heterogeneous.

To summarize, cancer pain is highly prevalent and associated with significant morbidity. No significant change in the prevalence rates of cancer pain have been found over time. It is more common in terminal cancer, particularly associated with metastasis. Studies have also reported pain prevalence with respect to specific diagnosis, tumor type, and pain syndromes. Despite the abundant literature, accurate prevalence estimates are not available. In addition, many of the studies have been criticized for their limitations. For example a good number of studies did not report prevalence rates at the time of diagnosis.
However, majority of the studies conclude that a substantial proportion of patients have pain related to cancer.

2.2. Section II: Treatment related Problems of Cancer pain

Currently available techniques can provide adequate relief to a vast majority of patients. However studies have shown that cancer pain is under treated. Various reasons for under treatment have been identified including barriers to pain management. The following section reviews the problems of cancer pain management.

2.2.1. Under treated pain

Although currently available therapies could be effective in most cases, undertreatment is common - about 30% of cancer patients never achieve adequate relief (Delgado- Guay & Bruera, 2009) and approximately 20% of cancer patients do not respond to the standard WHO three-step analgesic ladder approach (Fallon, 2008).

2.2.1.1. Undertreated Pain in elderly

Despite increased interest in treatment of senior cancer patients, older patients are much too often undertreated (Bouchardy, et al. 2003). An analysis of the computerized medical records of more than 1 million German patients revealed that only 1.9% of patients with cancer were receiving prescriptions for strong opioid medications, and many patients were receiving medications at inappropriate intervals and often on an “as required” basis (Zenz, Zenz, Tryba & Strumpf as cited in Mahony, 2003, p.39). Boucher, et al. (2003) reviewed clinical files of 407 breast cancer patients aged ≥ 80 years recorded at the Geneva Cancer Registry between 1989 and 1999. Patient and tumour characteristics, general health status, comorbidity, treatment, and cause of death were considered. The
study showed that elderly women with breast cancer had late diagnosis, incomplete
diagnostic assessment, and lacks a standardized therapeutic approach. Nearly 50% of the
patients had suboptimal treatments, resulting in a large excess of preventable breast cancer mortality.

The SAGE study group report of 4003 elderly nursing home residents with cancer
demonstrated a correlation between under medication of pain and advanced age. A total of
38% had evidence of daily pain, and 26% of these patients received no analgesics. In all
13% of patients with cancer pain older than 85 received opioid medications in comparison
with 38% of patients aged 65 to 74. Patients older than 85 were also more likely to receive
no analgesia (Bernabei, Gambassi, Lapane as cited in Mahony, 2003, p.39).

A Swedish nationwide questionnaire survey of practitioners treating 10% of the
country’s cancer patients suggested that many patients were still receiving opioids by
intermittent subcutaneous and intramuscular administration rather than continuously
(Rawl, Hylander & Amer, 1993).

In a survey of 1308 patients treated at 54 treatment locations affiliated with the
Eastern Co-operative Oncology Group, age greater than 70 years was predictive of poorly
controlled pain as well as greater functional impairment secondary to pain (Von Roenn,
Cleeland, Gonin as cited in Mahony, 2003, p.39).
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2.2.1.2. Undertreated pain in children

Children may be undertreated for pain because of the misconception that pain is not experienced by the very young or because of the difficulty of pain assessment. The problem of pain assessment is particularly significant in children younger than age 3 years. (Mahony, 2003). In a national Swedish survey of pediatric oncology clinicians, Ljungman et al. (1996) found that 63% followed the World Health Organization (WHO) analgesic “ladder principle,” 72% of clinicians felt that pain could be more effectively managed, and use of validated assessment instruments was rare. Only 31% of clinicians used visual analog scales, 23% used faces, 16% used systematic behavioral, observation, and 4% used pain diaries.

Miser, Mc Calla, and Dothage (1987) demonstrated that pain is a common presenting complaint of cancer in a pediatric population. In their study, 57 of 92 cancer patients had pain as an initial presenting complaint, and in 42 patients, this pain was sufficient to interfere with sleep patterns. Recent evidence suggests that although procedural pain becomes less severe later in treatment protocols for childhood cancers, there does not appear to be a decrease in treatment-related pain (Ljungman, Gordh, Sorensen, Kreuger as cited in, Mahony, 2003, p.39).

2.2.2. Barriers of Pain management

Unrelieved cancer pain remains a persistent and prevalent problem throughout the world (Anderson & Mendoza, 2000; Ashbury, 1998) and has been identified as a top research priority (Hinshaw, 2000). A number of patient, professional and system barriers interfere with medical management of disease-related pain in cancer (Borneman et al. 2011).
2.2.2.1. Patient related barriers

This includes socio demographic, cognitive, affective behavioral, and interpersonal aspects of the patient. In a study Keefe, Abernethy and Campbell, (2005) found that the number of barriers reported was significantly higher in cancer patients who were older, less educated, and had lower incomes. The level of patient-reported barriers was also linked to pain and pain management in that patients who reported a higher level of these barriers had significantly higher pain and tended to be under medicated.

Jacobsen, Moldrup, Christrup, and Siogren, (2008) conducted a literature review to assess patient related barriers to cancer pain management. Thirty-seven studies, dealing with cognitive, sensory and affective patient-related barriers, as well as studies, describing patients' pain communication and their adherence to analgesic regimen were included and analyzed. The dominant part of articles studied cognitive patient-related barriers to cancer pain management, while affective, sensory barriers, as well as pain communication and pain medication adherence were studied in much less extent. However, the findings from different studies regarding relationships between cognitive barriers and pain intensity were not consistent. On the contrary, the quality of pain communication was consistently found to be not satisfactory in some key areas. The associations between more expressed attitudinal as well as sensory barriers and less optimal adherence were also consistent.

The literature has consistently documented that patients’ beliefs and actions play a key role in the under treatment of pain (Cleeland & Janjan, Scott, Seiferheld & Curran, 2000). Patients are reluctant to report their pain for reasons including fear of side effects,
fatalism about the possibility of achieving pain control, fear of distracting physicians from treating cancer, and belief that pain is indicative of progressive disease (Ward et al. 1993).

Ward et al. (1993) studied 270 cancer patients with a self-report questionnaire that assessed the extent to which they have concerns about reporting pain and using pain medication. The 8 specific concerns included fear of addiction, beliefs that ‘good’ patients do not complain about pain, and concern about side effects. Patients also completed a measure of pain severity and pain interference (the BPI). The percentages of patients having concerns assessed by the BQ ranged from 37% to 85%. Those who were older, less educated, or had lower incomes were more likely to have concerns. Higher levels of concern were correlated with higher levels of pain. Based on their reports of pain medications used in the past week and on their reports of pain severity, patients were categorized as under-medicated versus adequately medicated. Those who were under-medicated reported significantly higher levels of concern.

2.2.2.2. System barriers

In addition to patient and caregiver barriers to adequate pain management, health system barriers also limit care. Physicians, nurses, and other members of the interdisciplinary team often fail to adequately assess the patient’s pain or to recognize patient barriers (Ferrell, Grant, Ritchey, Ropcha & Rivera, 1993). Professionals lack knowledge of the principles of pain relief, side effect management, or understanding of key concepts like addiction, tolerance, dosing, and communication. (American Cancer Society 2003, Mokdad, Marks, stroup & Gerberding, 2004, Vuorinen, 1993).
System barriers also include legal and regulatory structures that interfere with the provision of optimal care as well as inadequate reimbursement for pain services. System barriers can be internal, such as low referrals to supportive care services, as well as external system barriers such as reimbursement and regulatory constraints. (AHCPR 1994).

The studies generally indicate that the reason for under treatment for cancer pain could be multifactorial and the barriers at various levels might play a crucial role in determining the treatment outcome. It can be seen that some of the barriers such as personal beliefs fears and misconceptions etc. are modifiable so that the compliance to treatment may be improved. To sum up; many studies have consistently demonstrated that cancer pain is generally under treated. Moreover, certain segments of the population are more prone for undertreatment due to their inherent characteristics. Elderly patients are perceived to be less able than younger patients to tolerate standard chemotherapy regimens because of their decreased hematopoietic reserves, the high prevalence of comorbidities, and the greater risk of toxicity. This belief leads to under treatment through dose reductions and delays that may compromise outcomes. On the other hand children are under treated due to certain misconception that pain is not experienced by the very young or because of the difficulty of pain assessment. The under treatment of pain regardless of the patient characteristics is attributed to a variety of barriers which include personal, professional, and system related. Though many studied have explored the direct relationship between individual barriers and under treatment, the complex interaction among all has not been properly explored.
2. 3. Section III: Influence of Psychological factors on Cancer Pain

Cancer pain is not a purely nociceptive or physical experience but involves complex aspects of human functioning, including personality, affect, cognition, and behavior, coping and social relations. Research on psychological factors influencing cancer pain has focused on two main areas: Psychological distress and pain coping. Numerous Studies have examined the relationship between cancer pain and various forms of psychological distress. Some of the important studies are reviewed in this section.

2.3.1. Multidimensional nature of cancer pain

Current scientific conceptions of pain emphasize the multidimensional nature of the phenomenon: nociception, generated by organic pathology, continuously interact with psychological and social factors to determine the behavior observed in the clinical presentation. (Fishman, 1990).

Pain is a state of discomfort (sensory) and distress (affective). It corresponds poorly to the degree of tissue destruction and its intensity is not proportional to the type or extent of tissue damage. Studies have reported that cancer pain is largely modulated by the sensory, affective and cognitive components (Ahles, Blanchard & Ruckdeschel, 1983).

2.3.1.1. Affective responses

Pain causes greater disability in cancer patients. Pain is enervating and demoralizing for an individual patient. For the cancer patient, pain is more than an aversive sensory experience. It has particular meaning and significance (Chapman, 1979). Pain patients with cancer may signal advancing disease, approach of death, increasing physical disability, reduction in autonomous functioning, dependence on family and health care
providers, interpersonal process, reduced social functioning, reduced sense of personal control, and lowered self-esteem. These perceptions may produce profound affective and behavioral consequences that augment the suffering of the patient and his family, particularly in the setting of a terminal illness, which might affect the quality of life of an individual. Cancer patients with pain will have greater psychological disturbance than without pain.

Numerous studies have examined the relationship between cancer pain and various forms of psychological distress, including mood disturbance, anxiety, depression, emotional distress, fear, and worry. Zaza & Baine, (2002) systematically reviewed this relationship. Fourteen of nineteen studies supported an association between pain and psychological distress; the positive studies were larger and of higher quality, and the authors concluded that the evidence was strong.

Kane, Berstein, Wales, Rothenberg (1985) studied 247 terminally ill cancer patients in 1985 and demonstrated a significant association between pain with anxiety or depression using the Center for Epidemiological Studies Depression Scale and the anxiety subscale from the Ware General Well Being Scale. Kelsen, Portenoy and Thaler, (1995) recapitulated these findings in 130 pancreatic cancer patients using the Beck Depression Inventory and the State-Trait Anxiety Inventory. Further, the study by Kelsen et al. (1995) demonstrated that increasing pain relief correlated with decreasing depression on the Beck Depression Inventory. Glover, Dibble, Dodd and Miaskowski, (1995) studied the mood states of oncology outpatients who had cancer-related pain and those who were pain free. In addition the relationships between pain intensity, duration and mood states in those
patients with pain were explored. The results suggested that those patients who experienced cancer-related pain scored significantly higher on all of the subscale scores of the Profile of Mood States, except vigor, and had a significantly higher total mood disturbance (TMD) score than did pain-free patients. In addition, the subscale scores of tension, depression, anger, fatigue, confusion, and TMD scores were moderately correlated with increases in pain intensity. Also, depression, fatigue, confusion, and TMD scores were moderately correlated with increasing duration of pain.

Anxiety is one of the principal contributors to the cancer pain experience, existing in a feedback loop with depression and anger and it is associated with hyperactivity to noxious signals (Chapman, 1979). Strang and Qvarner, (1990) found a positive correlation between pain intensity and anxiety and depression in cancer patients. Anxiety and depression were significantly worse in cancer patients with no or almost no pain-free periods.

Zimmerman, Story, Gatson-Johansson, and Rowles, (1994) found a relationship between pain intensity and psychological status. Cancer patients with pain were more anxious, depressed, and hostile, and had more somatic complaints than patients who were not in pain. Although the majority of individuals will be understandably distressed or anxious in response to the diagnosis of terminal cancer, a significant minority will experience persistent debilitating anxiety symptoms that are maladaptive (Kadan-Lottick, Vanderwerker, Block, Zhang, & Prigerson, 2005).

In their review of studies, Miovic, et al. (2007) report that the prevalence of diagnosable anxiety disorders in individuals with advanced cancer at a given point in time
ranges from approximately 2% - 14%. Investigators using screening instruments have observed rates of clinically significant anxiety symptoms as high as 30% –40% (Delgado-Guay, Parsons, Li, Palmer, & Bruera, 2009; Hopwood & Stephens, 2000).

Coyle and Foley, (1985) found that anxiety depression, anger as common psychological factors that exacerbated pain in cancer. Ahles, Blancard, and Ruckdeschel, (1983) found a significant difference on scales of depression, hostility and somatization between cancer patients with pain and pain free cancer patients matched for diagnosis, stage of disease, age, and sex. However no difference was reported on measures of anxiety. The authors speculated that the lack of significant differences in anxiety is that anxiety is associated with multiple factors such as chemotherapy, nausea, or vomiting and not simply the pain itself. Cleeland, (1984) used the Brief symptom inventory to measure depression, hostility and anxiety and found that these mood states were not predictive of change in pain intensity associated with treatment. Measures of emotional disturbance have been reported to be predictors of pain in late stages of cancer, and cancer patients with less anxiety and depression are less likely to report pain (McKegney & Bailey,1981).

In summary, these studies strongly support an association between pain and psychological distress, predominantly manifested as mood disturbance, anxiety, and depression. Worsening pain leads to worsening psychological distress, and improvement in pain mitigates the effect. The effect is evident across the disease spectrum, from relatively well outpatients to terminally ill people with limited life expectancies. However the studies have been criticized for their limited range of investigation; primarily concentrating on
anxiety and depression, neglecting certain other important emotions such as anger, fear etc. (Sela, Bruera, Conner-Spady, Cumming & Walker, 2002).

2.3.1.2. Sensory component of Cancer Pain

The major components of Sensory pain are nociceptive, neuropathic, or mixed. Nociceptive pain is characterized by its sustaining mechanism related to ongoing tissue injury and its subtypes include somatic and visceral types. On the other hand neuropathic pain is associated with injury to neural tissues and is sustained by aberrant somatosensory processing in the periphery or in the central nervous system. The prevalence of different subtypes of sensory pain varies markedly. Fitzgibbon, (2009) in a study found that nociceptive pain occurred in 71.6% of patients, nociceptive Visceral in 34.7% and neuropathic pain in 39.7% of patients.

Studies have shown that sensory and affective components respond differentially to the effect of Morphine. Kupers, Konings, Adriaensen and Gylbel, (1991) in a double-blind, placebo controlled crossover study, investigated the effect of morphine on the affective and sensory pain ratings in different forms of chronic pain. Six patients suffering from central neurogenic pain, 8 from peripheral neurogenic pain and 6 from idiopathic pain participated in the study. It was found that morphine reduced the affective but not the sensory dimension of pain sensation in both groups of neurogenic pain patients. In the idiopathic pain group, neither the affective nor the sensory dimension of pain sensation was affected.

Geisser, Robinson, Keefe and Weiner, (1994) conducted a study to determine the relationship between catastrophizing and various components of pain. Catastrophising was
found to be associated with affective and evaluative component but not with sensory component of pain.

2.3.1.3. Cognitive Components of pain

The cognitive dimension refers to the way patients think of their pain and what the pain means for them, in terms of thoughts, beliefs, attitudes, and self-efficacy expectations. Judgments of self-efficacy, perceived pain control, and catastrophizing with respect to pain seem to constitute pain appraisals that are important in the adjustment to chronic pain. (Wit, Dam & Litjens, 2001).

Although a considerable body of knowledge exists on the role of pain cognitions in non-cancer patients, only a few studies in cancer pain patients have shown that pain beliefs are associated with pain intensity (Arathuzik, 1994). Arathuzik, (1994) found that cognitive and emotional factors appeared to play a central role in the response to pain and in the coping methods used to deal with pain. Turk, (1998) found that patients with cancer-related pain reported significantly higher levels of cognitive and behavioural fear-responses to pain than did patients with non-cancer pain.

To sum up, studies have shown that cognitive factors tend to play a crucial role in many aspects of cancer pain which include the coping mechanisms and adjustment with the pain experience.

2.3.2. Quality of Life and Cancer pain

Pain has been described as an experience that overwhelms the individual and consumes every aspect of life. Pain is a major influence on overall quality of life (Ferrell,
Dow & Grant, 1995). Until recently the association between pain and quality of life has not been fully explored, (Ferrell, 1995). The following review examines the relationship between various aspects of pain and QOL.

A recent study of patients with chronic nonmalignant pain reported significant correlations between pain severity and quality of life using the SF-36 and the Psychological General Well-Being Scale. (Becker, et al. 1999) Ferrell, Dow and Grant, (1995) found that pain, in addition to psychological control and uncertainty, were the best predictors of overall quality-of-life scores. This suggests that increasing pain can substantially impair functional outcome.

Calissendorff and Ljungman, (2006) conducted a prospective longitudinal study among 8 adolescent cancer patients to investigate variations in pain and quality of life during treatment as well as co-variation between the two. It was found that Pain varied across the treatment period with more pain towards the beginning and terminal stages of treatment. However less pain was reported at the middle of the treatment. Corresponding variations was observed in quality of life which was low in the beginning, higher in the middle and lower in the end. Pain co-varied inversely with quality of life and the higher quality of life was reported with less pain.

Berry et al. (2006) compared the quality of life and pain in two modes of medical treatment among androgen-independent prostate cancer treated with docetaxel and estramustine (DE) or mitoxantrone and prednisone (MP). There were no statistically significant differences in pain palliation between the treatment arms. The sensitivity analyses showed a consistent lack of statistically significant global QOL differences for the
two arms. Though patients treated with DE had superior clinical efficacy in terms of overall survival, time progression, and prostate specific antigen declines, there was no statistically significant difference in global QOL and pain palliation between two groups. Sitting (2004) studied the relationship between pain reduction and quality of life after giving sustained release of hydromorphone over a short period of time among 487 patients with severe pain of varying pathogenesis. Pain reduction at 3 points of time was reported with corresponding improvement in quality of life.

Rustoen, Moum, Padilla, Paul and Miaskowski, (2005) in a randomized control trial among 157 patients found that meaning of pain was significantly correlated with other pain characteristics such as intensity, and duration. It was also found depression to be the most important predictor of Quality of Life.

Zittoun, Achard and Ruszniewski, (1999) assessed Quality of life (QOL) of 179 patients with hematological malignancies, hospitalized for induction chemotherapy, allogeneic or autologous bone marrow transplantation (BMT), on three time points at 10 days interval after completion of the cytotoxic treatment. A relatively high frequency of somatic symptoms, fatigue, anxiety and depression was observed, with a trend to improvement at the end of hospitalization. The overall self-assessed QOL correlated mainly with fatigue and emotional disorders but not with the somatic symptoms. Unrelieved cancer pain had a negative impact on social activities (Strang & Qvarner 1990).

Padilla, Ferrell, Grant and Rhiner, (1990) found that physical well-being (including general functioning and disease / treatment-specific attributes) was one of the most important domains of QOL for cancer patients. Several studies have examined the
relationships between cancer pain and physical functioning (Strang, 1990; Burrows, 1998).

In one study, Burrows, Dibble and Miaskowski, (1998) found that oncology outpatients with somatic and visceral pain had significantly lower physical functioning scores than pain-free cancer patients. In addition, unrelieved cancer pain had a negative impact on social activities (Strang, 1990).

Thienthong, Pratheepawanit, Limwattananon, Maoleekaoonon, Lertsanguansinchai and Chanvej, (2006) conducted a multi-center; prospective cohort study to identify the association between Quality Of Life (QOL) and pain intensity, and the magnitude of change of pain scores that have a clinically significant impact on patients' quality of life among five hundred and twenty patients. The authors found that change in pain scores had statistical and clinical significance to patient’s quality of life.

Esnaola, et al. (2002) in a prospective study examined the relationship between pain reduction following various modes of treatment and quality of life in 45 patients with LRRC. Patients treated with nonsurgical palliation reported moderate to severe pain beyond the third month of treatment. Resected patients reported comparable levels of pain during the first 3 postoperative years, particularly after bony resections; long-term survivors (beyond 3 years), however, reported minimal pain and good QOL. Significant association was found between higher post treatment pain scores and worse QOL.

Cheng, (2007) studied the effect of oral mucositis associated with cancer therapy on QOL among chinese cancer patients. QOL, especially the functional sphere, was compromised for patients with oral mucositis. The data also supported the correlations
between oral mucositis and the physical sphere of QOL, as well as oral mucositis and the emotional sphere of QOL.

Nguyen, et al. (2007). Studied the impact of chemo radiation and postoperative radiation on patients' quality of life (QOL). In a retrospective analysis of 101 patients who had treatment for locally advanced head and neck cancer. Forty-seven patients had chemotherapy and radiation, 54 patients underwent postoperative radiation there was no significant difference in QOL between chemo radiation and postoperative radiation. Patients who developed complications following treatment experienced lower QOL, more anxiety and depression.


Nie, Liu and Di L, (2000) in a study found that regardless of its severity, cancer pain seriously affected patients general activity, mood, walking ability, normal work and sleep. With the seriousness of pain, the patients were more affected. However, no obvious difference was found between moderate and severe pain in terms of their effect on the patients' joy of life and relations with people.

Park, (2008) conducted a study among 159 Korean patients with cancer-related pain to assess the severity of pain and its impact on quality of life. The results indicated significant difference in terms of quality of life between improved and no improved cancer pain group with respect to pain.
Portenoy, Bruns, Shoemaker and Shoemaker, (2010) conducted a study to compare the effect of breakthrough pain on quality of life among chronic pain patients with cancer and without cancer. Compared with those without breakthrough pain, both patients with cancer and patients without cancer with breakthrough pain had increased pain interference in function, and patients without cancer were more impaired than patients with cancer. It was also found that breakthrough pain was associated with increased somatic complaints and pain complaints among patients without cancer, the study also revealed that breakthrough pain was associated with increased difficulties with functioning depression, and decreased quality of life.

To sum up, the review of related literature indicates that pain has a significant impact on quality of life. Pain intensity, meaning of pain and type of pain etc. apparently influence the QOL suggesting the predictive nature of pain. The studies are limited by their overemphasis on the objective dimensions of quality of life whereas QOL is predominantly a subjective construct. The variability in defining the concept of QOL would have influenced the outcome of many of the studies. In addition, lack of consistency with reference to the time frame of assessment of QOL also may limit the generalization of findings. On top of it, many of the studies have not addressed the complex relationship between pain syndromes, coping strategies and the effect of treatment while analyzing their effect on QOL.

### 2.3.3. Death Anxiety

Patients with cancer experience the approaching of death, which increases their fear of dying and the intensity of suffering. Cancer carries the threat of death and during the
stage in which they may be approaching their last days; patients can experience the approach of death with increased fear of dying and fear of increasing pain intensity.

Studies have attempted to explore the components of death anxiety. Adelbratt and Strang, (2000) studied death anxiety among 20 patients with brain tumors and 15 of their next of kin. Content and context analysis showed six categories such as 1) emotional reactions that could be related to death anxiety and included general anxiety, anguish, sadness, hope and despair; (2) existential fear, existential anxiety and existential pain; (3) contradictions; (4) trigger situations; (5) coping strategies related to death anxiety; and (6) new values for life.

Death anxiety has been analyzed with reference to various socio-demographic factors and most frequently with age. Tsai, et al. (2004) conducted a study in 224 patients with terminal cancers admitted to the Palliative Care Unit. The severity of death fear decreased gradually in both groups after being admitted to the hospice. However, the elderly (≥ 65 years of age) displayed higher levels of death fear than the younger group at two days before death. A significant negative correlation was observed between the degree of death fear and the total good death score in both groups at two days before.

Thorson and Powel, (1998) emphasized age difference in death Anxiety. Study conducted in elder and younger women diagnosed with breast cancer to know the effect of age difference on death anxiety found that younger women had significantly high death anxiety. The element of death anxiety was of principal concern to the younger women including what happens to the body such as dying a painful death, what happens to the
body when there is a long, slow dying with the getting of cancer. Decompensation seemingly was a particular fear among the younger women.

As regards age, Compas, et al. (1999) studied 80 patients who had been diagnosed for the first time with breast cancer and documented that young, female breast cancer patients experienced more emotional obstacles than older female breast cancer patients. Older women kept their feelings more stable because they supposed themselves to be more prone to disease. Findings from another study also support the impression of age differences in that younger women reported giving more attention to their disease and their feelings about cancer than did older women do, suggesting that younger women experience more serious emotional torment secondary to cancer (Wenzel, Fairclough & Brady, 1999).

The relationship between death anxiety and other personal factors were examined in some of the studies. Grumman and Spiegel, (2003) conducted a study among twelve cancer patients to determine their approach towards death anxiety. The results indicated the presence of significant death anxiety among the subjects. It was also reported that they were troubled by unresolved issues and higher anxiety, pain, and fatigue. The majority of the subjects expressed a desire to actively discuss their impending death and more than half of the patients reported being afraid of death and high death anxiety was associated with fear of dying in pain, high peak or usual pain, unresolved issues, and difficulty in parting with family in death. Most subjects experienced their religious faith as an important source of comfort and strength.
In some of the studies, death anxiety was found to be related to affective factors such as anxiety and depression. Mystakidou, et al. (2005) reported significant correlation between death anxiety, depression, and anxiety among terminally ill cancer patients. Tolor, (1989) conducted a study among thirty breast cancer patients and 30 cervical cancer patients to see the relationship between subjective life expectancy, death anxiety, and general anxiety. High death anxiety was present in the groups and it was found to be correlated with subjective life expectancy. The study however did not demonstrate any relationship between general anxiety and death anxiety as well as general anxiety and subjective life expectancy in both the groups.

Studies have been conducted to find out the correlates of death anxiety. In one such study, Benton, Christopher and Walter, (2007) demonstrated that the aging anxiety, dimensions of physical appearance, concern and fear of losses etc. positively predicted death anxiety.

On the whole, the studies suggest that death anxiety is related to age, state of illness, and other affective components such as anxiety and depression, fear of being separated form significant others indicating the possible existence of an affective network related to death anxiety.

2.3.4. Pain Coping

The diagnosis of cancer is a life altering experience for anyone. The nature of the patient’s response to it will affect mood, adherence to treatment, and the nature of social support. Effective coping with the disease involves dealing with its direct and indirect effects. (Roth, McClear & Massie, 2000) The related studies are reviewed in this section.
Schetter, Feinstein, Taylor and Falke, (1992) in their study identified five patterns of coping with cancer: seeking or using social support, focusing on the positive, distancing, cognitive escape-avoidance, and behavioral escape-avoidance. Type of cancer, time since diagnosis, and whether a person was currently in treatment had few or no relationship to coping. The study did not find any association between pain and mode of coping. Perception of stress was significantly associated with coping through social support and more of both forms of escape avoidance. Coping through social support, focusing on the positive, and distancing was associated with less emotional distress, whereas using cognitive and behavioral escape avoidance was associated with more emotional distress.

Researchers have shown that coping style is related to pain and adjustment in people with chronic illness. Prasertsri, Holden, Keefe and Wilkie, (2011) conducted a comparative, analysis of 107 lung cancer patients classifying them into four coping style groups as low-anxious, high-anxious, defensive high-anxious, and repressive. Compared to other coping style groups, the repressive group reported statistically significant lower mean scores for pain quality, pain catastrophizing, and depression.

Relatively few studies have assessed the efficacy of coping skills training in patients with persistent cancer pain. Coping skills training is no more effective than hypnosis / imagery alone in the management of acute pain in children and adults (Liossi & Hatira, 2003; Syrjala, Cummings & Donaldson, 1992). Berglund et al. (1994) studied a program of physical training plus coping skills training, exercise, progressive muscle relaxation training, information provision versus control in 199 patients who recently underwent curative resection of a primary tumor. Intervention patients had better pain
control over time, especially 3 to 6 months from initiation of the program. Dalton, Keefe and Carlson, (2004) studied a personalized program that tailors the coping skills intervention to the needs of the cancer pain patient. 131 participants were randomized to standard coping skills training (CST; information provision, coping skills, problem-solving, relaxation, cognitive restructuring, and promotion of personal control), profile-tailored CST (matching of CST modules to the patient's behavioral pain profile), or control. Profile-tailored CST provided better pain control in the month immediately after the intervention, standard CST patients had better pain control at six months, and both groups scored better than controls.

It has been found that Cancer patients use the same strategies to cope with their pain as patients with non-cancer chronic pain (Chia-Chin, 1998). Although the efficacy of specific coping strategies is often dependent upon the individual patient, the nature and chronicity of the pain and the specific situation being confronted (Turner, 1991). There have been consistent findings that the use of active coping strategies is associated with more favorable outcomes than the use of passive coping strategies. Active coping refers to strategies that are employed in an attempt to control pain or to function in spite of it, while passive coping refers to strategies that involve relinquishing the control of pain to others (Brown & Nacassio, 1987). Factor analysis of coping measures suggest that many of the specific coping strategies discussed in the literature can be categorized as active or passive (Brown & Nacassio, 1987; Snow-Turek, Norris & Tan, 1996). Patients who rely on active coping strategies report less pain, depression, affective distress and disability than patients who rely on passive coping strategies (Brown & Nacassio, 1987, Holmes and Stevenson 1990, Manne & Zautra, 1990). Further, it appears that there is considerable stability in the
extent that individuals utilize active or passive coping strategies, and this is thought to reflect a dispositional response style to pain (Brown & Nacassio, 1987) as indicated by several studies (Affleck et al. 1992, Bishop & Warr, 2003). It is hypothesized that the use of passive coping strategies would have a positive effect on perceived intensity of pain. Thus, the use of active coping strategies would predict less intensity of pain. On the other hand, it is assumed that there is an inverse relationship between active and passive strategies.

Cancer patients will use different coping styles to cope with the disease. Wang, (2000) reported that the optimistic style was most effective coping style in lung cancer patients who received chemotherapy. Similarly, studies by Halstead and Fernsler, (1994) pointed out that the optimistic coping style was effective and the most used coping style in cancer patients. Wang, (1999) reported that women with gynecological cancer used many coping styles, but the optimistic style was the most often used and effective style. “Hoped that things would get better” was the most often used coping style (Perry, 1990). Studies by Halstead and Frensler, (1994) reported that “Prayed or put your trust in God” was the most often used coping strategy.

Reuter, et al. (2006) found a positive association between fatigue pain and depression in a group of patients with a diagnosis of breast cancer. However the association between fatigue and coping style was found to be weak.

Guoping and Shan, (2005) studied the health related QOL and coping Style among ninety eight nasopharyngeal carcinoma patients. Positive emotion-focused coping styles were positively correlated to QOL, and negative emotion-focused ones negatively
correlated. Problem-focused coping styles were not statistically correlated to QOL among NPC patients post therapy. Chathurvedi, Shenoy, Prasad, Senthilnathan, and Premlatha, (1996) in their study found that Problem Oriented Coping leads to better adjustment and thereby improve Quality of life. Vidhubala, Latha, Ravikannan, Mani and Karthikesh, (2006) in a study conducted among head and neck cancer patients found that they adapted both emotion oriented coping and Problem oriented coping during the course of the illness.

Chadurvedi, Shenoy, Senthilnathan, and premalaya, (1996) conducted a study to explore the concerns and coping mechanisms used by patients with head and neck cancer and assess their quality of life. Commonest concerns were about the future (64%), subjective physical evaluation (60%), finances (56%), being upset (54%), communication (54%), current illness (52%) and inability to do things (50%). The commonest coping mechanisms used were helplessness and fatalism. Resolution was noted in less than 40% of the frequent concerns. As compared to laryngeal cancer patients, those with oral cancer significantly more often had concerns about current illness, subjective evaluation of health, eating and chewing, social interactions, pain and disfigurement. Most subjects had numerous unresolved concerns. Mainly ineffective coping mechanisms such as helplessness and fatalism were employed leading to incomplete resolution. Interventions to minimize these concerns and to handle associated anxiety and depression would improve their quality of life.

In a study Tarakeshwar, Vanderwerker, Paulk E, Pearce, Kasl and Prigerson (2006) found that greater use of positive religious coping was associated with better overall QOL as well as higher scores on the existential and support QOL dimensions.
Greater use of positive religious coping was also related to more physical symptoms. In contrast, greater use of negative religious coping was related to poorer overall QOL and lower scores on the existential and psychological QOL dimensions.

Wilke and Keefe, (1991) in a study examined the relationships between selected pain and psychological variables and the use of pain coping strategies among forty-five patients with pain related to lung cancer. Forty-two percent of the patients reported that they tried not to let others know they had pain, and 40% indicated they told others when they had pain. Preferences for not telling others was associated with more frequent pain coping attempts for all CSQ subscales but those of catastrophizing and reinterpreting pain sensation. The study also revealed positive correlation between state anxiety and catastrophizing coping strategies (r = 0.48) and negative correlation with ability to control (r = -0.50) and decreased (r = -0.50) pain. The number of pain sites was correlated with coping self-statements (r = 0.34). Pain intensity and state anxiety demonstrated similar relationships. Pain quality as measured with the MPQ demonstrated moderately strong correlation with diverting attention, praying and hoping, catastrophizing, and increased activity.

Utne, et al. (2009) conducted a study to determine the severity of pain as well as to examine its association with various coping strategies among cancer patients. The two groups divided on the basis of pain severity did not show any difference in terms of coping strategies except for catastrophizing. Compared with the mild pain group, patients in the moderate to severe group scored significantly higher on this subscale. In addition, patients in the moderate to severe group used more passive coping strategies. Except for
catastrophizing, the number and types of pain coping strategies used by this sample of hospitalized patients do not appear to be influenced by their pain intensity sources.

In view of the similarities and differences that exist between chronic pain and cancer pain, studies have been conducted to explore the nature of coping strategies that are employed in both types of pain. Lin, (1998) conducted a study to explore the differences between chronic cancer pain and chronic low back pain with respect to (a) the use of coping strategies to manage pain and (b) the relationship between self-efficacy for attenuating pain and pain outcomes. Patients with chronic cancer pain reported significantly lower pain intensity and pain interference than did patients with chronic low back pain; (b) the most frequently used coping strategies were almost the same between the low back pain group and the cancer pain group; (c) for both chronic cancer pain and chronic low back pain groups, patients' perceived self-efficacy was significantly inversely correlated with pain intensity and pain interference with daily life; and (d) patients' use of coping strategies was positively correlated with pain intensity and pain interference with daily life.

The relationship between coping strategies and pain tolerance was examined in some of the studies. Kashikar - Zuck, et al. (1997) examined the relationship between coping efficacy and pain coping strategies among 125 women over the age of 50 with reference to reports of pain during mammography. The authors found that up to 93% of the women reported the mammogram examination was painful. On average, women rated the mammography pain in the low to moderate range. Considerable variability in pain ratings was found, however, with some women reporting severe pain and others reporting little or
no pain. Women who rated their ability to decrease pain as high reported lower average levels of mammography pain, lower ratings on the mammography pain/discomfort scale, and were much more likely to report having had lower levels of pain during their last mammogram. Authors concluded that women who rate their coping efficacy in decreasing day-to-day pain as low may be at higher risk for having a painful mammogram. Individual pain coping strategies were not generally correlated with pain ratings.

The pain perception was found to be related to one’s knowledge about various aspects of pain. Yeager, Miaskowski, Dibble and Walhagan, (1997) found that patients with cancer-related pain knew significantly more about pain and its management than pain-free patients. Additionally, patients with cancer pain who had more education and those with higher reported pain intensity scores had more knowledge about pain and pain management. The study further revealed that women with cancer pain had more knowledge than men about pain and pain management.

Various pain coping strategies have been studied in cancer patients, including catastrophizing, diverting attention, reinterpretation, active coping, and passive coping. Despite the common references to coping in the cancer pain literature, the relationship between coping and pain is not entirely clear; some components of coping are studied more than other components.
To sum up, the studies presented under various psychological factors such as affective, sensory, cognitive components, quality of life, pain coping, and death anxiety substantiate their relationship with pain experience. However most of the studies failed to address the bidirectional relationship that has been proposed in some of the recent models of pain. Some studies have reported the interrelationship among the psychological factors which raise the possibility of a network that interact with pain perception.

2.4. Psychological intervention for cancer pain

Psychological interventions are often helpful and are sometimes necessary in the comprehensive treatment of patients with cancer related pain. Such interventions can facilitate coping with acute exacerbations of cancer pain, and can help patients with some chronic pain syndromes that may result from cancer and its treatment achieve a functional adjustment to living. Given the prevalence and magnitude of cancer related pain, clinical trials of psychological methods are surprisingly scarce. Current literature on various forms of psychological intervention with reference to cancer pain has been reviewed under the following section.

2.4.1. Cognitive Behavioral intervention

Cognitive behavioral treatment (CBT) for pain management is based upon a cognitive behavioral model of pain (Turk, Meichenbaum & Genest, 1983). The hallmark of this model is the notion that pain is a complex experience that is not only influenced by its underlying pathophysiology, but also by individuals' cognitions, affect, and behavior (Keefe and Gil 1986). Cognitive restructuring, or reframing, has been used effectively in cancer pain (Chen, Zeltzer, Craske & Katz, 1999).
CBT for pain management has three basic components. (Turk, Meichenbaum & Genest, 1983) The first is a treatment rationale that helps patients understand that cognitions and behavior can affect the pain experience and emphasizes the role that patients can play in controlling their own pain. The second component of CBT is coping skills training. Training is provided in wide variety of cognitive and behavioral pain coping strategies. Progressive relaxation and cue-controlled brief relaxation exercises are used to decrease muscle tension, reduce emotional distress, and divert attention from pain. Activity pacing and pleasant activity scheduling are used to help patients increase the level and range of their activities. Training in distraction techniques such as pleasant imagery, counting methods, and use of a focal point helps patients learn to divert attention away from severe pain episodes. Cognitive restructuring is used to help patients identify and challenge overly negative pain-related thoughts and to replace these thoughts with more adaptive, coping thoughts. The third component of CBT involves the application and maintenance of learned coping skills. During this phase of treatment, patients are encouraged to apply their coping skills to a progressively wider range of daily situations. Patients are taught problem solving methods that enable them to analyze and develop plans for dealing with pain flares and other challenging situations. Self-monitoring and behavioral contracting methods also are used to prompt and reinforce frequent coping skills practice. CBT for pain management is typically carried out in small group sessions of 4 to 8 patients that are held weekly for 8 to 10 weeks. Cognitive behavior therapy has been employed as an adjunctive in the management of both disease related and procedure related pain in cancer. Randomized controlled Studies have shown that it is efficacious in managing the pain as well as the distress associated with it.
Broome, Rehwaldt and Fogg, (1998) studied the effect of cognitive behavioral intervention among children and adolescents undergoing moderately painful procedures such as lumbar puncture, as they related to temperament. Positive mood as a component of temperament had a significant correlation with improvement in pain that sustained over a period of 5 months.

Robb, Williams, Duvivier and Newham, (2006) investigated the effect of a cognitive-behavioral pain management program (PMP) for 13 cancer patients with chronic treatment-related pain, taking a variety of outcome measures that include general fitness, psychological distress, coping success, activities of daily living, and pain report. Post intervention, there was a significant trend toward improvement in many variables, including anxiety and depression, fitness, and coping with pain.

Dalton, Keefe and Carlson, (2004) studied the effect of profile tailored CBT as opposed to standard CBT and usual care groups among 131 cancer patients who were randomly assigned to different groups. CBT patients attended five 50-minute treatment sessions. When compared to standard CBT patients, profile-tailored CBT patients experienced substantial improvement from baseline to immediately post-intervention in worst pain, least pain, less interference of pain with sleep, and less confusion. From baseline to one-month post-intervention, profile-tailored patients saw greater improvement in less interference of pain with activities, walking, relationships, and sleep; less composite pain interference; and less mobility and confusion symptom distress. Standard CBT and usual care patients experienced little change. Compared to profile-tailored CBT patients, standard CBT patients showed greater improvement at six-months post-intervention with
less average pain, less pain now, better bowel patterns, lower summary symptom distress, better mental quality of life, and greater improvement in Karnofsky performance status; usual care patients showed little change.

Tatrow and Montgomery, (2006) conducted a meta analytic study to determine 1) whether CBT techniques have a significant impact on distress and pain, (2) if individual or group treatments are more effective, (3) whether severity of cancer diagnosis influences distress and pain outcomes, and, (4) if there is a relationship between CBT technique efficacy for distress and pain. Results revealed effect sizes of $P = 0.31$ for distress ($p < 0.05$) and $0.49$ for pain ($p < 0.05$), indicating that 62 and 69% of breast cancer patients in the CBT techniques treatment groups had less distress and less pain (respectively) relative to the control groups. Studies with individual treatment approaches had significantly larger effects compared to studies that employed group approaches for distress ($p = 0.04$), but not for pain ($p > 0.05$). There were no significant differences in effects between those with or without metastases ($p > 0.05$). The correlation between effect sizes for distress and pain was not significant ($p = 0.07$). Overall, the results support the use of CBT techniques administered individually to manage distress and pain in breast cancer patients.

Wall and Womack, (1989) compared the efficacy of standardized instruction in hypnosis and cognitive behavioral intervention with respect to relief of procedure related pain in pediatric oncology cases. Results indicated that both strategies were effective in providing pain reduction. Neither technique provided for anxiety reduction.

Liossi and Hatira, (1999) in a randomized controlled trial compared the efficacy of clinical hypnosis versus cognitive behavioral (CB) coping skills training in alleviating the
pain and distress of 30 pediatric cancer patients (age 5 to 15 years) undergoing bone
marrow aspirations. Patients who received either hypnosis or CB reported less pain and
pain-related anxiety than did control patients and less pain and anxiety than at their own
baseline. Hypnosis and CB were similarly effective in the relief of pain. Results also
indicated that children reported more anxiety and exhibited more behavioral distress in the
CB group than in the hypnosis group.

Arathuzik, (1994) in a pilot study examined the effects of a combination of
cognitive and behavioral nursing interventions on pain perception, pain control, and mood
in metastatic breast cancer patients who were experiencing physical pain using a pretest-
posttest experimental research design. Twenty-four patients with metastatic breast cancer
who were experiencing physical pain were randomly assigned to a control group, to a
treatment group who received relaxation and visualization training, or to a treatment group
who received relaxation, visualization, and cognitive coping skills training. Measures of
the subjects' pain intensity, pain distress, pain control, ability to decrease pain, and mood
were taken pre- and post-treatment. Significant differences were found between the
treatment groups and the control group in ability to decrease pain. There were no
significant differences found in pain intensity or distress or mood.

Given, et al. (2004) in a randomized trial of a cognitive behavioral intervention on
reducing symptom severity among patients diagnosed with solid tumors and undergoing a
first course of chemotherapy found that patients in the experimental group who entered the
trial with higher symptom severity reported significantly lower severity at 10 and 20
weeks. Compared with conventional care alone, the experimental intervention was
effective among patients who entered the trial with higher levels of symptom severity. Age, sex, site or stage of cancer, and supportive medications did not modify the effect of this cognitive behavioral intervention on symptom severity.

Anderson, et al. (2006) in a randomized controlled study, compared the efficacy of behavioral strategies such as relaxation and distraction technique and positive mood interventions among fifty seven cancer patients who were taking opioid medication. The Patients in the 3 intervention groups received audiotapes of the cognitive-behavioral technique and were asked to practice regularly at home. Though patients in the relaxation and distraction groups reported significantly reduced pain intensity immediately after the intervention, the improvement was not sustained after 2 weeks of time. The groups did not differ significantly with regard to secondary outcome measures assessing quality of life, mood, self-efficacy, and other symptoms.

Mc Carthy, Cool, Petersen and Brune, (1996) conducted a survey to obtain information on the use and effectiveness of cognitive behavioral interventions and the availability of support services among children undergoing procedures related to cancer treatment. The results suggested that providing information before procedures and positive reinforcement after procedures, were used more frequently than interventions, such as rhythmic breathing, distraction, and imagery that require more time and training.

Jay, Elliot, Katz and Siegel, (1987) conducted a series of studies that systematically examined distress behavior, antecedent variables, and the effects of behavioral and pharmacological interventions on procedural distress. In their first study, five children aged 3-7 years, referred for severe anxiety and behavioral distress related to BMA or LP
reduced their distress scores by at least 50% after intervention. The second study was a comparison of the CBT package with oral diazepam and an attention-control condition (30 minutes of cartoon watching prior to the BMA), delivered in the context of repeated measures, and counterbalanced design. A total of 56 children with leukaemia, aged 3-13 years, were studied. Dependent variables were scores on the OSBD, self-reported pain, pulse and blood pressure readings. Overall, children had significantly lower pain ratings, OSBD scores and pulse rates when in the CBT condition when compared with either the diazepam or the attention control group. Diazepam was useful for lowering anticipatory distress but had no effect on distress during the procedure. The next study was investigated the combined effect of oral diazepam and CBT. Within a repeated measures factorial design, 83 children aged 3.5-12 years were assigned to either a CBT or CBT plus diazepam condition. Dependent variables included observed behavioral distress measured by the OSBD, self-reported pain scores from baseline to intervention; however the CBT plus diazepam group demonstrated only one third of the reduction compared with children in the CBT only group. In the last study, a comparison of CBT with general anesthesia in alleviating distress of 18 paediatric cancer patients (age 3-12 years) who were undergoing BMA. CBT and short acting mask anesthesia were delivered within repeated measures, counterbalanced design. The results indicated that children exhibited more behavioral distress in the CBT condition for the first minute lying down on the treatment table. With respect to the child outcome measures, no significant difference on self-reported pain and fear, pulse or anticipation of the next BMA were found in relation to CBT versus general anesthesia.
Kazak, et al. (1998) used several of the same CBT components to compare the efficacy of conscious sedation with a combination of conscious sedation and psychological intervention for children undergoing BMA or LP. In a randomized, controlled prospective trial of 92 children with leukemia, the combined treatment was found to be superior to conscious sedation alone on ratings of child distress by mothers and nurses. When contrasted with a cross sectional control group consisting of the parents of 70 patients who were in the first remission prior to the prospective study, the combined intervention group showed lower levels of child distress. The data also showed decreases in distress over time and concurrent improvements in quality of life and parental stress. CBT has shown in a number of studies to reduce the distress of children with cancer who are undergoing a variety of painful medical procedures and is considered a well-established treatment in the management of procedure related pain.

Though many studies have reported improvement in cancer pain with CBT, there have been relatively few controlled studies of the systematic use of CBT such as distraction, relaxation, or thought refocusing for cancer pain. Moreover such treatments have rarely been tested in clinical trials to determine their potential for enhancing pharmacologic therapy, decreasing pain intensity and pain behavior, improving function, or increasing control for patients with cancer who have pain. Further, little research has been done to determine which cancer patients will benefit from which specific cognitive-behavioral interventions.
2.4.2. Guided Imagery

Cognitive-behavioral strategies, including guided imagery and relaxation interventions, are recommended as adjuvants to analgesic medications to maximize relief of cancer pain (American Pain Society 2005). The effect of guided imagery has been studied in the context of procedures that are either related to investigations or treatment including surgical procedures.

Tusek, Church and Fazio, (1997) studied the effect of guided imagery technique on 130 patients undergoing colorectal surgery. Members of one group received routine perioperative care. Members of the other group listened to guided imagery tapes for three days before their surgical procedures, during anesthesia induction, intraoperatively, in the post anesthesia care unit, and for six days after surgery. The authors measured patients' anxiety levels, pain perceptions, and narcotic medication requirements. The patients in the guided imagery group experienced considerably less preoperative and postoperative anxiety and pain, and they required almost 50% less narcotic medications after their surgical procedures than patients in the control group. Current symptom experience, imaging ability may be a useful variable to assess in order to determine whether guided imagery is an appropriate intervention for individual patients.

Haase, Schwenk, Hermann and Muller, (2005) used a randomized, controlled, partially blinded trial to evaluate the differential effectiveness of two brief psychological interventions (guided imagery and progressive muscle relaxation) in terms of reduction of perioperative stress and continuation of it in the post-operative course of 60 elderly patients diagnosed with colorectal carcinoma undergoing abdominal surgery. Though no
significant difference was observed between experimental and control group in terms of any of the variables studied, such as analgesic requirement, pain perception, pulmonary function, duration of postoperative ileus, fatigue and the groups which received relaxation and guided imagery showed more positive response.

Roffe, Schmidt and Ernst, (2005) reviewed six controlled clinical trials regarding the use of guided imagery as a sole adjuvant therapy for cancer patients. Three studies reported significant differences in measures of anxiety, comfort or emotional response to chemotherapy for patients who received guided imagery over the control groups. Two studies showed no differences between guided imagery and other interventions in any of the outcome measures. Though no compelling evidence was found to suggest positive effects on physical symptoms such as nausea and vomiting, authors felt that guided imagery as a sole adjuvant cancer therapy may be psycho-supportive and increase comfort.

Renzi, Peticca and Pescatori, (2000) studied the effect of Guided imagery on the postoperative course in proctological patients using a prospective randomized trial in a group of patients operated on for anorectal diseases. It was reported that Perioperative relaxation techniques showed a trend to reducing pain following anorectal surgery and significantly improving the quality of sleep; a decrease in anxiety.

In a study of 26 hospitalized patients with cancer pain, Kwekkeboom, Hau, Wanta and Bumpus, (2008) analyzed to compare patients' perceptions of treatment effects with observed changes in pain scores, and to explore patients' ideas about factors that contributed to the effectiveness of each intervention. It was found that after a trial of guided imagery and progressive muscle relaxation, in most cases, participants' perceptions
of treatment effects matched observed changes in pain scores. Participants described treatment and patient characteristics that influenced effectiveness of the interventions such as active involvement in the intervention, guided instructions, providing a source of distraction, stimulating relaxation, individual abilities and preferences, and pain qualities.

Although evidence generally supports the efficacy of such interventions, studies have demonstrated wide variation in their effects, with some patients achieving significant reductions in pain while others experience little or no improvement.

2.4.3. Hypnosis

Hypnosis is an effective therapeutic technique with pain patients that, of all the psychological techniques, has the strongest empirical support in the treatment of cancer pain. (Roth, deRosayro, Devine, Montgomery, Du Hamel & Reddas cited in delion, 2006). It has been used and studied largely in cancer pain related to procedures, surgery, and chemotherapy. Up to 90% of patients benefit from the use of hypnosis. Montgomery, Weltz, Seltz, and Bovbjerg, (as cited in de Lion, 2006).

Hypnosis not only induces relaxation and a passive disregard of intrusive thoughts but can also introduce specific goals through suggestions. These suggestions enable patients to experience analgesia or reinterpretation of their pain. Posthypnotic suggestions allow the patient continued use of the new behavior and assistance in re-creating the relaxed state when needed after termination of hypnosis. Suggestion appears to be the most important element in reducing pain. Rainville, Duncan, Price, Carrier and Bushnell, (as cited in de Lion, 2006).
A review of the literature points to an increasingly broadening range of applications of hypnosis in treating cancer pain. It has been found to be effective in procedure related and disease related pain in cancer. Hypnosis has proven to be extremely valuable in the treatment of cancer patients. Specific applications include: establishing rapport between the patient and members of the medical health team; control of pain with self-regulation of pain perception through the use of glove anesthesia, time distortion, amnesia, transference of pain to a different body part, or dissociation of the painful part from the rest of the body; controlling symptoms, such as, nausea, anticipatory emesis, learned food aversions, etc.; psychotherapy for anxiety, depression, guilt, anger, hostility, frustration, isolation, and a diminished sense of self-esteem; visualization for health improvement; and, dealing with death anxiety and other related issues. Hypnosis has unique advantages for patients including improvement of self-esteem, involvement in self-care, return of locus of control, lack of unpleasant side effects, and continued efficacy despite continued use. (Levitan, 1992).

In a review, Sellick and Zaza, (1998) examined six randomized clinical trials of hypnosis and found that hypnosis effectively managed pain. Hypnosis was consistently found to be more effective than control conditions in alleviating discomfort associated with bone marrow aspirations, lumbar punctures, voiding cystourethograms, the Nuss procedure, and post-surgical pain. Furthermore, hypnosis was as at least as effective as distraction. Three hypnotic interventions met criteria as a possibly efficacious empirically supported therapy for reducing post-surgical or lumbar puncture pain. In a study of patients with hyperthermia-induced cancer pain, Reeves, Redd, Storm and Minagawa, (1983)
showed that those receiving a hypnotic intervention had significantly greater reduction in pain than those in the control group.

Studies comparing the efficacy of hypnosis in the management of cancer pain have established its superiority over other techniques. Syrjala, (1987) found hypnotherapy to be more effective than cognitive-behavioral treatment in reducing oral pain secondary to chemotherapy and radiation. Zeltzer and LeBaron, (1982) Compared hypnosis with non hypnotic behavioral techniques for efficacy in reducing pain and anxiety in 27 children and adolescents during bone marrow aspiration and in 22 children and adolescents during lumbar puncture. The patients and independent observers each rated (scale of 1 to 5) pain and anxiety during one to three procedures prior to intervention and one to three procedures with intervention. Prior to intervention for both groups, pain during bone marrow aspiration was rated as more severe (p < 0.01) than pain during lumbar puncture. During bone marrow aspiration pain was reduced to a large extent by hypnosis (p < 0.001) and to a smaller but significant extent by nonhypnotic techniques (P < 0.01), and anxiety was significantly reduced by hypnosis alone (P< 0.001). During lumbar puncture only hypnosis significantly reduced pain (P< 0.001); anxiety was reduced to a large degree by hypnosis (P < 0.001) and to a smaller degree by non- hypnotic techniques (P < 0.05). Thus hypnosis was shown to be more effective than non- hypnotic techniques for reducing procedural distress in children and adolescents with cancer.

Liosssi and Hatira, (2003) in a prospective controlled study investigated the efficacy of a manual - based clinical hypnosis intervention in alleviating pain in 80 pediatric cancer patients in the age range of 6-16 years of age undergoing regular lumbar
punctures. Patients were randomly assigned to 1 of 4 groups: direct hypnosis with standard medical treatment, indirect hypnosis with standard medical treatment, attention control with standard medical treatment, and standard medical treatment alone. Patients in the hypnosis groups reported less pain and anxiety and were rated as demonstrating less behavioral distress than those in the control groups. Direct and indirect suggestions were equally effective, and the level of hypnotizability was significantly associated with treatment benefit in the hypnosis groups. Therapeutic benefit degraded when patients were switched to self-hypnosis. The study indicates that hypnosis is effective in preparing pediatric oncology patients for lumbar puncture, but the presence of the therapist may be critical.

In a similar study, Richardson, Smith, McCall and Pilkington, (2006) investigated the evidence on the effectiveness of hypnosis for procedure related pain and distress in pediatric cancer patients demonstrated that hypnosis had potential as a clinically valuable intervention for procedure-related pain and distress in pediatric cancer patients though methodological limitations were identified in some of the studies.

Apart from pain reduction, hypnosis was also found to have some effect on the mood symptoms. Significant reduction of mood symptoms like depression and anxiety was reported by patients assigned to hypnotherapy compared with the standard group (Liossi & white, 2001).

Hypnotic procedures in cancer pain identified several shortcomings of the studies which highlight the paucity of robust clinical trials to support the use of hypnotherapy for symptom relief for terminally ill cancer patients. The patient population was not
adequately described. Most of the studies report small number of patients treated using a variety of hypnotherapy techniques with poorly stated outcome measures and no attempt was made to control the confounding variables and rarely using validated outcome measures. Majority of the studies provided little information about the other treatments the patients were receiving or any treatment changes during the assessment period. Information regarding the length and duration of treatment was also absent in some of the studies.

2.4.4. Biofeedback

Biofeedback can be a particularly effective modality for teaching relaxation to chronic pain patients, as well as self-regulation of physiologic processes. Patients learn to modify specific physiologic processes based on auditory or visual feedback, or both. It is based on the educational paradigm that learning occurs with feedback, which then enables a desired response. Ongoing physiologic processes (such as muscle tension or surface electromyography (EMG), temperature, heart rate, sweat gland activity or basal skin response, and breath rate) can be monitored and visual (through graphs, images, or games) and auditory (through tones or music) feedbacks are provided. The latest application of biofeedback is neurofeedback, which teaches patients to regulate electroencephalograph (EEG) activity or brain waves. Two studies, however, evaluating the effects of combined EMG and EEG protocols as well as combined EMG-electrodermal biofeedback training on cancer pain found that patients had difficulty transferring their acquired skills to the home. (Fotopolous, Cook & Graham, as cited in de Lion 2006) although some patients were able to reduce their levels of pain during the biofeedback sessions, most patients, particularly those with advanced disease, had difficulty reducing their pain levels.
Tsai, Chen, Lai, Lee and Lin, (2007) conducted a nonrandomized study to examine the effect of EMG feedback-assisted relaxation on cancer-related pain in advanced cancer pain. The findings suggested that relaxation training supplemented with visual and auditory EMG Feedback is effective in reducing cancer-related pain in advanced cancer patients, possibly through a mechanism of attenuation of physiological arousal.

In a study, Burish and Jenkins, (1992) assessed the effectiveness of electromyography (EMG) and skin-temperature (ST) biofeedback and relaxation training (RT) in reducing the aversiveness of cancer chemotherapy. Eighty-one cancer patients, equated on several individual-difference variables, were randomized to one of six groups formed by a 3 (EMG Biofeedback, ST Biofeedback, No Biofeedback) x 2 (RT, No RT) factorial design. Outcome was assessed with physiological, patient-reported, and nurse-reported indices taken over five consecutive chemotherapy treatments. RT patients showed decreases in nausea and anxiety during chemotherapy and physiological arousal after chemotherapy. EMG and ST biofeedback reduced some indices of physiological arousal but had no other effects on chemotherapy side effects. These findings suggest that RT can be effective in reducing the adverse consequences of chemotherapy and that the positive effects found for biofeedback in prior research were due to the RT that was given with the biofeedback, not to the biofeedback alone.

In a similar study, Burish, Shartner and Lyles, (1981) evaluated the effect of biofeedback and relaxation in the management of chemotherapy related side effects in a cancer patient. The results demonstrated that combination treatment that involved relaxation training and biofeedback yielded better outcome.
Fotopoulous, et al. (1983) reported two clinical studies that evaluated the impact of combined Electromyogram-Electroencephalogram (EMG-EEG) and Electromyogram (EMG) - Electrodermal biofeedback training on cancer pain. Although several patients demonstrated reduced pain during training sessions, few were able to transfer pain control outside of the treatment setting and the patients with advanced disease had significant difficulty learning the biofeedback task.

The review of the literature suggests that there is dearth of literature on the application of biofeedback in cancer pain. In addition the generalizability of treatment gains has been challenged in some of the studies.

2.4.5. Relaxation training and Cancer pain

Relaxation training is a systematic method of gaining awareness of physiologic processes and attaining both a cognitive and physiologic sense of tranquility. It is one of the most widely used cognitive psychological techniques in the management of chronic pain and is used extensively with individuals suffering from cancer pain (Good, Hicks & Grass, 1999). Studies report the effectiveness of relaxation in reducing pain (Syrjala & Chapko, 1995). A comprehensive review of the literature on relaxation training and pain support the effectiveness of this approach with patients in pain (Turner & Chapman, 1982).

Baider, Uziely and De-Nour, (1994) studied the immediate and long-term effects of six sessions of group Progressive Muscle Relaxation with Guided Imagery on the psychological distress of self-referred cancer patients. Patients' psychological distress and coping with cancer were assessed by three self-reports: the Multiple Locus of Control, the
Impact of Events Scale (IES), and the Brief Symptom Inventory (BSI). Of the 123 patients who started group therapy, 37 dropped out during its course. The 86 patients who completed the intervention showed marked improvement on both BSI and IES, an improvement maintained over the next 6 months in 58 patients who continued assessment through the follow-up period.

The effect of relaxation on various components of pain had been studied. The most common sensory variable studied was pain intensity. Ferrell, Ferrell, Ahn and Tran, (1991) found a steady decrease in pain over 5 weeks and a fluctuation in pain relief. On the other hand Dalton, Toomey and Workman, (1988) found that the pain intensity increased in their study despite their intervention. Affective variables have not been studied as sensory variables as outcome measures. The available findings are vague in terms of their association between intervention and affective components (Sloman, Brown, Aldana & Chee, 1994).

Syrjala, Donaldson, Davis, Kippes and Carr, (1995) in their study compared oral mucositis pain levels in 4 groups of cancer patients receiving bone marrow transplants (BMT): (1) treatment as usual control, (2) therapist support, (3) relaxation and imagery training, and (4) training in a package of cognitive-behavioral coping skills which included relaxation and imagery. A total of 94 patients completed the study which involved two training sessions prior to treatment and twice week ‘booster’ sessions during the first 5 weeks of treatment. Results confirmed the hypothesis that patients who received either relaxation or imagery alone or patients who received the package of cognitive-behavioral coping skills would report less pain than patients in the other 2 groups. The hypothesis that
the cognitive-behavioral skills package would have an additive effect beyond relaxation and imagery alone was not confirmed. Average visual analogue scale (VAS) report of pain within the therapist support group was not significantly lower than the control group ($P = 0.103$) nor significantly higher than the training groups. Patient reports of relative helpfulness of the interventions for managing pain and nausea matched the results of VAS reports. It was concluded that relaxation and imagery training reduces cancer treatment-related pain; adding cognitive-behavioral skills to the relaxation with imagery does not, on average, further improve pain relief.

Sloman, (1995) observed that progressive muscular relaxation coupled with imagery had the potential to promote relief of cancer pain. The author further hypothesizes that the relaxation response evoked by the techniques may break the pain- muscle tension -anxiety cycle and facilitates pain relief through a calming effect.

Sloman, Brown, Aldana and Chee, (1994) studied the efficacy of a package of relaxation techniques on pain relief in a group of sixty seven new patients diagnosed with cancer using a pre and post treatment design. The intervention which involved relaxation and imagery training, was carried out twice weekly for a period or three weeks. The scores on VAS and McGill pain questionnaire, used as outcome measures revealed significant reduction of pain and a corresponding reduction in the intake of non opioid analgesics for those patients who received relaxation training. The findings also indicated a reduced incidence of breakthrough pain.

Cancer patients often have to deal with severe side effects and psychological distress during cancer treatment, which have a substantial impact on their quality of life.
Among psychosocial interventions for reducing treatment-related side effects, relaxation and imagery were most investigated in controlled trials. In a meta analytic study Luebbert, Dahme and Hasenbring, (2001) synthesized published, randomized intervention-control studies aiming to improve patients' treatment-related symptoms and emotional adjustment by relaxation training. Mean weighted effect sizes were calculated for 12 categories, treatment-related symptoms (nausea, pain, blood pressure, pulse rate) and emotional adjustment (anxiety, depression, hostility, tension, fatigue, confusion, vigor, overall mood). Significant positive effects were found for the treatment-related symptoms. Relaxation training also proved to have a significant effect on the emotional adjustment variables depression, anxiety and hostility. Additionally, two studies point to a significant effect of relaxation on the reduction of tension and amelioration of the overall mood. Intervention features of the relaxation training, the time the professional spent with the patient overall (intervention intensity) and the schedule of the intervention (offered in conjunction with or independent of medical treatment to the cancer patient) were relevant to the effect of relaxation on anxiety. The interventions offered independently of medical treatment proved to be significantly more effective for the outcome variable anxiety. Relaxation was found to be equally effective for patients undergoing different medical procedures (chemotherapy, radiotherapy, bone marrow transplantation, and hyperthermia).

Relaxation was found to be effective in managing pretreatment anxiety, a key element that moderates procedure related pain in therapeutic procedures such as chemotherapy. Lerman, et al. (1990) conducted a study to determine (a) the relationship of coping style to cancer chemotherapy side effects and (b) whether coping style moderated the impact of a relaxation intervention on anxiety, depression, and nausea associated with
progressive muscle relaxation training before chemotherapy (experimental group) or standard care (control group). Spearman correlations indicated that a "blunting" or distraction-oriented coping style was associated with less anticipatory anxiety, less depression, and less nausea during and after chemotherapy. Spearman correlations also indicated that a "monitoring" or information-gathering coping style was associated with more anticipatory anxiety and more nausea before and during chemotherapy. Although there was a significant effect of the relaxation intervention on post treatment nausea, there were no other between-group differences. The results did suggest, however, that relaxation was effective in reducing anticipatory anxiety among "blunters," but not "monitors," perhaps because relaxation is a distraction strategy and therefore is consistent with a blunting coping style. The effects of coping and relaxation on pretreatment anxiety may have important implications, because anxiety is a key factor in classic conditioning models of anticipatory nausea and vomiting.

In a study, Vasterling, Jenkins, Tope and Burish, (1993) examined the efficacy of cognitive distraction and relaxation training among patients undergoing chemotherapy. Results indicated that distraction patients reported less nausea prior to chemotherapy and lower systolic blood pressures after chemotherapy than controls. Relaxation training patients reported less nausea prior to chemotherapy and exhibited lower systolic and diastolic blood pressures after chemotherapy than control patients. Both techniques were found to be equally efficacious in reducing the distress related to chemotherapy.
Decker, Cline - Elsen, and Gallagher, (1992) studied the impact of stress reduction by relaxation training and imagery in 82 patients who were undergoing curative and palliative radiotherapy. Significant reduction was noted in the treatment group in tension, depression, anger, and fatigue. Substantial improvement was reported on different parameters related to quality of life in ambulatory patient who were undergoing radiotherapy.

Bridge, Benson, Pietronic and Priest, (1988) conducted a randomized controlled study to see whether stress could be alleviated in patients being treated for early breast cancer lasting six weeks. One hundred fifty four women with breast cancer stage I and II after first session of six week course of radiotherapy, of which 15 dropped out before end of study. Patients received one session of intervention per week for six weeks. The relaxation group received one session of intervention per week for six weeks. The relaxation group received muscular relaxation whereas relaxation plus imagery group was taught to have peaceful imageries of own choice. The controls were encouraged to talk about themselves. The results indicated that the combined intervention group being more relaxed than those receiving relaxation training only; mood in the control group was worse. Women aged 55 and over benefited most. The authors also concluded that patients with early breast cancer benefit from relaxation training.

Kwekkeboom, Wanta and Bumpus, (2008) studied the variations in pain outcomes achieved with progressive muscle relaxation (PMR) and analgesic imagery interventions among 40 hospitalized patients with cancer pain, in terms of four individual difference variables (cognitive ability, outcome expectancy, previous experience, and concurrent
symptoms) on pain relief achieved with each intervention using a crossover design. The results indicated that only half of the participants achieved a clinically meaningful improvement in pain with each intervention. Patients who achieved a meaningful improvement in pain with analgesic imagery reported greater imaging ability, more positive outcome expectancy, and fewer concurrent symptoms than those who did not achieve a meaningful reduction in pain. Similar relationships were not significant for the Progressive relaxation.

Roykulcharoen and Good, (2004) in a randomized controlled study examined the effect of relaxation on the sensory and affective components of post-operative pain in 102 adults. Relaxation group had less post-test sensation and distress of pain. Relaxation did not result in significantly less anxiety or 6-hour opioid intake. However, group differences in state anxiety were in the expected direction and fewer participants in the relaxation group requested opioids. Nearly all reported that systematic relaxation reduced their pain and increased their sense of control.

Walker, et al. (1999) investigated the effects of relaxation combined with imagery on quality of life and response to primary chemotherapy among ninety-six women with newly diagnosed large or locally advanced breast cancer (T2 > 4 cm, T3, T4, or TxN2 and M0) in a prospective randomized controlled trial. Patients were randomized following diagnosis to a control condition (standard care) or to the experimental condition (standard care plus relaxation training and imagery). Psychometric tests to evaluate mood and quality of life were carried out before each of the six cycles of chemotherapy and 3 weeks after cycle 6: tests of personality and coping strategy were carried out prior to cycles one and
six. Clinical response to chemotherapy was evaluated after six cycles of chemotherapy using standard UICC criteria and pathological response was assessed from the tissue removed at surgery. As hypothesized, patients in the experimental group were more relaxed and easy going during the study (Mood Rating Scale). Quality of life was better in the experimental group (Global Self-assessment and Rotterdam Symptom Checklist). The intervention also reduced emotional suppression (Courtauld Emotional Control Scale). The incidence of clinically significant mood disturbance was very low and the incidence in the two groups was similar. Although the groups did not differ for clinical or pathological response to chemotherapy, imagery ratings were correlated with clinical response.

Relaxation with EMG was found to be an effective means of pain reduction in a sample of Taiwanese patients with advanced cancer. EMG data indicate that relaxation not only decreased pain but also anxiety and physiological arousal. This study also demonstrates cross-cultural validity for the use of relaxation techniques.

Cheung, Molassiotis and Chang, (2003) examined the effects of progressive muscle relaxation training (PMRT) on anxiety and quality of life in colorectal cancer patients after stoma surgery. The use of PMRT significantly decreased state anxiety and improved generic quality of life in the experimental group especially in the domains of physical health, psychological health, social concerns and environment. Social relationships decreased in both groups. In relation to the disease-specific quality of life measure, differences were observed only in the 10-week assessment, with the experimental group reporting better quality of life at 10 weeks, but not over time as compared to the control group (Tsai, Chen & Lai, 2007). Relaxation with EMG was found to be an effective means
of pain reduction in a sample of Taiwanese patients with advanced cancer. EMG data indicate that relaxation not only decreased pain but also anxiety and physiological arousal. This study also demonstrates cross-cultural validity for the use of relaxation techniques.

To sum up, overall the studies indicated that Psychological techniques are effective in the management of cancer pain, particularly procedure related pain. In addition to the improvement in pain intensity, some of the studies reported general improvement in mood symptoms, quality of life, and stress reduction. Most of the studies reported reduction of pain when a combination of techniques was employed. Some of the studies reported maintenance of improvement even after 6 months of treatment. However studies have been criticized for their drawbacks such as availability of few controlled studies, weak theoretical frameworks, few complete descriptions of the nature of the pain problem, and lack of control over the interventions. It was also observed that most of the studies failed to demonstrate significant effects as they had very small sizes. Additionally, the intervention methods and length of the interventions were highly variable.

2.5. Need for the Present study

Epidemiological studies indicate that pain is quite common in cancer and it is often one of the major concerns of individuals suffering from cancer. The review of existing literature on cancer pain strongly suggests that it is undertreated despite the development of guidelines, and advancement of pharmacological treatment. The reason for the under treatment is multifactorial, including personal, professional and system related barriers. In view of the poor compliance reported with respect to the analgesic consumption, the effect of non-pharmacological intervention as adjunctive needs to be examined. In addition, it is
evident from the literature that some of the personal barriers originate from the personal belief system which involves misconceptions about the origin, development and maintenance of pain. The compliance is expected to improve contingent to the reformulation of dysfunctional cognitions associated with personal barriers in the context of cognitive behavioral intervention. This can be examined with respect to the cognitive change pertaining to pain cognitions following psychological intervention.

As the review of literature indicated, cancer pain is largely moderated by negative emotions such as anxiety depression, fear about treatment, disfigurement, and disability which may have a substantial influence on the course and outcome of pain. The effect of cognitive behavioral intervention which is otherwise proved to be effective in other emotional problems has not been properly investigated with respect to cancer pain.

The multidimensional conceptualization of Cancer pain, having five separate components such as physiologic affective, sensory, Cognitive, Behavioral and Sociocultural suggest its complexity. A large number of studies have addressed the effect of psychological intervention on pain intensity and severity. However the effect of pain as well as the effect of treatment upon its various components has not been properly studied. The Understanding about the varying impact of treatment on different components might make the psychological intervention more parsimonious.

The studies have further demonstrated that cancer pain is syndromal in nature .The paradoxical nature of treatment becoming the source of pain makes the pain very unique. For example, surgery or radiation designed to eliminate a cancerous tumor may produce tissue damage that results in persistent pain. Medications designed to manage persistent
pain also may have significant effects such as constipation or fatigue that limit their use over long periods. These side effects may be particularly problematic in the many older adults who suffer from chronically painful diseases. The review of the existing literature show that pain syndromes are different in terms of their characteristics such as intensity quality and periodicity, demanding specificity of intervention matching with the pain characteristics. Hence it would be interesting to examine the effect of cognitive intervention upon some of the representative pain syndromes such as procedure related pain and disease related pain.

Death anxiety is an inherent component of cancer diagnosis. As seen in the review of literature, it has a decisive role in modulating the pain experience. Its association with other affective components such as anxiety and depression tends to suggest that cognitive behavioral intervention may be an appropriate strategy to deal with it which may have an impact on pain. Finally the current trends in pain management largely focus on coping strategy enhancement. However few studies have tested the hypothesized associations between cognitions and coping responses. Majority of the studies related to pain has addressed the impact of psychological intervention on pain. However it would be interesting to study the effect of intervention on pain and its components in the context of various related factors such as death anxiety, coping and quality of life so that a better conceptualization and management may be possible.