

CHAPTER 2

LITERATURE REVIEW

In this chapter, several aspects relevant to the study were explored and reviewed.

Information from this reviews are presented as follows:

Concept of Pain

Definition of Pain

Pain Mechanism

Multidimensionality of Pain Phenomenon

Chronic Pain

Chronic non-cancer pain

Chronic cancer pain

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Pain Intensity and Pain Acceptance in Patients with Chronic Cancer pain

Pain Intensity and Pain Behaviors in Patients with Chronic Cancer Pain

Pain Acceptance and Pain Behaviors in Patients with Chronic Cancer Pain

Pain Intensity, Pain Acceptance, and Pain Behaviors in Patients with Chronic Cancer

Pain

Concept of Pain

Definition of Pain

Pain is a very complex concept to define and understand. In nursing practices, pain is probably one of the most widely experienced and expressed phenomenon (Montes-Sandoval, 1999). Melzack and Casey (1968) emphasized that not only was pain a sensory experience, but it had motivational and affective properties as well.

The International Association for the Study of Pain (IASP) Sub-committee on Taxonomy (1986) formulated the definition of pain as “an unpleasant sensory and emotional experience associated with actual or potential tissue damage or is described in terms of such damage”.

The definition of pain indicates that pain is the combination of a sensory, emotional, and cognitive phenomenon. Although pain typically is associated with tissue damage, pain may occur in the absent of injury and often is not correlated with an identifiable source.

Pain Mechanism

Mechanism of pain includes the perception and response to pain. The pain mechanism consists of four processes: transduction, transmission, modulation, and perception (McGuire & Sheilder, 1993; Turk & Flor, 1999) described as follows:

Transduction: Transduction is the process of a stimulus converted into a form that is accessible to the brain (Turk & Flor, 1999). The transduction process starts when the nociceptor is activated in order to respond to a noxious stimulus such as tissue damage and related peripheral nerve fibers and chemical substances. Various mediators are capable to depolarize the nociceptive such as growth factor, bradykinin, serotonin, proton, prostaglandin, heat, and pressure (Twycross, Harcourt, & Bargi, 1996 as cited in Davis, 2003). In cancer related pain, there are ten common causes of pain with bone metastases, including visceral metastases, immobility, neurophatic pain, constipation, esophagitis, lymphedema, muscle cramps, and chronic postoperative scar.

Transmission: Transmission is a series of subsequent neural events that carry an electrical impulse throughout the nervous system to areas in the brain. Transmission involves the afferent nerves that arise from large and small-medium diameter cell bodies (Davis, 2003). The afferent axon terminates in the dorsal horns of spinal cord and extends the processes by second order nerves to the contralateral spinothalamic tract through the ventral lateral thalamus to the cortex cerebral. Transmission of noxious stimuli may be fast (involving A-delta fibers) or slow (involving C-fibers) such as somatic pain experiences but may also neither slow nor fast in visceral pain; therefore it is poorly localized (Davis, 2003).

Modulation: Modulation refers to the neural activity that leads to control of the nociceptive transmission pathway (Turk & Flor, 1999). Modulation involves the complex system of neural; when impulses arrive in the central neural, the transmission of pain impulses will be controlled by the central neural and transmitted to other parts of neural system such as the cortex. The impulses are then transmitted through descend neural to the dorsal horn to modulate the effectors. The transmission process involves the neurotransmitter such as the monoamines

neurotransmitter (e.g., serotonin, norepinephrines) and endogenous opiate (e.g., enkephaline, endorphine).

Perception: Perception is a subjective process (Turk & Flor, 1999) including cognition and memory in experience of pain (Davis, 2003), not only the actual physiological or anatomical process (McGuire & Sheildler, 1993). Therefore psychological, emotional, and behavioral phenomena arise as a response to the perception of pain in cancer-related pain experiences.

Multidimensionality of Pain Phenomenon

Cancer pain is a multidimensional phenomenon. Ahles and colleagues (1983) have categorized five dimensions of cancer pain experience: physiological, sensory, affective, cognitive, and behavioral. In addition to these five dimensions of this multidimensional model of cancer-related pain. McGuire (1987 as cited in McGuire & Sheidler, 1993) added the sociocultural dimension as the sixth dimension. The multidimensionality of pain is interrelated,

interactive, and dynamic. The dimensions of multidimensionality of cancer pain phenomenon are described as follows:

Physiological dimension

Physiology dimensions consist of the organic etiology of pain such as those caused by tumors that have metastasized to bone or infiltrated nerves (Ahles et al., 1983; Davis, 2003). Foley (1979 as cited in Ahles et al., 1983) described three types of cancer-related pain etiology: pain associated with direct tumor movement, pain associated with cancer therapy, and pain unrelated to either the tumor or its treatment. There are two characteristics inherent to the etiology of pain, duration and pattern. Duration of pain refers to whether pain is acute or chronic and pattern identified as brief, momentary, or transient; rhythmic, periodic, or intermittent; and continuous, steady, or constant.

In cancer patients, the sources of pain are broad. Tumors may produce a syndrome of somatic, visceral, and neurophatic pain with different qualities in different

anatomical parts of the body. Cancer treatment also contributes to the experience of pain, such as diagnostic procedures and standard therapeutic modalities (e.g., surgery, radiotherapy, and chemotherapy). These treatments cause pain in acute, short-term and even chronic long-term pain. However, pain may also be unrelated to either cancer or its treatment. The evidence of pain etiology is absent, but yet there is the presence of pain; this type of pain is related to the psychogenic aspects. Turk and Flor (1999) stated two etiological variants of the psychogenic perspective: the report of pain in the absence of object pathology are caused by conscious efforts of the individual (hallucination) to achieve some attention while financial compensation is the second etiology.

Affective dimension

The affective dimension influences the response of the individual. According to McGuire and Sheilder, (1993) the affective dimension is identical with certain personal traits. Those patients who easily engage in a state of depression or other psychological disorders, are

more likely to experience higher levels of pain. Buckelew, Parker, and Keefe and colleagues (1994) found that pain severity has a significant correlation with depression among chronic pain patients; the more severe the pain, the higher the depression scores.

Socio-Cultural dimension

The socio-cultural dimension of cancer pain consists of a variety of demographic, ethno-cultural, spiritual, and related factors that influence a person's perception of and response to pain (McGuire & Sheidler, 1993). Cultural has a strong role in determining attitudinal factors in pain perception and response to pain in addition to age, sex, and race. McGuire (1984 as cited in McGuire & Sheilder, 1993) has found that nonwhite females had significantly lower pain scores comparing with females of white skin color. Suza (2003) conducted a study in Indonesia, found that pain experience was different between Javanese and Batak patients.

Sensory dimension

The sensory dimension of cancer pain is related to where the pain is located and what it feels like. Ahles and colleagues (1983) stated that there are three specific components of sensory dimension: location, intensity, and quality.

Location of pain may give clues concerning current etiology and sensory aspects. Location of pain may be reported in two or more locations (McGuire & Sheidler, 1993).

The experience of a number of separate locations of pain, implicates the involvement of the sensory dimension; for example, visceral pain in abdominal cancer may be poorly localized while acute postoperative pain is usually well localized (Davis, 2003).

Intensity of pain is the amount of pain perceived by individual and is often described with words such as mild, moderate, severe, and intolerable or with a number representing amounts of pain scores. Individual threshold may contribute to the degree of pain reported, and be affected by a variety of factors, such as physical comfort, mood, medications, and social environment, thus causing perceived intensity of pain to increase or decrease (McGuire & Sheidler, 1993).

The quality of pain is how the pain actually feels. The quality of pain is often described as pulsing, radiating, penetrating, burning, and aching. In cancer pain, the quality of pain may be described as sharp, tender, throbbing, sore, stabbing, heavy, shooting, and growing (McGuire, 1984 as cited in McGuire & Sheidler, 1993).

Cognitive dimension

The cognitive dimension encompasses the manner in which the pain influences a person's thought processes or the manner in which the person views himself (Ahles et al, 1983). Barkwell (1999) reported that cancer patients who viewed pain as a challenge had lower pain and depression scores, but higher coping scores compared with those patients who viewed pain as punishment or as the enemy.

Knowledge is an important aspect of the cognitive dimension. Knowledge about pain and its treatment can affect responses to pain and various interventions. Pain can be modified by how patients think of their pain, what is their expectation of the pain, and what does pain mean in their lives. Cognitive dimension also relates to the interaction of the patient's cognition and its influence on their behavior and their reporting pain. Patients with impaired cognition (e.g.,

learning problem, confusion, dementia), early stages of cognition development (e.g., infant) or those undergoing pharmacology therapy which effects their cognition functioning cannot describe their pain.

Rhimer and colleagues (1987 as cited in McGuire & Sheilder, 1993)

demonstrated that with an educational intervention of nurse counseling and printed material, patients with cancer pain were likely to have taken correct doses of analgesics on the correct schedule.

Behavioral dimension

Patients engaged with pain may display a certain behavior (Fordyce, 1976; 1978). The behavioral dimension of pain includes a variety of observable behaviors related to pain and act as a means of communication with others to indicate that the patient is experiencing pain (Fordyce, 1976). The display of pain behavior includes guarding, bracing, grimacing, verbal complaints, and analgesic intake. Keefe and colleagues (1985) found that among head neck cancer patients, the guard movement and grimacing were found to be the major behavioral indicators of pain, with grimacing correlating significantly with patients' reports of pain intensity.

Furthermore, Fordyce (1976) proposed that pain behavior can be influenced by environmental factors or by reinforcement such as attention, social support, or avoidance of unpleasant tasks (e.g., job, housework, etc.). Pain, if followed by reinforcing consequences, may persist longer than the normally expected healing time (Sanders, 1996). Pain contingent can affect the expression of behavior, whether it acts as reinforcer or punisher. Romano, Turner, and Jensen and colleagues (1995) also Paulsen and Altmaier (1995) have found that spouse solicitous remarks predict patients' pain behavior. Schwartz, Slater, and Birchler (1996) found that pain behaviors were correlated with marital conflict. In addition they stated that patients' pain behavior can affect the relationship with their spouse.

Chronic Pain

Pain is a subjective experience that occurs as the result of wide range of diseases or trauma. Commonly, pain is divided into three broad categories, including: acute, chronic, and malignant or cancer pain. For the purpose of this study, chronic non-cancer pain and chronic cancer pain are explained as follow:

Chronic Non-Cancer Pain

Chronic non-cancer pain or chronic pain is often defined longitudinally as pain persisting for three months (Finley, 2004). Chronic pain is usually initiated by a specific type of injury to a tissue as in acute pain, but may persist beyond healing of the initial pathologic problems. Chronic pain is defined by the persistence for one month or more beyond the usual course of an acute illness or injury, a pattern of recurrence at intervals over months or years, or by association with a chronic pathological process (Cherny & Portenoy, 1999). In chronic pain, 58 percent of patients experienced coexisting symptoms of depression or anxiety (Marcus, 2000). Therefore, chronic pain may be associated with physical, emotional and financial disability.

The etiology of chronic pain is less known. As mentioned, chronic pain may occur in the absence of pathological problems or when the tissue injury has already completely healed. Chronic pain may occur as a result of a wide range of disorder, including neck and back disorders, diabetes, headaches, jaw pain, arthritis, fibromyalgia, pelvic disorder, and neuralgias (Finley, 2004). Chronic pain often begins with an injury that causes inflammation and a change in the central nervous system. The injury and inflammation may be healed, but for unknown reason,

the nervous system continues to send pain signal to somatic muscle (Marcus, 2000). This nervous system response is similar to the response to the original injury. Therefore, patients experience persistent pain longer than the expected healing time.

Chronic pain syndrome is an abnormal condition in which pain is no longer a symptom of tissue injury, but in which pain and pain behavior become the primary disease processes (Sternbach, 1990). Chronic pain syndrome is distinct from chronic or intermittent painful disease, in which the patient experiences pain but manifests functions and behaviors appropriate to the degree of tissue injury. In chronic pain syndrome, subjective and behavioral manifestations of pain persist beyond objective evidence of tissue injury. In addition, Cleeland, Nakamura, and Mendoza (1990) suggested that pain above a moderate level has a significant impact on the patient's ability to function in terms of enjoyment of life, work, mood, sleep, general activity, walking, and relationships with others.

The goals of pain management of chronic pain include significantly reducing the pain severity and frequency of exacerbations, and improving function, mood and sleep pattern (Savage, 1999 as cited in Finley, 2004). Pain management in chronic pain is divided into two

categories including pharmacologic and non-pharmacologic therapy. Pharmacologic therapy in chronic pain includes non-opioid analgesic (acetaminophen and non-steroid anti inflammation drugs/ NSAIDs). This therapy is usually followed by non-pharmacologic therapy, including physical, occupational, and psychotherapy.

Chronic Cancer Pain

Pain associated with cancer is frequently under-treated. Patients with advanced cancer may be experiencing multiple concurrent symptoms of pain. Pain is the most common symptoms experienced by cancer patients. Cancer-related pain may be acute or chronic. Acute cancer pain is often described by the patients as sharp with a rapid onset, and is often associated with diagnostic procedures (e.g., lumbar puncture or bone marrow biopsy) and therapeutic interventions (e.g., hormonal therapy, immunotherapy, and chemotherapy), while chronic pain is generally associated directly with a tumor and typically persists for a long period of time (Cherny, Chang, Foley, 1994 as cited in McKenzie, Hobbs & Warrick, 2002).

The sources of pain in cancer may be broad and affect multiple sites of the body. According to Foley (1979 as cited in Ahles et al., 1983), most common cancer pain is associated

with tumor involvement and cancer therapy; however, some patients may experience pain unrelated to tumor and therapy.

1. Cancer Pain Associated with Tumor Involvement

Cancer pain associated with tumor involvement can be classified into two types, namely nociceptive pain and neuropathic pain.

1.1. Nociceptive Pain

Nociceptive pain refers to identifiable lesions causing tissue damage, accompanied by the stimulation of nociceptors in somatic or visceral structures. Nociceptive pain can be subdivided into somatic and visceral pain.

Somatic pain involves the A-delta and C-fibers for transmission of the noxious stimulus (Davis, 2003). In cancer pain, somatic pain may be related to infiltration of bodily (somatic) structure such as bone or muscle (Stannard & Booth, 2004) and has been reported by cancer patients as the common cause of pain (Daut & Cleeland, 1982; Davis, 2003). Moreover, Davis (2003) stated that bone metastases produce not only nociceptive pain (somatic pain) but neuropathic pain as well.

Visceral pain is considered unique and poorly localized compared to somatic pain.

Visceral pain can occur when the tumor infiltrates or compresses a solid organ with autonomic innervations such as pain in bowel obstruction in colorectal cancer (Stannard & Booth, 2004).

Patients may report their pain as cramping, aching, sharp, or throbbing.

1.2. Neuropathic Pain

Neuropathic pain involves the nervous system either the central or peripheral nervous system. In cancer pain, tumor infiltration or treatment such as surgery may cause injury or compression of the nervous system. Patients may describe their pain as burning, tingling, or numbing. Clinically, neuropathic pain is very difficult to treat. The neuropathic pain in cancer patients is usually treated by a combination of opioids, non-opioid analgesics, and adjuvant drugs and/or the alternative treatments such as cognitive-behavioral treatment (Stannard & Booth, 2004). In addition, developing the patients' ability to live with their pain is important in improving their quality of life.

2. Cancer Pain Associated with Cancer Therapies

Most treatment-related pain is caused by tissue damaging procedures which lead to acute and chronic pain. The treatment of cancer pain is considered broad and long term. It is possible that the treatment may produce side effects or complications. In some cases, the pain syndrome in cancer may occur long after the therapy is completed or terminated. The pain may occur associated with post-chemotherapy, post-radiotherapy, hormonal therapy or a combination of them.

The goals of treatment of chronic cancer pain are to achieve adequate pain relief safely within an acceptable time frame, to minimize the side effects of treatment and to provide ongoing analgesic therapy by the most convenient and least noxious means available (Cherny, Chang, & Frager et al., 1995 as cited in McKenzie et al., 2002). Similar to chronic non-cancer pain, the pain management of chronic cancer pain is also divided into two categories, namely pharmacologic and non-pharmacologic therapy. In pharmacologic therapy, generally, three types of drugs are used to treat cancer pain including non-opioid, adjuvant, and opioid analgesics. For the appropriate drug selection, WHO has developed a three-step strategy in cancer pain management (Table 1).

Table 1

World Health Organization guidelines for cancer pain management

Intensity of pain (Subjective rating)	Treatment
Step 1	Non-opioid agent (24-hour coverage with acetaminophen,
Mild pain (1-4)	aspirin or other NSAIDs)
	With or without adjuvant
Step 2	Weak opioid (e.g., codein or oxycodone) plus non-opioid
Mild to moderate pain (5-6)	agent
	With or without adjuvant
Step 3	Strong opioid (e.g., morphine, hydromorphone, fentanyl)
Moderate to severe pain (7-10)	With or without non-opioid agent or adjuvant

Adapted from McKenzie, C. A., Hobbs, A. E. & Warrick, L. E. (2002). Pain management in the cancer patient. U.S. Pharmacist. www.uspharmacist.com

For non-pharmacologic therapy, the non-invasive physical and psychosocial modalities can be used along with pharmacologic therapy. A wide range of noninvasive modalities includes: heat and cold; massage, pressure and vibration; exercise; repositioning; counter-stimulation; cognitive-behavioral therapy.

In conclusion, chronic cancer pain is considered different from other types of chronic non-cancer pain such as chronic low back pain or migraine headache. Although the pathophysiologic mechanism of the chronic cancer pain is better understood than those in the chronic non-cancer pain, it is often under-treated and to a lowering of the patients' quality of life.

Pain Intensity in Cancer Patients

Definition of Pain Intensity

Pain is one of the most feared consequences of cancer (Cleeland, 1984). The presence of pain represents a continued source of frustration to both patients and family, and even to the health care team. Pain intensity is the most frequent aspect assessed by the health care professional to indicate patient pain (Carr, Gaudas, & Lawrence et al., 2002 as cited in Cepeda, Africano, & Polo et al., 2003). The intensity of pain can be identified by words such as 'none', 'mild', 'moderate', 'severe', 'intolerance', 'excruciating', 'bad', and 'intense', or measured by some scored level indicating the severity or intensity of the pain.

The intensity of the pain at an early stage of cancer may be reported by 5 to 10% of the patients; however, as the disease develops towards an advanced stage of cancer, particularly with metastases to the bone, the intensity of pain becomes extensively increased and is reported by 70% of cancer patients. Pain becomes a major problem and the intensity of the pain experienced by the cancer patients rises to the level that interferes with the patients' mood and activities, thus having significant impact on the patients' quality of life.

The source of pain in cancer may be broad. Pain may be associated with a tumor, cancer treatments, or unrelated to either tumor or treatments (Foley, 1979 as cited in Ahles et al., 1983).

Davis (2003) confirmed that cancer metastasis to the bone has been reported to be the most painful experience of cancer pain. In addition, the site of the tumor is also significantly related to the progression of the pain. Unfortunately, many cancer patients are under-medicated for pain (Cleeland, 1984; Stannard & Booth, 2004). It has been widely accepted that pain intensity may be influenced by many factors, particularly factors associated with cognitive and behavioral processes.

Influencing Factors of Pain Intensity

Cancer-related pain is caused by many factors. Pain may be the result of the cancer itself and metastases to other parts of the body or the treatment of cancer disease. Several studies have shown that the severity of cancer disease, age, and gender have contributed to influence pain intensity, as follows:

1. Severity of the Cancer Disease

The prevalence and severity of the cancer pain varies among individuals depending on the type of tumor, stage of the disease, the location of metastases, and the treatment adequacy (Daut & Cleeland, 1982). Pain has been experienced by more than 70% of patients with advanced cancer (Brescia et al., 1992 as cited in Shanon et al., 1995) and cancer metastases to the bone was the most common cause of cancer pain (Twycross, Harcourt, & Berqi, 1996 as cited in Davis, 2003). Pain is the first sign of cancer with its frequency and intensity tending to increase with advancing stages. Spiegel and colleagues (1994) reported that those patients with metastases cancer showed higher levels of pain compared to those patients with localized malignancies.

Petpichetchian (2001), conducting a study in Thailand, found that the stage of the disease in cancer had a significant contribution to pain intensity.

2. Age

Age has been recognized as an important factor influencing the pain. Several studies have found that those younger in age were more likely to experience higher levels of pain intensity. McMillan (1989) found that there were a low to moderate negative relationship ($r = -.22$) between age and pain intensity among cancer patients ($N = 99$). In addition, McMillan stated that elderly people reported a lower intensity of some physical symptoms than younger individuals. Yates, Edwards, and Nash and colleagues (2002) conducted a study in Australia which found that older patients with cancer pain reported being more willing to tolerate pain and perceived less control over their pain ($N = 114$). Bedeau, Jones, and Moore, and colleagues (2004) also found that younger cancer patients reported more pain intensity than older patients ($p \leq .09$, $n = 20$) and older patients used more passive coping strategies than younger patients ($p \leq .07$, $n = 20$). However, Stein and Miech (1993) reported that there was no statistical significant difference

between younger and older patients in reporting of pain intensity among cancer patients (N = 537).

3. Gender

Gender plays role in responses and reports of pain intensity. Males have been shown to have higher level of somatic pain, depression, anxiety, and psychosis (Buckelew, Shutty, & Hewett et al., 1990 as cited in Vallerand & Polomano, 2000). On the other hand, females experienced more visceral pain and more concern about the effect of the pain (Vallerand & Polomano, 2000). Similarly, Unruh (1996) stated that females were more likely to report recurrent pain, severe levels of pain, and longer duration compared to males. In addition, Unruh stated that females seem to show lower pain thresholds, a greater ability to discriminate painful sensations, higher pain ratings, and a lower tolerance for pain. However, Edrington, Paul, and Dodd and colleagues (2004) conducted a study to determine the differences between genders in various pain characteristics, including pain intensity. They found that no significant sex differences were found in mean least, average, and worst pain intensity scores (N = 187). In addition, they also stated that no significant sex differences were found in analgesic prescriptions

or intake of analgesic medications. Similarly, Hirsh, Waxenberg, and Atchison and colleagues (2006) found no significant sex differences in mean pain intensity (men 30.52 [SD 16.10], women 28.72 [SD 15.49], N = 197).

According to Berkley (1997), the differences between males and females in pain experience are small and exist only for certain forms of stimulation and situations such as with the presence of disease, experimental or clinical setting, and nutritional status. Furthermore, Berkley stated that differences may exist not only in reporting of pain, coping, and response, but also differences in measurement of pain and the treatment.

4. Culture

Cultural is believed to have a strong role in the determination of attitudinal factors in pain perception and response (McGuire & Sheilder, 1993). Kodiath and Kodiath (1995) stated that the effect of cancer pain may be different in the context of culture, such as Eastern and Western culture; pain may has a debilitating effect in Western culture but may not in Eastern culture.

A few studies have demonstrated the contribution of ethno-culture in pain experience. Streltzer and Wade (1981) conducted a study to examine the relationship between culture and the treatment of pain in a clinical setting. They found that Caucasians and Hawaiian received significantly more analgesic as an indication of their pain than Filipinos, Japanese, or Chinese. McGuire (1984 as cited in McGuire & Sheilder, 1993) found that nonwhite females had significantly lower pain scores than white female cancer patients. Also Kodiath and Kodiath (1995) in their study compared the pain experience between patients in India and United States (N = 10 for each group). They found that pain experience were significantly difference between patients in India and American patients.

Measurement of Pain Intensity

Pain is a human experience, subjective, and varies among individuals. Assessing pain should not only determine the intensity, quality and duration of pain, but, broadly based, should also entail the impact and response of pain in the patient's life. Pain measurement helps to determine the most effective treatment, such as the types of analgesic drugs or other therapies

necessary to control the pain, and is also essential in evaluating the relative effectiveness of different therapies (Max, Portenoy, & Laska, 1990).

Pain measurement commonly relies on the patient's report and often involves rating pain on metric scales. Complex pain measurement may include the McGill Pain Questionnaire (MPQ) or the Brief Pain Inventory (BPI). Other pain measurements, considered simple measurements, are the Verbal Descriptor Scale (VDS), Visual Analogue Scale (VAS), and Numeric Rating Scale (NRS).

NRS is the most commonly used scale for measuring pain intensity. Ratings of 1-4 correspond to mild pain, 5-6 to moderate pain, and 7-10 to severe pain. In clinical trials, the NRS was found to be more reliable than other pain measurements such as VAS, especially with less educated patients (Ferraz, Quaresmo, & Aquino et al., 1990 as cited in Serlin et al., 1995). Berthier, Potel, and Leconte and colleagues (1998), conducted a study to compare the NRS, VDS, and VAS in an emergency department (N = 290, 200 with and 90 without trauma). They found that the NRS and VAS were significantly correlated for traumatic patients ($r = .795, p < .0001$) and non-traumatic patients ($r = .911, p < .0001$). In addition, they stated that NRS had proven

more reliable for patients with trauma and suggested using the NRS for the evaluation of acute pain intensity in an emergency department. Similarly, in the same setting (emergency department), Bijur, Latimer, and Gullagher (2003) also found that the NRS strongly correlated with VAS scores at all time periods ($r = .94$, $N = 189$). Bijur and colleagues suggested that a verbally administered NRS could be substituted for the VAS. Another study, Jaywant and Pai (2003), found that the NRS significantly correlated with other pain measurements such as the VAS ($r = .892$, $p < .01$) and the FPS (Facial Pain Scales) ($r = .784$, $p < .01$) in acute burn patients ($N = 50$).

The advantages of NRS may include as follows: (1) Easy and simple for administration and scoring, (2) Has multiple response options (mild, moderate, and severe), (3) Has no age-related difficulties, (4) Has ability to be administered to patients with less education, or the elderly with cognitive impairment, and (5) Has ability to be administered verbally or in writing. Therefore, regarding the advantages of the Pain Numeric Rating Scales (PNRS-11 scores), this study will use PNRS to measure pain intensity “right now or currently” in patients with chronic cancer pain.

Pain Acceptance in Cancer Patients

Definition of Pain Acceptance

Acceptance, a common but difficult word to define, can often evoke a plurality of emotional responses depending on the situation or event (Bland & Henning, 2004). Acceptance is an active process of acknowledging feelings, thought and memories without getting trapped in negative verbalizations or interpretations of psychological events. Patients who accept their pain demonstrated less depression and less overt pain behavior (Jacob et al., 1993), lower pain intensity report (McCracken, 1998), and better mental well-being (Viene, Crombez, & Eccleston et al., 2003).

Nevertheless, acceptance does not mean having to live with constant and severe pain, or give up all hope and feel defeated, there are many pain medications available to reduce or eliminate the pain. However, it may not be reasonable to expect that all treatment and medication will totally relieve the pain or when the socioeconomic status become a burden. Healthy

acceptance means recognizing the futility of struggling against the unpleasant realities such as pain that are beyond control (Hanson, 2003).

Acceptance is defined as pain acknowledgment, giving up unproductive attempts to control pain, acting as if the pain does not necessarily imply disability, and being able to commit one's efforts towards living a satisfying life despite the pain (McCracken et al., 1999).

Acceptance of chronic pain is living with pain without reaction, disapproval, or attempts to reduce or avoid it (McCracken, 1998). It is more than a mental exercise and not simply a decision or a belief. Importantly, acceptance involves disengagement from struggling with pain (McCracken & Eccleston, 2003).

Acceptance originates from an interaction of past and ongoing experience with current social, emotional, and verbal influences (McCracken & Eccleston, 2003). Therefore, acceptance becomes a dynamic process, time-to-time or moment-to-moment to help a person move from a negative interpretation of self, others, and the future, towards perception of meaningful life (Bland & Henning, 2004).

Component of Acceptance Processes:

Acceptance is a complex process leading to new meaning of life. Bland and Henning (2004) emphasized three components of the acceptance process: control, emotional regulation, and cognitive-behavioral structuring.

Control

Control in the context of acceptance is control of the reaction to the pain rather than control of the pain itself. Pain control may be useful when it is achieved and there are many available therapies to eliminate the pain. However, efforts to control pain can be troublesome under certain circumstances (McCracken, Carson, & Eccleston et al., 2004). In order to control their pain, patients may extend their rest period, try to avoid activity, increase their medication intake, repeat medical consultation and procedures, and retire from work. Pain becomes the center of thought, disrupted of other dimensions of their lives, and their dominant focus. As a result, the quality of life may be sacrificed, abundant their health, family and friend, and their meaningful life. Pain becomes persistent and more difficult to deal with. Hayes, Bisset, and Korn (1999 as

cited in McCracken et al., 2004) confirmed that those patients who attempted to control pain led to less pain tolerance compared with those who did not attempt to control their pain.

A different approach, however, is controlling the reaction to pain. Reaction control means to control the effects of the pain on the functioning of life. Patients with chronic pain may re-define themselves and incorporate the new limitation into their present capability (Bland & Henning, 2004). Patients can enjoy their lives, engage in activities that they can tolerate, and set new meaning and expectations. Finally, patients will be able to operate effectively within their limitation and learn to control their reaction to the pain.

Emotional Regulation

Experiencing chronic cancer pain may generate many different emotions such as depression, anxiety and anger or other negative emotions including sadness, grief, fear, frustration, and irritability (Bland & Henning, 2004). Moreover, the negative emotional feeling contributes towards a reduction of the patient's functional ability as well as towards greater disability (Benk & Kern, 1996 as cited in Bland & Henning, 2004). Depression in patients with chronic pain can be explained by looking not only at the symptom of pain, but also at the level of

impairment and disability, and the level of secondary losses (e.g., economic, social, work, leisure, self-esteem). McCracken and Eccleston (2005) conducted a study to investigate the relationship between acceptance of chronic pain and patients functioning (N = 118). The findings showed that acceptance of chronic pain significantly correlated with depression ($r = -.37, p < .001$), pain-related anxiety ($r = -.41, p < .001$), physical disability ($r = -.23, p < .001$), psychosocial disability ($r = -.38, p < .001$), and better work status ($r = .38, p < .001$). Environment stressors also contribute to emotional states. Patients with low level of environment stressors (e.g. support from spouse and significant others, adequate economical states, adequate information and access to health facilities) probably dealt with their pain differently compared to those patients with a high level of environment stressors.

Cognitive Behavioral Structuring

The cognitive process of pain may relate to the interpretations, meanings, beliefs, attitudes and emotional sequels. The cognitive process is significantly influenced by pre-existing cognitive structures of schema, such as current and historical context, intensity and novelty of pain, prior experiences, and learning.

Influencing Factors of Pain Acceptance

Previous studies have demonstrated that several factors influence the acceptance of pain.

These factors are presented as follows:

1. Social Response

Chronic pain may impact on social circumstances. In a behavioral context, social responses were considered potentially reinforcing or punishing the overt behaviors. In addition, social responses may also affect the learning processes in the perception of chronic pain.

McCracken (2005b) conducted a study to examine the social influences on the acceptance of chronic pain (N = 228) and found that acceptance of pain negatively correlated with both solicitous responses ($r = -.30, p < .001$) and punishment responses ($r = -.32, p < .001$) from significant others. In addition, McCracken suggested that social influences plays a role in activity engagement with pain present and their willingness to have pain without trying to avoid or control the pain. Similarly, MacKichan, McCracken, and Eccleston (2005) found the social response

(solicitous and punishing) was correlated with pain acceptance. Overall, the spouse response accounted for 15.0% of the variance in total pain acceptance.

2. Self-Efficacy

According to Bandura (1977 as cited in Buckelew et al., 1994), self-efficacy is the belief that one can manage a specific challenging situation. Self-efficacy seems to contribute in the pain acceptance process. With great self-efficacy, patients may be able to construct positive thoughts related to their pain and to seek for meaning of pain in their life. There are a few studies which have observed the contribution of self-efficacy in pain acceptance process. For example, Dixon, Carson, and Keefe, and colleagues (2005) conducted a study in osteoarthritis patients (N = 59) to examine the construct validity of Acceptance of Pain Questionnaire (APQ), a newly developed measure of acceptance. They found that acceptance of pain correlated positively with greater self-efficacy for management of osteoarthritis pain ($p < .001$).

Measurement of Pain Acceptance

Acceptance is emerging as a potentially valuable concept of how patients react and adapt to chronic pain. Acceptance of chronic pain was found to have a high correlation in predicting pain, depression, disability, pain related anxiety, and a patient's physical and vocational functioning (McCracken & Eccleston, 2003; McCracken et al., 2004).

An early version instrument to measure the acceptance of chronic pain was named Chronic Pain Acceptance Questionnaire (CPAQ). It included 34 items with a reliability coefficient (α) = .85. The CPAQ initially was developed by Geiser (1992) in her doctoral dissertation. There are four factors evaluated by the CPAQ: 1) Life focus - engaging in normal life activities (10 items), 2) Cognitive control - believing that controlling thoughts control pain (5 items), 3) Acceptance of chronicity - recognizing that pain may not change (4 items), and 4) Avoid/ control - needing to avoid or control pain (8 items). McCracken (1999) analyzed that the CPAQ suggested a complex factor structure including aspects of engagement in activities regardless of pain, struggle with direct control over private experience, recognizing the persistent nature of pain, and attempting pain control and avoidance.

McCracken and colleagues (2004) revised the CPAQ from 34 items into 20 items. The original 34 items indicated that seven of the items could be excluded because of restricted frequency distribution and poor total correlation with other items. The revised CPAQ included 20 items, which is divided into two components: 1) Activity engaging (11 items) and 2) Pain willingness (9 items reverse score). A recent study showed that the revised CPAQ scores were not significantly different during the period when a patient was waiting for treatment, but significantly increased during treatment (McCracken et al., 2006).

The CPAQ has been used frequently in several studies. McCracken and Eccleston (2005) reported the subscales and total scores of the CPAQ ($\alpha = .78 - .82$). McCracken and Eccleston (2006) also found that the CPAQ subscales and total scores achieved adequate reliability ($\alpha = .72 - .82$). Therefore, this study will use the revised CPAQ to measure pain acceptance among cancer patients with chronic pain.

Pain Behaviors in Cancer Patients

Definition of Pain Behaviors

Pain behavior is one aspect of the pain experience. It is an overt and observable behavior such as a limp or facial grimacing (Fordyce, 1976). The presence of pain is often signaled by some kind of visible or audible behavior interpreted as pain behaviors (Pilowski, 1994). Pain behaviors may or may not be regarded as appropriate to the degree of somatic pathology observed (Diagnostic and Statistical Manual of Mental Disorder, 1987 as cited in Lofvander & Furhoff, 2002).

Pain behavior is any and all outputs of the individual that a reasonable observer would characterize as suggesting pain, such as posture, facial expression, verbalizing, lying down, taking medication, seeking medical advice, and receiving compensation (Loeser & Fordyce, 1983). Pain behaviors are actions that communicate disability and discomfort (e.g., wincing, limping, decreased activity) and have been shown to play a significant role in reducing an individual's level of functioning and exacerbating the pain condition (Fordyce, 1976).

Pain behaviors are signals of pain and powerful in eliciting attention and response from others. Anderson, Keefe, and Bradkley and colleagues (1988) observed that patients with rheumatoid arthritis demonstrated frequent guarding, passive rubbing, and rigidity as expressions

of their pain. This pain behavior may be maintained, at least in part, by potentially reinforcing consequences, such as solicitous behavior from others, or the evidences of aversive experiences, such as a stressful job situation or conflict with significant others (Romano et al., 1995).

Types of Pain Behaviors

A chronic pain behavior typically is based on the premise that there are at least two types of pain behavior: respondent and operant behavior.

1. Respondent Behavior

Respondent behavior is a type of reflex behavior as a response to antecedent stimuli (Kats, 1998) whether the individual wants it or not (Fordyce, 1976). The antecedent stimuli is usually specific and predictable (Fordyce, 1976). Respondent behavior is spontaneous behavior. When the antecedent stimulus is adequately presence such as nociceptive stimuli, the response of behavior is likely to be emitted. In contrast, when an antecedent stimulus is not adequate, the

behavior seems not to be occurring. Therefore, respondent behaviors are strictly in terms of stimuli.

In chronic pain, when pain occurs, the patient may respond to the pain in various ways such as guarding, rubbing, grimacing, bracing, and audible pain behavior or frequent touching on affected parts of the body. Previous studies have shown that pain behavior has positive association with pain intensity and severity (Ahles et al, 1983; Asghari & Nicholas, 2001; Buckelew, Parker, & Keefe, 1994).

2. Operant Behavior

Operant behavior is not usually associated with specific antecedent stimuli (Kats, 1998). It occurs as a direct and automatic response to antecedent stimuli, the same as the respondent behavior. But operant behavior may occur because the behaviors are being followed by positive or reinforcing consequences (Fordyce, 1976). Operant behavior often is not associated with a specific antecedent stimulus (Kats, 1998). This type of pain behavior is not controlled by antecedent stimuli and even the stimuli is not adequate any more, but when the patient receives effective reinforcement from the environment (spouse, health caregiver, and environmental

events), then pain behaviors such as guarding, rubbing, grimacing, bracing, and audible pain behavior or frequent touching of favored part of the body, are likely to be emitted and may persist long after the initial cause of pain is resolved or greatly reduced (Turk & Flor, 1999).

Operant behavior could be at first related to tissue damage and a nociceptive stimulus or anticipation of circumstances, but it develops within the environment through learning processes. Therefore, the operant behavior model is not concerned with the internal cause of the pain, but is more focused on the overt manifestation of pain expressed as a pain behavior (Turk & Flor, 1999).

Fordyce (1978) proposed that in order to maintain behaviors, reinforce consequences (reinforcement) or terminate behavior by punishment is needed. The terms 'reinforcement' and 'punishment' refer to a relationship between behavior and a resulting environmental change. Reinforcement results in an improvement of condition for the individual whereas punishment results in a worsening of condition. Fordyce (1976) divided reinforcement into two types: direct and indirect reinforcement of pain behavior.

2.1. Direct Reinforcement of Pain Behaviors

Reinforcing factors such as the environmental situation or events may act as a pain contingent. For example, when pain occurs and the patient displays a certain pain behavior, their spouse may provide more attention to the patient. Those pain behaviors are likely to remain because the patient feels the benefit of attention while he or she is in pain. Usually, the reinforcing events do not occur unless preceded by pain behavior or in some other way in which the reinforcement occurs as a response to pain behavior.

2.2. Indirect Reinforcement of Pain Behaviors

Indirect reinforcing of pain behavior may occur when pain behavior leads to effective avoidance of some aversive or unpleasant consequence (Fordyce, 1978). If a patient thinks that some activities may cause pain or if the patient had experienced pain while engaged in activities such as sitting, walking, etc., those activities will be avoided to reduce adverse consequences. Through indirect reinforcement, the patient learns to engage in certain behaviors which effectively avoids or minimizes an aversive consequence.

Fordyce (1976) also pointed that the pain behaviors differ in durability. Respondent behavior is unlikely to persist if the stimulus is not repetitive or persisting. In

contrast, operant conditioned behaviors need only occasional reinforcement to persist, and perhaps only the occasional, but sufficient to make behavior persist, even though the reality of circumstances would never be occurred but the behaviors are produced because of the anticipation of the circumstance.

Influencing Factors of Pain Behaviors

1. Gender

Gender may contribute to the performance of pain behavior. Several studies have shown that gender has a strong relationship with certain pain behavior (Asghari & Nicholas, 2001; Lofvander & Forhoff, 2002). Women are more likely to report avoidance (especially of housework) and complaining behavior than men (Philips & Jahanshahi, 1986). Similarly Keefe, Lefebvre, and Egert and colleagues (2000) also found that women with osteoarthritis exhibited more pain behaviors than men in the same condition.

In laboratory setting, Sullivan, Tripp, and Santor (2000) examined the gender differences in pain behavior and the role of catastrophizing. This study involved 80 healthy

students ($n = 42$ female, 38 male). They found that females displayed pain behaviors for a significantly longer duration ($t [78] = 2.5, p < .01$), achieving higher scores on Pain Catastrophizing Scales ($t [78] = 3.8, p < .001$) than males. In a clinical setting, Keefe and colleagues (2000) found that among osteoarthritis patients ($N = 72$ males, 96 females), females had significantly higher levels of pain and physical disability, and exhibited more pain behavior.

2. Pain Intensity

Pain intensity is the amount of pain perceived by the patients. Willkie and colleagues (1992) conducted a study in lung cancer patients ($N = 45$) examining five related positions and 31 pain related behaviors by using videotape observation. They found that pain behavior correlated significantly with pain intensity ($r = .44$) and pain quality ($r = .64$). In addition, they reported that the location of pain, pain quality, and pain intensity accounted for 41 percent of the variance in pain behavior.

Buckelew and colleagues (1994) conducted a study to explore the relationship of pain behavior and psychological variables in Fibromyalgia patients ($N = 73$). They found that total pain behavior was moderately correlated with self-reported pain ($r = .27, p < .02$). Similarly,

Asghary and Nicholas (2001) conducted a study to examine the self-efficacy and range of pain behavior in chronic pain patients. They observed the pain behavior at four different times. They found that pain intensity had a significantly positive correlation with total pain behavior (time 1, $r = .20$; time 2, $r = .36$; time 3, $r = .33$; and time 4, $r = .31$, $p < .001$).

3. Ethnic/ Culture

Every ethnic group and culture perceives illness in different ways (Waddle et al., 1989) and also differs in their expression of behavior related pain (Lofvander & Furhoff, 2002). The beliefs of western cultures are quite different from eastern cultures which tend to be more stoical and less acceptable of pain-related impairment whereas western cultures are more liberal, permissive, and pluralistic. Greenwald (1991) emphasized that among cancer patients in United States ($N = 536$), ethnic cultures may identify the individual expression of pain. Bates, Edwards, and Anderson (1993) stated that ethnicity can affect the attitudes, beliefs, and the emotional and psychological states.

A few studies have demonstrated the influence of ethnic culture on pain behavior. Brena, Sanders, and Motoyama (1990) conducted a study to compare the psychological, social,

and general behavior among lower back pain patients in Japan and the United States. They found that Japanese patients were significantly less impaired psychologically, socially, vocationally, and avocationally in their functions than the American patients. Similarly, Hobara (2005) conducted a study to examine the effects of sex and culture on patients' beliefs regarding gender-appropriate pain behavior among Japanese ($N = 32$) and Euro-Americans ($N = 22$). The finding showed that Japanese pain behaviors were significantly lower than Euro-Americans ($F(1,60) = 10.6, p < .002$). In addition, they stated that females considered pain behavior more acceptable than the male.

4. Self-Efficacy Belief

Self-efficacy refers to the belief that one can manage a specific challenging situation (Bandura, 1977 as cited in Buckelew et al., 1994).) Those patients with a high level of self efficacy were associated positively with exercise and negatively with use of medication. According to Kores, Murphy, and Rosenthal and colleagues (1990 as cited in Jensen, Romano and Romano et al., 1999), self-efficacy is associated with the ability to engage in a number of basic activities such as sitting, standing, walking. Therefore, self-efficacy has been shown to be

able to predict disability in chronic pain patients and that a patient's belief about their pain can influence their behavioral and psychological function. Many studies have demonstrated the significant relationship between self-efficacy belief and pain behavior.

Jensen and colleagues (1999) conducted a study to examine the relationship between pain beliefs and patient functioning and behavior among chronic pain patients and their spouses. (N = 121). They found that the patient's pain behavior significantly correlated with the patient's belief in three categories: disability ($r = .27, p < .01$), harm ($r = .36, p < .001$), and solicitude ($r = .40, p < .001$). In addition, they defined disability as the belief that one is necessarily disabled because of pain, solicitous as the belief in the appropriateness of a solicitous response from one's family member when in pain, and harm as the belief that pain significantly damages and that exercise and activity should be restricted.

Asghari and Nicholas (2001) found that self-efficacy beliefs predict the total pain behaviors and avoidance behavior among chronic pain patients. Other study, Buckelew and colleagues (1994) found that the self-efficacy belief predictive of pain and disability over and above psychological distress among fibromyalgia patients. In addition, they also stated that when

the self-efficacy belief was high, patients exhibited less pain behavior. Self efficacy belief also has been found to be positively associated with exercise and negatively with medication use within 6 to 12 months of follow up.

5. Spouse/ Family Members

A spouse is an important source of social contingencies for the patient and may serve as a discriminative cue and selective reinforcer for the behavioral expression of the pain patients (Fordyce, 1976). A spouse and other family members are often involved in treatment and are taught to respond positively to increased patient activity and other indications of well behaviors. Flor, Turk, and Rudy (1998) stated that spouses have a strong role for reinforcement of pain. In their study, they found that responses of the significant other were highly correlated with pain. Similarly, Schwatz and colleagues (1996) found that spouses' negative feeling regarding the pain, were significantly correlated with patients' pain behaviors ($r = .41, p < .001$).

Romano, Turner, and Friedman and colleagues (1992), conducted a study in chronic pain patients (N = 50) in which they found that spouse solicitous and aggressive behaviors significantly correlated with the patient's non-verbal behavior. Similarly, Paulsen and Altmaier

(1995) examined the effect of spouse support on a patient's display of pain behavior in chronic back patients (N = 110). They found that total pain behavior was significantly associated with total solicitous responses ($r = .24$, $p < .006$). Moreover, Romano, Turner, and Jensen and colleagues (1995) have found that solicitous responses to non-verbal pain behaviors significantly predicted physical disability in depressed patients and high level pain scores.

Spouse and family care givers provide social support for patients that may influence patients' behavior. Those patients with high levels of enacted spouse support were more likely to display pain behavior compared to those with lower level of enacted spouse support. Gill, Keefe, and Crisson and colleagues (2003) conducted a study to examine the relationship of high versus low levels of social support to pain behavior in chronic pain patients (N = 51). They found that patients who reported high satisfaction with social support exhibited significantly higher levels of total pain behavior.

Measurement of Pain Behaviors

It has been widely accepted that a patient engaged in a certain level of pain will display behaviors such as resting in bed, taking medication, guarding affected areas, or facial grimacing. These behaviors are the means by which patients communicate that they are in pain.

The earliest study in pain behavior demonstrated that pain behavior was measured by self-observation methods. Fordyce (1976) developed self-observation through pain diaries to measure pain behaviors. In these pain diaries, patients were asked to identify how much time they spent engaged in three categories of behavior: sitting, standing or walking, and reclining. Patients also were asked to record each time they took pain medication and the amount of the dose. Self observation methods are simple and inexpensive, and, moreover, can increase a patient's awareness of his own behaviors (Keefe, 2000). However, the validation of self-observation of pain behavior was likely to be biased or inaccurate (Turk & Flor, 1987) because most patients may not always be accurate in recording their own behavior.

The other method for measuring pain behaviors rely on the interview or questionnaires. Patients are asked to answer a serials of questions related to pain behaviors. This method also has been criticized because patients may tend to choose the best or right answer. The major limitation

of the interview or questionnaire methods is that there is no direct observation of behavior (Moore & Watson, 2004).

The current method for measuring pain behavior is the direct or indirect observation method. These methods were developed based on the premise that pain behaviors are overt and observable. In the direct observation, pain behaviors are scored based on judgment and skill of the observer. While the indirect method usually relies on a video tape recording. Both these methods have advantages and disadvantages. However in a clinical setting, indirect observation seems to be impractical, costly, and complicated. Moreover, when patients know that they are being observed, they may tend to manipulate their behavior, particularly in Indonesian cultures. According to Simmond (1999 as cited in Moore & Watson, 2004), the highly utilized measures should be simple to use, reliable, acceptable to the patients, cost effective, and provide instant feedback. The direct observation method seems to be more reliable, simple, and easier to administer, therefore this study used the direct observation method.

In the observation method, patients are usually asked to perform some activities as instructed in the standardized protocol. The wide use of the standardized protocol was first

developed by Keefe and Block in 1982. The Keefe and Block protocol consists of serials of activities such as sitting, standing, reclining, and walking. These activities will be repeated twice. While patients performing these activities, five pain behaviors including guarding, bracing, rubbing, grimacing, and sighing, are observed.

The Keefe and Block system has been extensively used in lower back pain, osteoarthritis, and cancer patients. Ahles, Coombs, and Jensen and colleagues (1990 as cited in Frank-Stromborg & Olsen, 1997) conducted a study to evaluate the reliability of the Keefe and Block protocol in cancer patients (N = 19). Five pain behaviors including guarding, bracing, rubbing, grimacing, and verbal pain behavior, were observed by using the indirect method involving videotape recording. They found that the inter-observer reliability was demonstrated ranging from 96 to 99 % of percentage agreement and 61 to 91 % for percentage effectiveness agreement.

Therefore, this study will use the Pain Behavior Observation Protocol (PBOP) designed by Keefe and Block in 1982. The PBOP consists of five features of pain behaviors rated by three points of the Likert scale (0 = none, 1 = frequent, and 2 = always). The 10 minutes of the Keefe and Block standardized protocol of serial activities then will be adapted. The description of the

five behaviors are: (1) Guarding which refers to the abnormally stiff, interrupted or rigid movement, (2) Bracing which refers to stationary movement in which a fully extended limb supports and maintains an abnormal distribution of weight, (3) Rubbing which refers to the touching or holding of the affected painful part, (4) Grimacing which refers to obvious facial expressions of pain that may include furrowed brow, narrowed eyes, tightened lips, corners of mouth pulled back, and clenched teeth, and (5) Sighing which refers to an exaggerated exhalation of air (Keefe & Smith, 2002).

In order to cover the other pain behavior that may be expressed by cancer patients in context of Indonesian cultural, the researcher will add two blank items. These additional items are not calculated in summation of the total pain behavior.

The Relationship of the Studied Variables

Pain Intensity and Pain Acceptance in Patients with Chronic Cancer Pain

Chronic pain is believed to contribute to a reduction of cancer patient's quality of life.

Chronic cancer pain is considered to be a dreadful situation in a patient's life especially in

advanced stage of cancer. McCracken (2005a) stated that the problem of chronic pain could cause considerable suffering, lead to tremendous cost, and affect the patient's relationship with his or her family, community, and workplace.

According to the Gate Control Theory (Melzack & Wall, 1965), the intensity of the pain is perceived by the central nervous system and through the evaluation processes of the brain. The impulse is projected to the gate control as one part and to the action system in the other part. Therefore, the cognitive processes can affect the pain intensity perceived by the patients. When patients, especially chronic cancer patients find their pain unacceptable, they tend to attempt to avoid these activities and seek available interventions to reduce or eliminate the pain. However, when the pain persists beyond the patient's expectation, the pain becomes more disruptive and vigorous, and, thus, will be perceived as more intense and severe. In contrast, those patients who fully accept their pain have been shown to be more productive, perceived pain positively, engaged in tolerable activities, were less-medication depend, and enjoyed a better life compared to those who did not accept their pain.

Many studies have shown that patients who accept their pain had reported lower levels of pain intensity. McCracken (1998) conducted a study to examine the acceptance of pain in chronic cancer patients (N = 160). McCracken found that the greater acceptance of pain was associated with reports of lower pain intensity ($r = .28, p < .01$). McCracken and Eccleston's (2003) study compared coping and the acceptance of chronic pain approach. They found that acceptance of chronic pain was associated with less pain ($r = -.26, p < .001$), depression ($r = -.61, p < .01$), and pain related anxiety ($r = -.70, p < .01$). Similarly, McCracken (2005b) found that among chronic pain patients (n = 228), the intensity of pain was correlated with activity engagement ($r = -.21, p < .01$) and pain willingness ($r = -.27, p < .01$).

Nevertheless, the relationship between pain intensity and pain acceptance was relatively low. McCracken (1998) emphasized that the low correlation of pain intensity and pain acceptance showed that the pain acceptance is not simply a function of having low levels of pain, but addressed the effort involved of the cognitive processes in adjust better to the functions of the patients, irrespective of perceived pain intensity. Vowles and Sorrell (2004) confirmed that

acceptance differs from traditional intervention. Furthermore, they stated that pain acceptance is not heavily focused on pain reduction, but rather on function improvement.

Pain Intensity and Pain Behaviors in Patients with Chronic Cancer Pain

Pain is the feared consequences among cancer patients. Pain may be the first sign of cancer experienced by most patients. The intensity of pain may indicate the severity of the disease, particularly in chronic cancer disease (Daud & Cleeland, 1982; Petpichetchian, 2001; Spiegel, Sand, & Coopman, 1994). When the stage of the cancer becomes more severe, the intensity of the pain is more likely to increase.

Recently, it has been established that patients when experiencing some levels of pain, observable behavior related to such pain as guarding, grimacing, and avoiding, were more likely to be expressed. Fordyce, Fowler, and Lehmann and colleagues (1973) stated that patients who experiencing pain, must be engaged in some behaviors. These behaviors can be identified by observers as indication of patients experiencing pain. Fordyce (1976), pain behavior is the way

patients communicate to others that they are experiencing pain. In addition, Fordyce stated that pain behavior plays a significant role in reducing a patient's functioning.

Pain Acceptance and Pain Behaviors in Patients with Chronic Cancer Pain

Patients who suffer from persistent pain, such as those patients with chronic cancer pain, will change in their behaviors. According to Fordyce (1976), these types of behaviors are pain behaviors including all observable behaviors expressed by the patients when they are engaged in some level of pain. These pain behaviors may include guarding, bracing, rubbing, grimacing, and sighing. Moreover, these behaviors may lead to the refusal of physical activities or doing an activity with a rigid or restricted posture, seeking certainty or guarantee, unwilling to talk about emotional circumstances, refusing a course of action, or denying reality (McCracken, 2005a).

Fordyce (1976) emphasized that pain behaviors are influenced by pain consequences. Turk, Michenbaum and Genest (1983 as cited in McCracken, 2005a) confirmed that patients' interpretation, beliefs, and cognitive processes influence the manifestation of the overt behaviors.

Therefore, if the behavior is followed by reinforcing consequences, pain behavior may persist longer than the normal expected healing time (Sanders, 1996).

McCracken (1998) proposed an acceptance based approach to chronic pain. The acceptance of the pain was designed to undermine unworkable control strategies and a loosening between thoughts, feeling, and action. In conclusion, the acceptance of the pain is a collaboration of the cognitive and behavioral processes. Many studies have shown that acceptance of pain is associated with less avoidance, disability, less medication intake, and better adjustment for mental health and well being. For example, Jacob, Kern, and Rosenberg and colleagues (1993 as cited in McCracken & Eccleston, 2003) reported that patients who accommodated pain demonstrated less depression and less overt pain behavior. In addition, Jacob and colleagues defined acceptance of pain as the ability to live a satisfying life despite chronic pain. McCracken (1998) conducted study in chronic pain patients (N = 160). He found that greater pain acceptance was significantly associated with less avoidance behavior ($r = -.55, p < .001$), less disability and more daily uptimes ($r = .46, p < .01$). Another study, Viane, Crombez, and Eccleston and colleagues (2003) found that among chronic patients (n = 120), pain acceptance correlated with mental health ($r = .45, p < .001$).

Also, Viane, Crombez, and Eccelstone and colleagues (2004) confirmed that pain acceptance had a significantly negative correlation with attention to pain (study 1: $r = -.27$, $p < .001$, $n = 501$; study 2: $r = -.33$, $p < .01$, $n = 62$) among chronic pain patients.

Pain Intensity, Pain Acceptance, and Pain Behaviors in Patients with Chronic

Cancer Pain

Chronic cancer pain is a major health problem impacting on many aspects of the individual's life. Improvements of medical diagnostics, surgical treatments and other medical devices have helped many patients to reduce suffering caused by pain. However, a medical approach alone has not provided a complete solution for most chronic pain sufferers.

The gate control theory (Melzack & Wall, 1965) has emphasized that pain experience involves the complex constellation of sensory-discrimination, cognitive processes, and action systems to produce behaviors as well as affective-motivational and social influences. Therefore, pain experience is considered subjective for each individual. Furthermore, these influencing

factors have been conceptualized as multidimensional (Ahles et al., 1983; McGuire, 1987 as cited in McGuire & Sheilder, 1993).

Fordyce (1976) proposed that pain could produce a certain behavior to communicate the pain to others. These pain behaviors are more likely to be emitted if being followed by reinforcement factors in the environment (Fordyce, 1976, 1978; Fordyce, Fowler, & Lehmann et al., 1994). If pain behaviors received consequences that could increase or decrease the frequency of behaviors, the behavior will be presented or eliminated. Pain behavior may be affected by injury or tissue damage in the first place as a respondent behavior, but within the presence of pain consequences such as social circumstances, the behaviors will be maintained. These behaviors are considered as operant behaviors.

Many studies showed that pain intensity was associated with pain behavior (Asghari & Nicholas, 2002; Buckelew et al., 1994; Sanders, 1996; Wilkie et al., 1992). Baumstark, Buckelew, and Sher and colleagues (1993) examined the relationship between pain intensity and pain behaviors among fibromyalgia patients (N = 79) by using the pain behaviors score method developed by Keefe and Block (1982). They found that the pain behaviors was correlated with

pain intensity ($r = .28, p < .001$). Prkachin, Schultz, and Berkowitz and colleagues (2003) conducted study to record five categories of pain behaviors in lower back pain patients ($N = 176$). They found that the pain intensity (currently/ right now) was correlated significantly with all categories: Guarding ($r = .43, p < .001$), touching ($r = .34, p < .01$), verbal articulation ($r = .24, p < .01$), sound ($r = .33, p < .001$) and facial expressions ($r = .39, p < .001$).

Nevertheless, the problem of chronic pain can be addressed from many angles. Morley, Eccleston, and Williams (1999) conducted a meta-analysis study to compare the effectiveness of cognitive-behavioral treatments on chronic pain patients. The study involved 25 trials from 33 papers. Overall, they concluded that cognitive-behavior treatments produced significantly greater changes for the domain of pain experiences, cognitive coping and appraisal, and reduced behavioral expression of pain. McCracken (2005a) stated that the treatment for chronic pain should produce the engagement of patients in daily activities, present fewer or less severe complaints of pain, and seek less pain-related health care. Furthermore, he stated that the effective pain treatment may lead to freer, fuller, and more vital life following treatments (pharmacological, surgical, alternative, or combination of treatments).

The acceptance approach seeks to determine the linkage between pain and overt behavior rather than attempting to control the pain (Hayes, 1999; McCracken, 2005a). Pain acceptance may have a low correlation with pain intensity because acceptance of pain is not simply a function of a low level of pain, but addresses for proper functioning in daily activities despite the presence of pain (McCracken, 1998). Overt behavior is displayed because of the patient's attempt to control the pain thus effect the behaviors such as facial expression, guarding, touching, avoidance, lying still, prolonged rest, posture rigidity, and seeking medication. Pain behaviors involve learning process in the context of individual and social environments (Fordyce, 1978; Turk & Flor, 1999). Moreover, Turk and Flor confirmed that a maladaptive cognitive process is responsible for maintaining the pain as well as behaviors. In contrast, acceptance of pain, which etymologically means "to take or receive what is offered" (Hayes, 1999) involves an active process takeoff accepting the present pain without abandoning a meaningful life. The process may include bodily sensations, emotions, thoughts, memories, and behaviors. Hayes and Duckwoth (2006) define acceptance of pain as a mindful defusing from pain-related thought, which is a separate experience of pain from behavioral avoidance of pain and provides for the possibility of

experiencing pain and living a valued life. Therefore, those patients who accept their pain clearly have shown better behavior-related pain such as engage into the tolerable activities, diminished the avoidance behavior, and less control of their pain. A few studies have found a correlation between pain acceptance with a dimension of behavior-related pain; pain acceptance associated with less depression and overt pain behavior (Jacob et al., 1993 as cited in McCracken & Eccleston, 2003), less avoidance, disability and more daily uptime (McCracken, 1998), better mental health (Viane et al., 2003), and less attention to pain (Viane et al., 2004).

In conclusion, chronic cancer patients who are experiencing pain will express their pain through behavior as a means of communication with others. Within the cognitive processes, patients may interpret their pain, value the meaning of pain and life, and finally accept their pain as part of their life.