CHAPTER II
THEORETICAL CONCEPTS AND FRAMEWORK

For appreciating the theoretical basis of music therapy and such psychological variables as anxiety, pain, fatigue, sleep quality, positive affects and negative affects, the present section can be helpful for studying the theoretical outline and academic models. Throughout the world the therapy of music is an emergent vocation and contains assorted practices and models (Bunt & Hoskyns, 2002; Hanser, 2005; Wigram, Perdersen & Bonde, 2002). A large collection of music activities together with individual and group listening, guided imagery and music and improvised individual and group music making may be included by music therapy. Trained music therapists draw on, amid others, psychodynamic, humanistic and transpersonal approaches irrespective of the therapeutic involvement (Bunt & Hoskyns, 2002).

Cancer

Hippocrates, a native of Greek was the one who coined term cancer first of all to clarify diverse types of tumor. More than hundred types of cancer have been diagnosed till now. Cancers can occur from any kind of cell and various types of cancer have been classified as per the cell of origin. Most often, the expression tumor is understood to be synonymous with cancer; nevertheless, every tumor is not cancerous. Called a neoplasm also, a tumor is a fresh and irregular growth of cells, and these cells do not serve any helpful purpose. Apart from it, they may interfere with healthy functioning of tissues (Falvo, Catania, D'andrea, Marzullo, Giustiniani & Antoni, 2005).

The symptoms of cancer are reliant on the type of the disease, but common symptoms caused by cancer are there, and/or by, pain, fatigue, sleep disturbances, loss of appetite, nausea (feeling sick, vomiting), dizziness, limited physical activity, hair loss, a sore mouth/throat and bowel problems are some of the most common physical symptoms. Psychological problems such as depression, anxiety, mood disturbances, stress, insecurity, grief and decreased self-esteem can also be caused by cancer. This, in due course of time, can involve social cost. Because of physical or psychological
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symptoms, social isolation of such type as, feeling too tired to meet friends, cutting oneself off due to depressive complaints) can take place. Apart from the conformist pharmacological healings of cancer, treatments for taking care of psychological and physical requirements of the patient too exist there. Psychological outcomes of cancer, such as depression, anxiety or loss of control, can be counteracted by psychotherapy. For example, in the ambit of cognitive therapy, cancer patients can create coping strategies for managing or overcoming this disease. Researches have pointed that music therapy, which is a type of psychotherapy, may offer positive effects on both physiological and psychological symptoms of cancer patients. This therapy can offer positive effects too in sensitive as in palliative situations (Coyne & Tennen, 2010).

**Music Therapy**

A famous definition for music therapy has been given by Bruscia (1989): “Music therapy is a reflexive procedure in which the therapist assists the client to optimize his/her health by means of a variety of facets of music-therapy experience and by means of the relationships formed through them as the momentum for change. As is clear from the definition here, music therapy is the professional-practice constituent of the discipline, which notifies, and in turn is informed by theory and research” (Bruscia, 1989, p. 84).

Aldridge (1994) explains music therapy as: “a technique, which engages the client by playing musical instruments or by singing with the music therapist, thereby making communication achievable. Music therapy makes it possible for a person to converse. It uses music and sounds for communication in some ways. Music therapy was seen as advantageous for persons having other physical cognitive and emotional disabilities”(Aldridge, 1994, p. 3).

Music therapy is a vast pasture where definitions change as per the treatment model and setting. A working description projected by Scheiby (1999) is that “music therapy engages the use of improvised or composed music intended to bring about therapeutic transformation”.

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Bunt and Hoskyns (2002) explains music therapy as follow: “Music Therapy is the use of sounds and music within an developing relation between client and therapist to sustain and hearten physical mental, social and emotional wellbeing” (Bunt & Hoskyns, 2002, p.11). Being a recognized healthcare profession, music therapy utilizes music for alleviating such problems as physical, emotional, social, cognitive, and spiritual requirements of people belonging to all ages (AMTA, 2010).

Numerous music therapists apply an assortment of clinically music-based techniques for the progress of the worth of life for people, who are troubled by an assortment of ailments or disabilities, and such persons use music and music-based interventions, and these two things are based on patients’ necessities and inclinations. The WFMT (2011) has specifically defined the music therapy as: “Music therapy means utilizing music and/or its musical elements (sound, rhythm, melody and harmony) by a capable music therapist, with a client or group. He does so in a process that has been created for smoothening and promoting communication, relationships, learning, mobilization, expression, organization and other relevant therapeutic objectives in for taking care of physical, emotional, mental, social, and cognitive requirements. Building up potentials and/or restore functions of the individual is the main aim of music therapy. This aim is there so that he or she can achieve better intrapersonal and/or interpersonal integration and, accordingly, a better quality of life, in the course of prevention, rehabilitation or treatment” (WFMT, 2011).

Bonde (2011) described music therapy as: “A systematic process of the intervention wherein the therapist helps the client improve his or her health by means of using music experiences and by means of the relationships that build up through them as dynamic forces of change”. In the clinical care, music therapy normally aims at the enhancement or maintenance of the patient’s quality of life, including the management of pain and stress, the regulation of negative emotions (e.g. anxiety, anger, and depression), as well as the facilitation of the communication and spiritual understandings. We can classify music therapy techniques either as active or receptive. In end-of-life care, the techniques typically encompass relaxation or imaginative interventions (receptive), the therapeutic use of songs (active or receptive), and various forms of improvisation (active). Verbal conversations can be

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preceded or complimented by the music-therapy interventions, but is not an intrinsic precondition for the achievement of a music therapeutic contact. The interventions have been designed as to the patient’s physical state and the psychosocial needs in most cases (Maratos, Gold, Wang & Crawford, 2009). People have documented the music as a non-threatening and enjoyable intervention that uses musical interaction as a means of making possible non-verbal expression (Watson, 2007).

Its capacity to address therapeutic goals differentiates music therapy from musical entertainment/recreation. The capacity of music therapy to bring about alterations offers a non-traditional means of externalizing and working by means of the social and emotional factors that arise from both the gained disability and the hospitalization experience linked with it. These features possess particular importance to the music therapy perspectives. Many therapeutic opportunities that may otherwise remain inaccessible can be created by music (Batt-Rawden, 2010).

Music therapy theories and models

Music therapy has been defined very much within the behavioral concept by the pioneers of music therapy, namely Gaston (1995) and Sears (1996).

A. Analytical, Psychodynamic and Transpersonal Theories

To base their professional identities on a humanistic, psychodynamic and music-psychological foundation is characteristic for numerous music therapists. The theoretical surroundings for appreciating clinical work comprise psychodynamic theories, theories of communication and theories of learning. This is so because music therapy forever engages work with contact and communication, whether or not the therapy is focused on training more specialized functions. On account this rationale music therapy includes, uses, and develops theories from psychoanalysis and its offshoots in developmental psychology, Freudian-based psychoanalysis, ego psychology, object relation theories, self-psychology and transpersonal psychology. Apart from it, music therapy has found motivation and models for appreciating from a number of diverse theories of therapy and from the psychology of music. Depending on the client population-receiving therapy, it can also be pertinent to know and explain clinical practice in the course of communication theory and theories of
learning. Therefore, music therapy theory and the growing science of music therapy depend on a compound theoretical basis. It is pertinent to mention that the profession of music therapy must continually apply, critically regard and develop from existing theories in psychology, psychoanalysis, education, musicology, medicine and communication. Music therapists work and identify themselves professionally within a turf that is, both art and science, a fact that can make establishing an identity as a music therapy ‘scientist’ complicated and multi-faceted (Bonde & Wigram, 2002).

B. **Bio-psychological model of Music Therapy**

The power of music when used in a group setting, allowing participants to socialize, connect, and share experiences with others was acknowledged by the early music therapy pioneers, such as Gaston (1995). Various music therapists to enhance therapeutic results use the inherent physical, psychological, and social components of music. Music therapy can accommodate a broad range of patient needs and responses (Gfeller, 2015) because music is used and enjoyed by all ages and cultures. For example, Merriam (1964) recognized more than a few ways that people use music in society, including music as an influence on physical response, a type of communication, a form of emotional appearance, as symbolic representation, and as a way to implement social standards. Apart from it, music may be used to authenticate social institutions and religious rituals. Music can also be used for contributing to the permanence and stability of culture, contributes to the integration of society, provide aesthetic enjoyment, and provide entertainment (Merriam, 1964).

C. **Bio-psychosocial model of music therapy**

Biological factors as the physiological function and structure of a person, with healthy have been identified by the bio-psychosocial model. The unrestrained cell growth linked with cancer wreaks havoc on characteristic performance of the affected body systems, and this kind of growth can bring unbearable pain and uncomfortable physical symptoms. Unluckily, many of the treatments used to fight the disease-process are also painful or distressing, and may cause additional pain, stress, nausea, fatigue, and diminished immune functioning. These symptoms are tried to be alleviated by various medical professionals by means of medication, but a lot of
patients undergo painful side effects or pain despite the accessibility of pharmacological interventions. An effective adjunct therapy can be offered by music therapy for lessening distressing side effects and for abating the amount of medication needed, thereby offering a measurable relief in symptoms (Olofsson & Fossum, 2009).

**Anxiety**

As per DSM-V (2013) anxiety has been defined as “the anxious anticipation of future danger or misfortune accompanied by feelings of dysphonic or somatic symptoms of nervousness. Anxiety is an unpleasant state of inner turmoil, often accompanied by nervous behavior, such as pacing back and forth, somatic complaints and rumination. It is the subjectively distasteful feelings of fear over anticipated events, such as the feeling of imminent death” (Davison & Gerald, 2008, p. 11). Anxiety is a mood-state linked with anticipation for possible upcoming negative events (Barlow, 2004). Uncontrollable and excessive manifestations of the condition can develop into a pathological disorder despite the fact that anxiety is a natural human response and adaptive warning mechanism.

Spielberger (1972) postulated two distinct anxiety constructs namely state anxiety and trait anxiety. State anxiety is conceptualized as a transitory emotional state or condition of the human organism that is characterized by subjective, consciously perceived feelings of tension and apprehensions and heightened autonomic nervous system activity. If a situation or thought is perceived as threatening, irrespective of the presence of real or objective danger (stress), the person who perceives the situation as threatening will experience an increase in state anxiety. State anxiety is thus, defined by the stress level of the situation and an individual’s experience of it. States are temporary moments in one’s life and are transitory in nature. Their quality and intensity will vary from situation to situation. According to Spielberger (1983) “state anxiety is a transitory emotional state or condition of human organization that varies in intensity and fluctuates over time. This condition is characterized by subjective consciously perceived feelings of tension and apprehension, and activation of autonomic nervous system.”
Lazarus (1991) defined state anxiety as “an unpleasant emotional arousal in face of threatening demands or dangers. A cognitive appraisal of threat is a prerequisite for the experience of this emotion”.

Anxiety is a feeling of fear, dread, and uneasiness that may occur as a reaction to stress. A person with anxiety may sweat, feel restless and tense, and have a rapid heart beat. Extreme anxiety that happens often over time may be a sign of an anxiety disorder (National Cancer Institute, 2009). Cancer is considered a serious and chronic disease, and it heralds hopelessness and uncertainties. Further, it reminds of a painful death, evokes guilt and anxiety, and creates panic and confusion. In this manner, cancer causes disaster and dramatic breakdown in the psychic balance of a human being (Ozkan, 2002). Despite the fact that anxiety is a normal reaction to threats such as cancer, a few patients display an overwhelmingly anxious response that impairs their day-to-day functioning. Often, anxiety enhances as the disease progresses or as treatment becomes more aggressive as well as the treatment reaches a transition points that represent threatening events throughout the course of the disease. Patients becoming aware of cancer diagnosis, learning about a recurrence, or hearing that treatment has been ineffective usually experience/feel initial shocks or disbelief followed by emotional turmoil, anxiety and depressive symptoms (breitbart, 1995).

Anxiety takes place in quite a few patients afflicted with cancer, and anxiety varies from the “normal” worries and fears associated with a life threatening illness, through sub-syndromal distress, adjustment disorders, and generalized anxiety disorders and anxiety due to the medical condition (Wells, Golding & Burham, 1998). The following are the common cause of anxiety in patients afflicted with cancer:

(a) Situational anxiety: which includes diagnosis or illness relate crisis, conflict with family or staffs, anticipating a frightening procedure or test results, and fear of recurrence.

(b) Disease-related anxiety: poorly controlled pain, abnormal metabolic states, hormone secreting tumors and para-neoplastic syndromes (remote central nervous system effects).
(c) Treatment-related anxiety: such as anxiety producing drugs (antiemetic, neuroleptic, bronchodilators), withdrawal states (opioids, benzodiazepines, and alcohol), conditioned (anticipatory) anxiety, nausea, and vomiting with cyclic chemotherapy.

(d) Exacerbation of preexisting anxiety disorder: Phobias (needles, claustrophobia), Panic and generalized anxiety disorders, Post-traumatic stress disorders or as a result of traumatic cancer treatments (Holland, 1996).

We can identify pathological anxiety as it tends to be out of proportion to the level of threat; it persists or gets worse when no intervention is offered, the intensity of symptoms is unacceptable regardless of the intensity of the threat (these include panic attacks, severe physical symptoms, abnormal beliefs such as thoughts of sudden death), and the patients experience a disruption of their usual or desirable functioning (DSM-5, 2013). However, such criteria are difficult to apply to cancer patients for the reason that cancer is at all times lined with some form of threat: the threat of loss, death, body functions, roles, body image, etc. Apart from it, while the duration of symptoms is vital in identifying unusual anxiety, the natural history of anxiety in oncology is uncertain. Disruption of functioning is also common in patients suffering from cancer, and it is frequently associated with anxiety (ICD-10, 2010).

Anxiety in cancer patients has been categorized in three groups by Massie and Shakin (1993): 1) reactive anxiety, 2) pre-existing anxiety disorders, and 3) anxiety-related to medical illness. Anxiety can manifest itself in physiological functioning in various ways. The pattern seems to be idiosyncratic, different physiological subsystems being more or less likely to respond in anxiety provoking situations in different individuals (Selye, 1974). We all recognize this in ourselves. Some people have nervous stomachs, others get palpitations, and still others are susceptible to tension headaches. Symptoms of anxiety were most frequently reported by cancer patients (Stark & House, 2000). According to National Cancer Institute (2009), anxiety is a normal reaction to cancer. One may experience anxiety while undergoing a cancer screening test, waiting for test results, receiving a diagnosis of cancer, undergoing cancer treatment, or anticipating a recurrence of cancer. Anxiety associated with cancer may increase feelings of pain, interfere with one's ability to
sleep, cause nausea and vomiting, and interfere with the patient's (and his or her family's) quality of life. If left untreated, severe anxiety may even shorten a patient's life.

**Theoretical Perspectives of Anxiety**

Anxiety-experts generally clarify anxiety and anxiety-related disorders by utilizing the bio-psychosocial model. The bio-psychosocial model suggests there are multiple, and inter-related causes of pathological anxiety. These causes can be generally classified into four main groups: a) biological causes, b) psychological causes, c) environmental and d) social causes. When psychologists use the word "environment," they mean all the things that are taking place around us. Used in this way, environment references our experiences of our routine life, particularly social interactions with other people, especially caregivers, family members, etc. (Mattew, 2013). Strongman (1995) categorized the theories of anxiety into psychoanalytic, learning/behavioral, physiological, phenomenological/existential and cognitive.

1. **Psychoanalytic theory of anxiety (Freud, 1926)**

   Psychoanalysis recognizes two types of anxieties. The first type, traumatic anxiety, results from over stimulation. Events happen faster than the mind can comprehend them; this produces a sensation of crisis. That this feeling has a physical basis in the capacity of the nervous system is the belief of Freud, and that birth throws every child into a state of traumatic anxiety is another feeling of his. In his opinion, this birth trauma becomes the model for later episodes of anxiety. The second type of anxiety in psychoanalysis, signal anxiety, is believed to arise from a person’s need to guard against the disorganization of traumatic anxiety. The ego appraises its own aptitude to overcome both external demands and the push of internal drives and wishes. The ego responds with anxiety when normal methods of coping with these pressures threaten to fail, and ego then mobilizes the person to take new action. The small-scale discomfort of signal anxiety helps to avoid a larger, more devastating experience.
2. **Phenomenological or existential theory of anxiety (Kirkeegard, 1844)**

   In this theory anxiety is seen as a naturally occurring state of the person. This idea can cause this awareness that development and maturity depend on freedom, which in turn depends on being aware of the possibilities that exist in life. To deliberate such possibilities, means that anxiety should be involved. Being mature that can lead to freedom, is dealing with the anxiety that is an essential part of experiencing possibility.

3. **Learning theory of anxiety (Dollard & Miller, 1950)**

   In learning theory, anxiety is considered both as a response to learned signals and as a drive, or motivator, of behavior. That anxiety is derived from reaction to pain is what the most learning theorists maintain. One can reduce anxiety by removing or avoiding the foundation of the situation that have created pain. Evasion may become firmly established and lead to constricted or bizarre behavior. A better way to reduce anxiety is to pair a strong, positive reinforcement such as food with the frightening situation so that the stimulus that formerly elicited anxious responses becomes associated with positive feelings.

4. **Cognitive theory of anxiety (Beck, 1979)**

   Just some time ago, in the control of anxiety, psychologists focused on the role of cognition as the origin of anxiety. Cognitive theories lay stress the development of appraisal and the unnoticed internal dialogue that increases emotional response. Experiments have shown that the interpretation of a situation determines whether a person feels anxiety or some other emotion. This theory assumes that cognition and affect go hand in hand, with the cognition preceding and determining the affect. The common element in all anxiety reactions is the perception of some type of threat.

5. **Physiological theory of anxiety (Panksepp, 1991)**

   Evidence subsists that some people may be biochemically susceptible to an extreme form of anxiety identified as “panic attacks.” A few medications alleviate panic, and this relief from pain leads to the hope that anxiety can be understood physiologically, but the metabolic pathways are unknown and can be quite
intricate. The best treatment for panic attacks is provided by a combination of medication and therapies, including relaxation training.

6. **Theory of somatosensory amplification (Barsky, 1992)**

   This theory refers to the tendency of anxious people to scare them by over focusing on frightening physical sensations.

7. **Psychodynamic theories of anxiety (Heller, 1996)**

   According to this theory anxiety as an unpleasant affective state originating in the unconscious. Anxiety is a signal or a symptom of an unconscious conflict, usually stemming from childhood that remains unresolved. To deal with their feelings of anxiety, people develop psychological defenses that may be either adaptive (i.e., realistic anxiety) or maladaptive (i.e., neurotic anxiety).

**Models of Anxiety**

Two chief streams of models of anxiety have developed, and these two streams draw attention to biological and psychological bases: animal models of anxiety and human models of anxiety.

A. **Animal Models of Anxiety**

   Environmental factors that contribute to anxiety and are typically developed to induce a fear or anxious response to stimuli have been studied by the animal models of anxiety (Craig, Brown & Baum, 2000). Anxiety and fear have analogous behavioral and physiological symptoms, but these two factors have diverse etiological roots. For example, anxiety is associated with non-specific stimuli; a stimuli that is commonly referred to as generalized unfocused response, while fear is often a result of an experienced danger in the immediate environment. Both in human and in animal studies, such anxiety-evoking agents as unpredictability, uncontrollability and negative experiences are used (Craig, Brown & Baum, 2000).

   i. **Conditioned emotional response (CER)**

      The conditioned emotional response model was developed for creating an emotional response in animals by the means of using a series of pairings and non-pairings of an unconditioned stimulus (US), such as a shock, with a conditioned
stimulus (CS), such as a tone. The US and CS relationship has permitted researchers to ascertain if an emotional conditioning is developed, inhibited, or retarded. In the course of time, the conditioned baseline-behavior response of the shock-tone pairing dwindles and is known as a CER (Visintainer, Volpicelli & Seligman, 1982).

ii. **Fear-potentiated startle**

The fear-potentiated startle animal model augments an acoustic startle-reflex by presenting an auditory-startle stimulus in the attendance of a conditioned stimulus that earlier was paired with a shock. This model is exceptional in that it associates augmented emotional response with the desired effect rather than using suppression of the continuing behaviors as an indicator of an emotional state. More significantly, this permits researchers to measure a distinct symptom of anxiety as compared to other animal models of affective disorders that are characterized by behavioral inhibition, such as depression and learned helplessness (Craig, Brown & Baum, 2000).

iii. **Punishment-conflict**

The punishment-conflict model employs operant techniques to draw out well-established behaviors, and then penalizes the behaviors by utilizing aversive stimuli causing the behaviors to fall down. The suppression in behavior is thought to parallel the passive-avoidant factor of anxiety. The expansion of this model arose from the works of Skinner (1999) who discovered that a conditioned stimulus (e.g., shock) could restrain an animal’s response to eat. In addition, the environment draw outs signals that repeated exposure is paired with punishment.

iv. **Separation and abandonment**

The separation and abandonment model is based on the manipulation of social interactions (e.g., if you were to separate an animal from an object of attachment). This model has been utilized in studies by utilizing Rhesus monkeys. Rhesus infants that have been separated from attached objects have established fear responses in the absence of dangerous situations, comparatively linked to panic attacks in humans. Like anxiety, intensity and regularity of these behaviors are reliant on the sort and amount of stress encountered (Dutton, Saunders, Starzomski & Bartholomew, 1994).
B. Human Models of Anxiety

a. State versus trait anxiety

Spielberger (1983) has focused on psychometric tools and individual differences when studying anxiety. This study is based on a psychological approach to anxiety as an acute emotion and personality construct. Spielberger (1983) introduced a distinction between two types of anxiety: state and trait. This distinction has now become commonplace in literature and has been further studied. Lazarus (1991) defined state anxiety as “an unpleasant emotional arousal in face of intimidating demands or dangers”. Conversely, trait anxiety has been defined as reflecting stable individual differences regarding the tendency to respond with state anxiety in expectation of a intimidating state of affairs (Lazarus, 1991).

b. Self-efficacy and anxiety

That self-efficacy is a key construct of anxiety is that which this model has proposed. The basis of this assumption is that individual’s mood and linked behavior are determined by their ability to control the environment (Craig et al., 2000). Self-efficacy can be defined as an individual’s anticipations in attaining set goals, sense of control, personal agency and a focus on how one perceives their own success. Individuals not only assess their own self-efficacy, but also take into consideration vicarious occurrences such as observational learning and modeling (Marks, 1977). Many identified state variables such as arousal, appraisal, and social influence have been shown to affect one’s assessment on self-efficacy (Craig et al., 2000). Apart from it, self-efficacy has established positive correlations with self-esteem and individual self-concept. Consequently, one’s aptitude to cope with anxiety-arousing events has been linked to low self-efficacy. In that case, it is not surprising that avoidance behavior of feared objects may not wholly be controlled by the fearful stimulus, but also by evaluations of self-efficacy. Discoveries have shown that fear and self-efficacy are individual predictors of anxiety and affiliated behavior.

Pain

According to International Association of Pain Study (2012): “Pain is an unpleasant sensory and the emotional experience related to the actual or potential tissue damage, or described in terms of such damage” (IAPS, 2012). The most current
accepted definition of pain from the International Association of Pain Study states: “Associated with actual or potential tissue damage, or described in terms of tissue damage, pain is an unpleasant sensory and emotional experience. It is always subjective. Everyone learns the application of the word through experience related to injury. Based on past experience and/or present state of mind, the experience of pain varies from person to person based on past experience and/or present state of mind” (Koestler & Myers, 2002).

Dealing with physical (e.g., tissue damage), psychological (e.g., psychogenic pain), and behavioral processes (Sarafino, 2006), pain is a complex and subjective phenomenon. Pain can be acute or chronic. Acute pain lasts for less than six months, while chronic pain lasts for more than six months and may begin with an acute episode that does not decrease with time or treatment. Depending on tumor type and location, surgical procedures, and resulting disability associated with some cancer treatments the patients of cancer may suffer from both acute and chronic pain (McMenamin, 2011). Acute pain is characteristically linked with an active disease state or traumatic injury. Pain naturally disappears when the damaged area heals. Acute pain serves, as an important signal for identifying that there is damage. Behavioral changes can be initiated with this information in order that further injury might be avoided. At times pain persists even after injuries have healed. We usually refer to it as chronic pain. Chapman, Casey, Dubner, Foley, Gracely and Reading (1985) identify three types of chronic pain: (1) Pain that remains after the normal feeling of a disease or an injury; (2) Pain lined with a chronic medical condition, such as a degenerative disease or a neurological condition; or (3) Pain that extends and persists in the absence of identifiable organic problem.

There are two factors on which people's experience is dependent: (1) Whether the underlying state is benign or is malignant and worsening; and (2) Whether the discomfort continues livings continuously or occurs in frequent episodes.

Turk, Meichenbaum, and Genest (1983) have described three types of chronic pain by means of these factors:

1. Chronic/recurrent pain begins from benign reasons and is characterized by replicated and intense episodes of pain separated by periods without pain. Two examples of chronic/recurrent pain are migraine headaches and muscle-
contraction (tension) headaches; another example of this is myofascial pain, a syndrome that characteristically engages shooting or radiating, but dull, pain in the muscles and connective tissue of the head and neck, and sometimes the back.

2. Discomfort that is typically present all of the time, with varying levels of intensity, and is not related to an underlying malignant condition is what we call Chronic/intractable/benign pain. This pattern is often there in chronic low back pain.

3. Continuous discomfort characterizes chronic/progressive pain, and this pain is associated with a malignant condition. It becomes increasingly intense as the underlying condition worsens. Rheumatoid arthritis and cancer are two of the most prominent malignant conditions that frequently produce chronic/progressive pain.

**Theoretical Perspectives of pain**

It was in ancient Greece that the first model for pain originated and Descartes was codified this model in the 17th century. This model is referred to as the biomedical model (Koestler & Myers, 2002). This model assumes that there is a direct link between an individual’s complaints and symptoms to a specific disease. That the disease can be confirmed by medical evaluation and tests relating to tissue damage and impairment is an assumption in this case. The mind and body are treated as two detached entities and treatment to pain is aimed at toward the body. It is believed that symptoms of pain are believed to arise as a direct result of a physical impairment. For centuries it was assumed that the complaints were psychological in nature if a medical treatment did not alleviate the pain or if a physical ailment could not be discovered to explain the pain. A few conflicting theories about pain existed there by the end of the 20th century (Koestler & Myers, 2002).

i. **Specificity theory (Von-Frey, 1895)**

Specificity theory is one of the first modern theories for pain. It holds that specific pain receptors transmit signals to a "pain center" in the brain that produces the perception of pain. Von-Frey (1895) argued that the body has a separate sensory
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system for perceiving pain, just as it does for hearing and vision. This theory considers pain as an independent sensation with specialised peripheral sensory receptors, which respond to damage and send signals through pathways (along nerve fibres) in the nervous system to target centres in the brain. These brain centres process the signals to produce the experience of pain. Thus, it is based on the assumption that the free nerve endings are pain receptors and that the other three types of receptors are also specific to a sensory experience.

ii. Aristotelian concept (Skevington, 1995)

Pain is an affective (emotional) quality. The Gate Control Theory (GCT) is the chief working theory of pain. That the balance of the input between large and small fibres is important in pain-sensation is what this theory proposes. That a predominance of small fibre activity constitutes an opening of the gate’ allowing the brain to receive and interpret the impulses as pain is the postulation of this theory. In the course of a preponderance of large fibre activity the gate is ‘closed’ and pain is not perceived. To acknowledge and integrate known psychological mechanisms that affect individual perception and interpretations of pain is the first theory. That psychological mechanisms such as anxiety, depression and relaxation can affect the “opening of the gate” that allows for the transmission of pain, has been acknowledged by this theory.

iii. The bio-psychosocial model (Engel, 1977)

That the mind and the body are an integrated and dynamic system is what this model suggests. The doctors, who were treating soldiers during the Second World War, initiated this model (Koestler & Myers, 2002). Some scholars made observations questioning the traditional belief that the mind and the body are separate entities when treating pain. Soldiers with serious injuries saw their injuries as a ‘ticket out’ and reported less pain than soldiers who had incurred less serious wounds and would have to return to the battlefield (Beecher, 1972 as cited in Koestler and Myers, 2002).

To explain the physiological basis of pain, several theoretical frameworks have been proposed although none yet completely accounts for all aspects of pain-
perception. To describe mechanisms underlying pain perception a number of theories have been postulated, and these theories date back many centuries and even millennia. They indicate that pain is not simply a neuro-physiological phenomenon, but pain also involves social and psychological performers. It has been stated that factors like culture, family, and environment influence pain perception, and ultimately affect a person’s emotions, behaviors, and cognition (Perl, 2007).

![Figure 1. Bio-psychosocial model of pain](image)

iv. **The Fourth Theory of Pain (Hardy, Wolff & Goodell, 1940)**

It stated that pain was composed of two components: the perception of pain and the reaction one has towards it. The reaction was described as a complex physio-psychological process involving cognition, past experience, culture and various psychological factors, which influence pain perception.

v. **Intensive Theory (Erb, 1874)**

An Intensive (or Summation) theory of pain has been postulated at several different times throughout history. This theory first, conceptualized in the fourth century by Plato (1998). The theory defines pain, not as a unique sensory experience but rather, as an emotion that occurs when a stimulus is stronger than usual. This theory is based on Aristotle’s concept that pain resulted from excessive stimulation of the sense of touch. Both stimulus intensity and central summation are critical determinants of pain. It was implied that the summation occurred in the dorsal horn cells.
vi. **Descartes’ description of the pain system (Descartes, 1664)**

This theory described as a perception that exists in the brain and makes the distinction between the neural phenomenon of sensory transduction and the perceptual experience of pain. His description of nerves, which he perceived as hollow tubules that convey both sensory and motor information (Descartes, 1664) is something that is essential to the development of Descartes’ theory. Pain was observed by Specificity theory as "a specific sensation, with its own sensory apparatus independent of touch and other senses" (Bonica, 1990).

vii. **Pattern Theory of pain (Goldschneider, 1920)**

Goldschneider (1920) proposed that there is no separate system for perceiving pain, and the receptors for pain are shared with other senses, such as of touch. This theory considers that peripheral sensory receptors, responding to touch, warmth and other non-damaging as well as to damaging stimuli, give rise to non-painful or painful experiences as a result of differences in the patterns of the signals sent through the nervous system.

viii. **Sensory Interaction Theory of pain (Noordenbos, 1959)**

This theory described two systems involving transmission of pain: the fast and slow system. The later presumed to conduct/ somatic and visceral afferents were presumed to have been conducted by the later while the former was considered to inhibit transmission of the small fibers.

ix. **Gate Control Theory of pain (Melzack & Wall, 1965)**

The first one to propose a model with an interaction between small (unmyelinated) and thick (myelinated) fiber, was Noordenbos (1959). The fast (myelinated) fibers block the slow (unmyelinated) fibers, "fast blocks slow". That non-painful input closes the "gates" to painful input is what the gate control theory of pain avers, and this process prevents pain sensation from traveling to the central nervous system. Consequently, stimulation by non-noxious input is successful in suppressing pain. The gate control theory is considered one of the most influential theories of pain because it offered a neural basis, which reconciled the specificity and pattern theories, and it eventually revolutionized pain research (Moayedi, 2012).
Although there are some important observations, which the gate control theory cannot explain adequately, it remains the only theory of pain that most accurately deliberates the physical and psychological aspects of pain perception (Meldrum, 2014). Music and music therapy combined with the data from the research contributed to the evolution of three theories:

- Biological events such as emotions and memories can be influenced by music therapy, and this therapy has some impact on the perception of pain.
- Healthy distraction to an individual’s pain, including the side effects of pain medication such as nausea, by blocking pain messages can be offered by music therapy.
- Music therapy has the capacity to decrease anxiety, alleviate symptoms of depression, motivate and provide enjoyment that contributes to quality of life. Decrease in pain-perception can be brought by improved quality of life.

![Figure 2. Gate control theory of pain](image)

**Fatigue**

The word fatigue is “a subjective perception and/or experience related to disease, emotional state and/or treatment, involving physical, emotional, social and
spiritual well-being affecting quality of life. Fatigue is a multidimensional symptom (Ferrell, Grant, Dean & Funk, 1996). Health professionals often use the words ‘asthenia’ and ‘fatigue’ interchangeably (Waller & Caroline, 2000; Tyler & Lipman, 2000; Sweeny, Neuenschwander & Bruera, 2005). Many words are often used interchangeably by various patients and families to describe weakness, drowsiness, tiredness, fatigue, lethargy and reduced alertness (Dean, Harris, Regnard & Hockley, 2006). Fatigue is a widespread symptom and it is the presenting-concern for 5% to 10% of visits in primary care. Considerable costs to patients and society is by means of time lost at work, medical visits, and evaluation. The underlying cause of a patient’s fatigue cannot be found in many cases, but rarely can fatigue be the initial symptom of a life-threatening disease, such as a yet undiagnosed malignancy or heart failure. A guide to a rational, systematic approach to evaluation and treatment of fatigue is important for the aforesaid causes (Wright, 2014).

Right after each treatment, patients treated with chemotherapy frequently feel the most fatigue during those early days. Thereafter the fatigue abates until the next treatment. There is enhancement in fatigue usually after each cycle. It has been shown in some surveys that patients have the most severe fatigue abates, even then patients may not feel back to normal until a month or more after the last treatment. Incidentally even after some months or some year, many patients feel fatigued after treatment ends. The pain, depression, anxiety, anemia, lack of sleep caused by some anticancer drugs, etc. may become enhanced in fatigue during chemotherapy. The National Cancer Institute at the National Institutes of Health (2012) characterized CRF as a distressing, persistent, and subjective sense of tiredness or exhaustion connected with cancer or cancer-treatment that is not proportional to fresh activity and interferes with usual functioning. Since most BMT patients will experience some form of treatment including chemotherapy or radiotherapy before receiving a BMT (NCINIH, 2012), BMT patients are likely to undergo comparable negative side effects including CRF. Additionally, CRF can be experienced at diverse stages during and after cancer treatment (Goedendorp, Gielissen, Verhagen & Bleijenberg, 2009). For example, more than 80% of the patients undergo at least some fatigue at some stage in adjuvant chemotherapy for breast cancer (Glaus, Crow & Hammond, 1996). One-
third survivors of breast cancer suffer from fatigue, even for a period of five to ten years after they have been diagnosed (Scott, Lasch, Barsevick et al., 2011). In patients suffering from advanced cancer, the estimated prevalence of fatigue is 74%, and it can increase up to 88% in the last two weeks of life (Minton & Stone, 2009).

It has been observed that cancer patients point out that fatigue is more troublesome and has a considerable negative influence on quality of life and daily actions than any other cancer-related symptom, including pain, nausea and depression. Their daily routine is changed owing to the force of fatigue, and fatigue limits them in physical actions (e.g. walking distances), cognitive activities (e.g. concentrating) and social activities (e.g. taking care of the family) (Teunissen, Wesker & Kruitwagen, 2007). It has been disclosed by qualitative studies on fatigue in cancer patients that patients describe their fatigue experiences as physical, cognitive or emotional sensations of tiredness (Curt, Breithart & Cella, 2000; Hickok, Morrow, Roscoe, Mustian & Okunieff, 2005). The absence of a universally accepted definition is one continuing concern in interpreting the high prevalence rates of CRF (Lawrence, Kupelnick, Miller, Devine & Lau, 2004). Currently, a majority of investigators refer to some variant of the definition proposed by the National Comprehensive Cancer Network (NCCN), which explains CRF as “an unusual, persistent, subjective sense of tiredness related to cancer or cancer treatment that interferes with usual functioning” (Mock, 2001). Despite the fact that the inherently subjective and multifaceted nature of CRF has been highlighted by this definition, it overlooks two important components that are specifically connected with CRF as compared with fatigue in healthy individuals: (a) CRF is not automatically alleviated by rest and sleep; and (b) The symptoms are disproportionate to the person’s level of actual physical exertion (Jean-Pierre, Figueroa-Moseley, Kohli, Fiscella, Palesh & Morrow, 2007).

The escalating number of self-report quantitative measures, designed to assess both uni-dimensional and multi-dimensional components of fatigue, reflect the lack of consensus regarding the definition of CRF (Jean-Pierre et al., 2007; Wu & McSweeney, 2001). Fatigue is one of the most regularly predictable adverse effects of cancer treatment; we have shown that 95% of patients, scheduled to receive chemotherapy or radiotherapy, expect to experience some degree of fatigue during
their treatment (Hofman, Morrow, Roscoe et al., 2004). Side effects of treatment expected by patients programmed to get chemotherapy or radiotherapy. Based on data from Hofman, Morrow, Roscoe et al. (2004) the expectations of cancer patients undergoing treatment-related side effects (Figure 3).

![Figure 3. Chemotherapy and Radiation-therapy side effect](image)

**Fatigue Theories**

Quite a few fatigue theories such as Aistairs’ organizing framework (1987), Piper, Dibble and Dodd’s integrated fatigue model (1987), Irvine, Vincent, Graydon, Bubela, and Thompson’s energy analysis model (1994), Lee, Hicks and Nino-Murcia’s fatigue and women’s health model (1994), and Winningham’s psychobiological entropy model (1996) have triggered the conceptualization of energy and fatigue. Ream and Richardson (1999) summarize these models practice-oriented and they have rated the theories as being limited in their predictive capacity (Ostrop, Hallett, & Gill, 2000), but tentative guidelines for clinical practice and directions for research (Ream & Richardson, 1999) would be offered by them. In spite of criticism by Ream and Richardson (1999), Piper’s integrated fatigue model presents a theoretical structure and a authenticated measurement tool that has been built up for use in breast cancer patients and that has been applied to various patient populations (cancer, end-stage renal disease, HIV, post polio syndrome), which augments its credibility to be used as a framework for fatigue research across a broad
spectrum of diseases (Cella, Davis, Breitbart & Curt, 2001; Cho & Tsay, 2004; Strohschein, Kelly, Clarke, Westbury, Shuaib & Chan, 2003; Trask, Paterson, Esper, Pau & Redman, 2004).

- **The Integrated Fatigue Model (Piper, 1987)**

  This model was developed by a team of nurse-scientists led by Piper (1987) deductively from a review of the literature on cancer fatigue (Piper, 1998). Describing 14 biological and psychosocial patterns that influence signs and symptoms of fatigue in clinical populations, specifically women with breast cancer, this model is a comprehensive framework. The wide range of contributing factors to be interrelated to each other was understood by the developers. These factors lead to chronic fatigue-experiences for cancer patients. Sufficient sleep or rest cannot resolve fatigue. Fatigue is considered acute when experienced for less than a month and chronic when experienced for more than one month (Piper, 1993). The theoretical link between fatigue and energy substrates is supported by Progressive wasting, weight loss, and altered nutrition, elevated total globulin levels (total protein minus albumin) (Darko & McCutchan, 1992), and increased resting energy metabolism. Empirical outcomes about dwindling motor functioning (Perkins, Sexton, DiMarco, Grobe, Scierka & Stiller, 1995) hold up the theoretical relationship between fatigue and activity/rest patterns. The theoretical relationship between fatigue and altered sleep/wake patterns is sustained by insomnia and sleep patterns (Lee, Portillo & Miramontes, 2001)

- **Potential Tumour-Related Causes of CRF**

  The first signal that causes people to seek medical care is the cycle of unusual tiredness. In patients with newly diagnosed cancer, especially patients with renal or small cell lung cancer who develop paraneoplastic syndrome, we can observe significant fatigue. Patients with advanced-stage cancer may suffer from even more upsetting CRF. Various organs systems are affected by progressive cancer and this process of affecting organs causes neurophysiologic changes in skeletal muscles. Abnormal production of certain substances (eg, inflammatory cytokines) (Kurzrock, 2001; National Comprehensive Cancer Network, 2007) possibly will slow down metabolism or standard muscle tasks. Dwindled accessibility of metabolic substrates
in patients with cancer can also be involved (Shaw & Wolfe, 1987). For example, CRF is one of the main symptoms of cachexia, and it presents in approximately 50% of patients with cancer and is characterized by loss of body mass and skeletal muscle that cannot be explained solely by decreased food intake. Increased levels of certain inflammatory cytokines, including interleukins and tumor necrosis factor have been associated with Cachexia, and may also be related to abnormalities in energy metabolism (Gutstein, 2001; Stasi, Abriani, Beccaglia, Terzoli, Amadori & 2003; Tisdale, 2003).

- **Potential Treatment-Related Causes of CRF**

  1. **Surgery**

     After any major surgery, fatigue is common and it interrupts recuperation (Rubin, Cleare & Hotopf, 2004). Fatigue is generally attributed to the physiological response to surgery. Immediately after curative surgery, postoperative fatigue has been reported in many cases (Salmon & Hall, 1997; Galloway & Graydon, 1996) and may be related to such factors as having received anesthesia, type of analgesia, decreased ventilatory capacity, immobilization, infection, or anxiety (Smets, Garssen, Schuster-Uitterhoeve & deHaes, 1993). Only during early times after surgery have the mechanisms of postoperative fatigue been scrutinized. Salmon and Hall, in a study of patients who underwent hip arthroplasty, established that the severity of postoperative fatigue was predicted not by physiological changes but by the preoperative level of fatigue (Salmon & Hall, 1997). In contrast, Rubin and colleagues have proposed that psychological procedures are pertinent in the etiology of postoperative fatigue (Rubin, Cleare & Hotopf, 2004).

  2. **Chemotherapy**

     Induced by chemotherapy, nausea, diarrhea, and vomiting can influence CRF symptoms (Gutstein, 2001). Chemotherapy-related fatigue may also be associated with anemia or with accumulation of end products from cell destruction (Stasi, Abriani, Beccaglia, Terzoli & Amadori, 2003). The correlation between anemia and fatigue has been supported by the available evidence (Smets et al., 1993; Turner, Anglin, Burkes, Couture, Evans, Goss et al., 2001). Chemotherapy drugs that cross
the blood-brain difficulty may stimulate neurotoxicities that produce fatigue (Smets et al., 1993). Fluctuations are experienced by most patients during high-dose chemotherapy paired with stem cell transplantation, with fatigue increasing as the patients’ blood counts approach white blood cell nadir but improving as counts recover (Anderson, Giralt, Mendoza, Brown, Neumann & Mobley, 2007). In patients with breast cancer, the relationship of fatigue and chemotherapy has been comprehensively studied (Greene, Nail, Fieler, Dudgeon & Jones, 1994; Jacobsen, Donovan, Vadaparampil & Small, 2007). Even existing anemia and fatigue can be worsened by chemotherapy and radiotherapy (Morrow, Andrews, Hickok, Roscoe & Matteson, 2004).

3. Radiotherapy

The most severe symptom experienced by patients during radiation therapy, can be fatigue may be (Wang, Fairclough, Liao, Komaki, Chang, Mobley et al., 2006). Healing with radiation can lead to anemia, diarrhea, weight loss, anorexia, and chronic pain, any of which can influence fatigue severity. For instance, in a longitudinal study of patients with colorectal cancer, getting chemo-radiation, the rigorousness of pain before treatment and the harshness of diarrhea during treatment predicted the development of severe fatigue (Wang et al., 2001). Patients getting radiation therapy may experience a gradual deepening of fatigue with ongoing treatment (Curt, 2000; Wang, Janjan, Guo, Johnson, Engstrom, Crane et al., 2001). A known risk factor for persistent fatigue is called combined modality therapy (e.g. concurrent chemotherapy and radiation).

Sleep

From a scientific point of view, sleep has been described on the basis of both the behavior of the person while asleep and related physiological changes that occur to the waking brain’s electrical rhythms in sleep. The behavioral criteria comprises a lack of mobility or slight mobility, slow eye movements, characteristic specifies-specific sleeping posture, reduced response to external stimulation, increased reaction time, elevated arousal threshold, an impaired cognitive function and a reversible unconscious state (Chokroverty, 2009).
A significant aspect of maintaining the body’s circadian rhythm is sleep. Heart disease, diabetes, depression, falls, accidents, impaired cognition, and a poor quality of life can be the reasons of inadequate sleep. While normal aging changes interfere with the quality of sleep, other disease circumstances and medications used by older adults compromise patterns related with sleep. A comprehensive assessment of sleep quality and sleep patterns begins a nursing assessment of sleep. The nurse may be able to improve the sleep problem immediately with interventions or work with the health-care team to evaluate the sleep-issue in greater depth (Vena, 2004).

Such sleep-related problems as difficulty in falling asleep, frequent night-time wakening, waking too early in the morning, or excessive daytime sleeping, are reported by up to 72% of persons suffering from oncology disease (Davidson, 2002).

The restitution theories of sleep propose that the task of sleep is to repair and restore the brain and body. If this did not occur, the functioning of the brain and body would steadily break down. Within this general area, some important theoretical contributions have been made by two theories. Oswald (1980) suggests that diverse types of sleep are compulsory for restoring dissimilar biological functions. Rapid Eye Movement (REM) sleep is necessary for brain growth, repair and re-organization. At the time of the REM sleep, the patterns of brain activity change for permitting this to happen. Slow Wave Sleep (SWS) is necessary for bodily growth and repair. During SWS, growth hormone is let loose, and this process is important for protein synthesis.

Horne (1988) extends Oswald’s theory. Sleep is divided into core sleep (REM and SWS) and optional sleep as per this scholar. He recommends that brain restitution and repair take place at some stage in core sleep. Bodily restitution takes place at the stage of optional sleep, but can also take place at other times (e.g. during periods of relaxed wakefulness).

The sleep of cancer patients becomes frequently uneasy (Ancoli-Israel, Moore & Jones, 2001) yet sleep disorders and their health outcomes are frequently ignored in this population (Savard & Morin, 2001) Most of the literature studying sleep in cancer patients has focused on insomnia, particularly in breast cancer patients (Fiorentino, Ancoli-Israel, 2006) with a few studies investigating the prevalence of sleep-
disordered breathing (SDB) in head and neck cancer patients (Nesse, Hoekema, Stegenga et al., 2006). Systematic research on other sleep disorders is scarce in matters that are related to cancer patients. Understanding the relationship amid sleep disorders and cancer is noteworthy as the physical and psychological correlates of poor sleep may interact with the patient’s cancer treatment, general well being, and quality of life. There are seven domains in sleep quality, namely: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medication, and daytime dysfunction over the last month (Taibi, 2011).

Number of 30% to 75% of newly diagnosed or recently treated cancer patients are influenced by sleep disturbances (Ancoli-Israel, Moore & Jones, 2001). A rate that has been reported as double that of the general population (Berger, Parker, Young-McCaughan et al., 2005). Reviews have suggested that complaints that are related to sleep amongst the patients of cancer consisted of difficulty faced in falling asleep and difficulty faced in staying asleep, with frequent and prolonged nighttime awakenings. These complaints were reported by various patients; both before treatment (Cimprich, 1999) and during treatment (Engstrom, Strohl, Rose, Lewandowski & Stefanek, 1999). Moderate to severe sleep commotion were reported by a study comparing cancer patients with psychiatric patients and controls found that 62% of the cancer patients, whereas sleep disturbance was reported by 53% of depressed patients and only 30% of the volunteers (Anderson, Getto, Mendoza et al., 2003). Among advanced cancer patients, there are very limited numbers of studies that are meant for investigating sleep disturbances. That 72% of patients with advanced cancers reported sleep disturbances was the report of one of the studies. (Sela, Watanabe, Nekolaichuk, 2005). The most frequent grievances were trouble falling asleep (40%), difficulty staying asleep (63%), and not feeling relaxed in the morning (72%). Apart from it, 19% of the cancer patients reported that they were experiencing trouble in sleeping before their cancer-diagnosis. It is quite probable that sleep disturbance in cancer patients might be miscalculated. A telephone survey (Cimprich, 1999) in 150 lung or breast cancer patients in various stages of treatment, who were undergoing a variety of treatments, disclosed that 44% reported a sleep-problem in the previous month, but only approximately 17% communicated the problem to their doctors. A second group
of cancer patients was also surveyed by this study, and it was found that 45% reported a sleep-problem in the prior month, and of these 50% rated the sleep-problem as moderate, severe, or intolerable. There were varied sleep-complaints that were reported, with 90% of the patients complaining of awakening during the night, approximately 85% complaining of sleeping fewer hours than normal, 75% complaining of difficulty in getting back to sleep, and 39% reporting napping at unusual times, such as midmorning and mid-afternoon.

A survey (Davidson, MacLean, Brundage & Schulze, 1977) carried out in 1000 cancer patients with different types of cancer and at different treatment phases established that 31% reported insomnia, 28% reported excessive sleepiness, and 41% made complains related to restless legs. In this study, the occurrence of sleep problems varied; lung cancer patients had the highest or second-highest prevalence of sleep problems in general, whereas breast cancer patients had a high incidence of insomnia and fatigue. Another survey established that the amount of insomnia in cancer patients was as high as the amount of insomnia in depressed patients (Holland & Plumb, 1977).

In one more study (Savard, Simard, Blanchet et al., 2001) took note of the prevalence of insomnia in 300 women with breast cancer, and it was found by this survey that 19% met the diagnostic criteria for insomnia, with 95% of the cases being chronic insomnia. Apart from these statements, in 33% of the cases the onset of insomnia followed the breast cancer diagnosis, and 58% of the patients reported that cancer either caused or aggravated their sleep problems.

Theories and Models of Sleep

- **Bio-behavioural model of altered deregulation in circadian systems**

  Mechanisms that contribute to sleep-wake disturbances manifested as circadian dysregulation has proposed the Bio-behavioral Model of Altered dysregulation in circadian systems. It has been assumed by the model that psychological functioning (stress, depression, mood states) has direct-reciprocal relationships with the endocrine system, autonomic nervous system, and sleep system. We can be attributing dysregulation to one or more of these biological arrangements.
Sleep-duration and sleep-quality, as well as by cortisol, melatonin, and autonomic nervous system activity can measure dysregulation. Poor quality of life, impaired well-being, poor treatment adherence, fatigue, disease progression, and poorer survival are the ultimate result of this dysregulation (Carlson, Campbell, Garland & Grossman, 2007).

- **Spielman’s three factor insomnia model**

  An interface in the midst of predisposing, precipitating, and perpetuating factors of insomnia has been suggested by Spielman’s Three-Factor Insomnia Model (Spielman, Caruso & Glovinsky, 1987). This cognitive-behavioral model is also identified as the 3P model. The model includes both stress and behavioral factors for enlightening the evolution of insomnia and for explaining how individual dissimilarities bring about initiation of acute disturbances in sleep that become chronic. It has been proposed by the model that people with insomnia have predisposing factors or traits that, when combined with life stress (precipitating factors), lead to chronic insomnia if there are maladaptive coping strategies (perpetuating factors) (Spielman, Nunes & Glovinsky, 1996). Conclusion can be heightened episodes of insomnia when a person with predisposing factors of insomnia experiences one or more precipitating factors (Spielman, Caruso & Glovinsky, 1987). Perpetuating factors are behaviors used to compensate for the loss of sleep.

- **Two-process model of sleep regulation**

  An understanding of the physiological mechanisms that drive sleep and wakefulness is provided by the two-process model of sleep regulation (Borbely, 1982). The model has altered during a period of time because researchers were able to pinpoint mechanisms or processes of sleep in connection with the two major sleep cycles of non-rapid eye movement and rapid eye movement sleep. Visually, the model is a wavelike structure that shows the association between two physiological processes of sleep regulation, process S and process C. The homeostatic process (process S) augments during the awake state (drives the need for sleep) and dwindles during sleep (decreases the need for sleep). The essential mechanism of sleep guideline is process S.
Process S elicits a compensatory increase in the duration and intensity of sleep in case there is a deficit of sleep. A sleepy feeling is produced during wakefulness; consequently it drives the need or desire to correct this deficit by falling asleep. The circadian procedure (process C) decides modifications of high and low sleep inclination that are free of prior sleeping-waking (the timing to sleep and wakefulness), which decides the onset and end of sleep (Borbely, 1982). A clocklike mechanism directs process C, and that mechanism is not related to prior levels of sleep or the wake-like process S. Process C is the mechanism that assists the body stay asleep. It is impelled by a pacemaker established in the brain called the hypothalamic suprachiasmatic nuclei, which works in combination with neurotransmitters that facilitate sleep and thermoregulatory processes. The interaction of process S and process C has been utilized to forecast the timing and period of sleep, structure of sleep, and changes in daytime wakefulness (Borbely, 1982).

- **Piper integrated fatigue model**

  In cancer patients, the Piper Integrated Fatigue Model has been used to examine fatigue in relation to sleep disturbances (Berger, VonEssen, Kuhn et al., 2003). The mid-range-nursing model by Piper, Lindsey & Dodd (1987). In this model, one of numerous factors persuading fatigue is the sleep-wake proposes a variety of factors as influencing subjective and objective manifestations of fatigue. We can segregate Fatigue manifestations into physiological, biochemical, and behavioral components. Physiological muscle fatigue, changes in behavioral work activity, and/or symptoms of depression are included in these components, and they can happen in grouping, as fatigue becomes a constant difficulty. In this model, one of numerous factors persuading fatigue is the sleep-wake trouble (Piper, Lindsey & Dodd, 1987).

- **Psychobiological hot flash model**

  Disturbances connected with sleep as a product of menopausal hot flashes are shows by this model. This mode depicts relationships amongst physiological hot flashes, perceived hot flashes, and the reporting of hot flash severity and bother, and it suggests that hot flashes add to a possible cluster of symptoms that contain sleep-wake disturbances, mood disturbances, and changes in influence, which eventually
affect quality of life. This model was incorporated in one article (Carpenter, Neal, Payne, Kimmick & Storniolo, 2007).

- **Roy adaptation model**

  Assuming that human beings have the ability to adapt to changes in the environment, Adaptation Model is a complex model (Roy & Andrews, 1999). Adaptation or coping with environmental change happens by means of preserving 4 subsystems: a) physiologic needs, b) self-concept, c) interdependence, and d) role function. To guide health promotion and adaptation to illness is the goal of this model. The assumption of this model is that focal, contextual, or residual stimuli can be manipulated to promote adaptation based on stage of personal development, family development, and culture. Depending on the mode of adaptation the responses from adaptation can be effective or ineffective. It is considered that effective adaptation responses promote reliability of the human system (Roy & Andrews, 1999). Sleep can be conceptualized as a physiological mode of adaptation alone or in combination with other outcomes on the basis of this model (Young-McCaughan, Mays, Arzola et al., 2003).

- **Theory of unpleasant symptoms**

  To describe sleep as it interacts with other symptoms people have used the theory of Unpleasant Symptoms. The theory has 3 unified components: a) symptoms that the person experiences, b) influencing factors that cause or affect the nature of the symptoms, and c) consequences of the symptom experience. The main component of the model is symptoms, and these symptoms are measured in terms of intensity, quality, timing, and distress. The model posits that symptoms can occur alone or simultaneously with some symptoms, and this model further suggests that certain symptoms can catalyze other symptoms. Influencing factors are the physiological, psychological, and situational factors influenced by the symptoms. The third constituent is the consequence, defined as the impact of symptoms on an individual’s aptitude to carry out functional or cognitive actions. Functional performance contains such activities as physical, routine-living, social, interactive, and role performance (eg, work) actions. The contact amongst the chief notions of symptoms, influencing
factors, and consequences is reciprocal, and the contact can get altered as the symptom experience changes. It is suggested by this that symptoms can moderate or mediate the relationship between influencing features and performance. In this model, sleep-wake disturbances can be one of many symptoms or an influencing factor affecting other symptoms (Lenz, Pugh, Milligan, Gift & Suppe, 1997).

**Affect**

Affect is the word initiated by psychologists for explaining behavior that is the observable depiction of emotion. “What we see when someone expresses a state of feeling (emotion) is what we can call the affect. Emotions are personal and are for that reason calculated by observing affect. One of the ways in which positive and negative emotional states have been conceptualized has been in terms of positive and negative affect” (Watson & Clark, 1984).

Batson, Shaw and Oleson (1992) noted: "most often, the expressions affect, mood, and emotion are used interchangeably, without any effort at conceptual differentiation".

The term of core affect has been explained as a "neurophysiological state consciously available as a simple primitive non-reflective feeling most evident in mood and emotion but always obtainable to consciousness" (Russell & Feldman Barrett, 2009, p. 104). Examples of core affect contain pleasure and displeasure, tension and relaxation, energy and tiredness. A person feels core affect constantly, despite the fact that the nature and intensity of affect differ over a period of time. Co-influence can be a constituent of emotions and moods, but it can also happen in pure, or isolate, form. For instance, as per Russell (2003): "Pride can be thought of as feeling good about oneself. The 'feeling good' is core affect and the 'about oneself' is an additional (cognitive) component" (p. 145). As clarified in the following words, this qualifies pride as an emotion. Watson (1994) differentiated positive affect as “reflecting the degree to which a person senses wholehearted, active, and alert. Someone with high positive affect is in a state of high energy, full concentration, and congenial engagement, as contrasted with a low state of positive affect, which is characterized by sadness and lethargy”(Watson & Clarck, 1994).
In contrast, negative influence is a “general dimension of subjective anguish and un-pleasurable engagement that subsumes a variety of aversive mood-states. Persons suffering from low negative affect are regarded as being in a state of calmness and serenity while high negative affect mirrors conditions of distress and emotional pain. This distinction has been supported by health congruence studies, which find a protective effect of optimism (positive affect) and lower depressive levels and higher pessimism (negative affect) with poorer well-designed status and higher levels of depression” (Hong, Zarit & Malmberg, 2004).

As calculated by the Bradburn affect balance scale, genetic and environmental etiologies of positive and negative affect were studied for obtaining the understanding of a two-factor theory of wellbeing. The theory was that negative affect would demonstrate noteworthy genetic and environmental variance and positive affect would be explained primarily by environmental influences (Baker, 1992).

Performance on many cognitive tasks is influenced by positive affect systematically. A new neuropsychological theory is proposed that accounts for quite a few of these effects by presuming that positive affect is lined with increased brain dopamine intensity. The theory predicts or accounts for influences of positive affect on olfaction, the consolidation of long-term (i.e., episodic) memories, working memory, and creative problem solving. For instance, the theory supposes that original trouble solving is improved, in part; owing to increased dopamine release in the anterior cingulated improves cognitive flexibility and assists the selection of cognitive perspective (Ashby, 1999).

Affect is the experience of feeling or emotion. Affect is a key part of the process of an organism's contact with stimuli. The word also is related sometimes to affect display, which is "a facial, vocal, or gestural behavior that serves as an indicator of affect" (APA, 2006).

Affect has been observed in many cultures to include both positive and negative dimensions. "Affect" can mean an instinctual reaction to stimulation occurring before the typical cognitive processes considered necessary for the formation of a more complex emotion. Zanjonc (1980) avers that this response to
stimuli is most important for human beings and that it is the leading reaction for lower organisms. He proposes that affective reactions can take place exclusive of widespread perceptual and cognitive encoding and can be made sooner and with greater confidence than cognitive judgments.

Positive affect mirrors the degree to which an individual senses energetic, enthusiastic, cheerful, active, and alive, and negative affect is shown as a condition of discontentment, not being joyful, or subjective distress, including such feelings as anger, hate, weariness, shame, fear, and irritation (Watson, Clark, & Tellegen, 1988). Persons possessing high positive affect have a tendency to be more social, energetic, and active, as well as inclination to join in social activities (Lyubomirsky, King & Diener, 2005). Nevertheless, individuals with high negative affect have the tendency to be in a continual state of distress or dissatisfaction under any circumstances. They formulate more self-observations, and they habitually dwell on their failures and shortcomings. They are focused on the negative aspects of themselves as well as the negative aspects of others and the world they live in (Watson & Pennebaker, 1989).

**Theories of Affect**

Several theorists (e.g., Lazarus, 1982) judge affect to be post-cognitive: elicited only after a certain amount of cognitive development of information has been consummated. In this view, such affective reactions as liking, disliking, evaluation, or the occurrence of pleasure or displeasure each result from a diverse prior cognitive process that makes a variety of content discriminations and identifies features, examines them to find value, and weighs them as per their involvements (Brewin, 1989). Some scholars (Lerner & Keltner, 2000) disagree that affect can be both pre and post-cognitive: initial emotional responses create thoughts, which create affect. In a further iteration, some scholars contend that affect is necessary for facilitating more rational modes of cognition (Damasio, 2000).

Researches illustrate that positive and negative affect are related to personality characteristics and body and mental health variables such as neuroticism, extroversion, depression, loneliness, self-esteem, and physical health (Finch, Baranik, Liu, & West, 2012). Positive and negative affect, which together constitutes the
affective domain of subjective well being, (Diener, Suh & Oishi, 1997) is also one of the pointers of happiness (subjective well-being) and psychological fine-tuning. When the negative relation between stress and subjective well being (Schiffrin & Nelson, 2010) is also considered, it is feasible to consider that positive and negative affect can mirror on stress which is another fine-tuning variable and the insight of social support as a source for coping with stress.

- **Neurophysiological theories (Cannon, 1927)**

  Define emotion in expressions of neurophysiology, centering on organic manifestations, biological accompanying feelings: changing respiratory rate, heart rate, increased levels of adrenaline, dopamine and other chemical mediators, etc. Physiological theories of emotion first were peripheral theory of emotion (James, 1890) and central physiological theory (Cannon, 1927).

  Peripheral theory disagrees that emotions origin is peripheral autonomic changes: "we are afraid because we run", "we are happy because we laugh". According to the theory of physiological, expression of emotion has an emotional self-regulation (feedback effect of expression). Additionally investigations on the neurophysiological substrate of emotions have valued the role of the limbic system in triggering emotional reactions. The chief constituents of the limbic system consist of: cingulate cortex previously, tonsillar nucleus and hypothalamus; in general, studies have turned to higher nervous activity (in terms of brain activation level) and the transformation actions of chemical mediators. Neurophysiological perspective, emotions are described in terms of endogenous and exogenous inputs to the nervous system. Receiving specialized cells senses changes in nerve stimulus energy. Receiving information from the structures of the analyzers (information on or impulse) moving inland for the thalamus, neocortex and amygdala. Some recent advances in the neurophysiology of the biological basis of emotions have revealed that the limbic system is not the only mechanism absorbed in activating emotions. While the significance of emotional stimuli, internal or external, is made out in the limbic system, the existing studies display the continuation of multiple neural pathways and specialized areas in processing emotional information.
Neurophysiological homeostatic mechanisms work; tend to balance, for the purpose of reducing energy and mental limits for maintaining constant (homeostasis). Tension is a normal state of living systems, a coordinated intrinsic human psyche, and a product of the interaction or conflict between contrary forces inherent in the relationship-life. Maintaining an most advantageous level of internal tension, the balance between the energy available and the person they consume, is the key to mental balance and emotional stability: an intensity too high or too low feelings of disturbing effects, dezorganizatoare on personality (Cannon, 1927).

- **Evolutionary theory of affect (Darwin, 1967)**

  Evolutionary perspective, emotions are interpreted as adaptive subsystems obtained from survival requirements or appearances of inherited programs, hereditary (genetic programming that predispose to certain kinds of emotional reactions). One of the first representatives of the theory of evolution and the scientific move towards emotion is Darwin (1967) that the basic discrete emotions are caused by genetic heritage; they are universal and adaptive function (manifested in all cultures). He identifies eight basic discrete emotions: a) Suffering; b) sadness or depression; c) joy; d) Malaise; e) hatred and anger; f) contempt and disgust; g) surprise, fear, and fear; h) shame.

  Of basic emotions, fear, emotion is considered fundamental, essential for survival, including the basal mechanism of preservation of the species. Fear, originally engrams in hazardous conditions for survival, is activated unconsciously in dealing with threatening stimuli or which would be a potential danger. Evolutionary approach, diversity and complexity of emotional experience is owing to their expansion, both in ontogenetic and phylogenetic line from simpler forms to more complex forms, developed and adaptive self-organized according to the goals of each species and body part.

- **Cognitive theories on emotions (Roseman, 1984)**

  This theory emphasizes the role of cognitive features and rational assessment of stimuli in the onset of emotions. Cognitive theorists emphasizes that cognitions are able to influence the dynamics of emotional experiencing, shaping it or changing it, depending on the person's adaptive goals. The cognitive interpretation of emotions is
called the concept of "cognitive representation", referring to the set of images and ideas that herald and trigger emotional processes. In terms of neurophysiology, "emotional experience" and the appropriate emotional response are the result of higher information progression in the cortex. Cognitive perspective, not the object (stimulus) in itself is significant, but rather how the person plays, rational meaning that it assigns (Roseman, 1984).

- **The theory of emotions (Frijda, 1987)**

  This theory lay stress of the function of situational forerunners of emotion and overall appraisal of the worth of the stimulus, when experiencing an exacting emotion, for the reasons of developing information at multiple levels: conscious/unconscious, sensory/cognitive/affective, etc.). By and large the emotional experience with regard to a stimulus is construed by Frijda (1987) as a succession of emotional episodes, running in high speed, in which affective and cognitive evaluations occur at the same time, the following:

  a) Situational antecedents of living (information on previous experience in relation to the stimulus, memory of past experiences,

  b) Stimulus attributes,

  c) The context in which the stimulus occurs,

  d) Concerns or timing purposes subject to emotional stimuli.

  Evaluation is carried out particularly in terms of "fit- mismatch" or degree of compatibility between living situation "here and now" (goals of the moment) and the common goals of the subject (in terms of significance to the numerous concerns of the body). The rationale of evaluation mechanisms consists in deciding a behavioral way of many possible variants actions.

- **The theory of discrete affects (Izard, 1991)**

  Discrete Emotions Theory, (Izard, 1991) conceptualize sentiments as systems with heterogeneous, highly individualized matters. According to Izard (1991), emotions function as a system as whole-different emotional elements, which interact, which persuade each other, but keep hold of their comparative autonomy inside the mutual conditioning. Consequently, a mixture is of such emotions as fear, anger, fear,
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experienced simultaneously, leading to a complex emotional experience that brings together different elements specific emotions, but which has a dominant emotional tone, given the emotion with the highest intensity. In the mutual acts, a few emotions are augmented, others ebb, and emotional behavior mirrors these active changes.

Izard (1991) explains emotion as a multifaceted system, distinguished by the interaction between neuro-hormonal components, expressive behavior and empirical (experiential). Emotions remain linked with one another and make contingent emotional patterns by means repetition is stable over a period of time. Emotional systems are formed as the person's emotional responses to specific situations are repeated over time, whereas the repetition, at the neurophysiological specific neural pathways, are created and fortified links between elements of emotional experience.

After Izard (1991), the emotions of the same sign (positive or negative) based on similarity, form couples, which are triggered at the same time. For instance, a positive emotion (joy) triggers other emotions of the same type (satisfaction, well being, optimism) and at nearby motivational triggers tend-purpose. Such a negative emotion as anger-emotions activates the same sign, disgust, contempt, and tends to avoid the destruction of its purpose. If the models are of discrete emotions plus a reasonable interpretation, the response sequences are enhanced by cognitive assessment, either positively or negatively.

- **Affective infusion model (Forgas, 1995)**

  Emotional evaluation may be harmonious with rational evaluation or, on the contrary, can disagree with. Based on the whole affective evaluation and extraction of the essential factors of subjective experiences (infusion), "infiltrating" the whole triggering retrieval systems (past experience stored in memory updates), influence attention mechanisms, volition, and decision (judgments, decisions, and behavior of employees).

- **The theory of affective primacy (Rogan & LeDoux, 1996)**

  This theory contends that emotions can prompt before the stimulus and rational assessments independently of them. Two main categories of arguments support Affective primacy theory: 1) Neurophysiological evidence showing the existence of specialized neural circuits directly causes emotional responses in the
amygdala, without the requirement for information processing in the cortex superior and 2) The results experimental research that subliminal stimuli were used.

Zajonc (1980) conducted a series of experiments in which subjects were exposed to subliminal stimuli and sowed the power of unconscious processes of information processing. Though unable to recognize subliminal stimuli, they were exposed to the experiment, and the participants reacted emotionally to sensory stimulation. Investigational data have shown the effects of subliminal stimulation on activating emotional responses. Emotional responses to stimuli have both a conscious determination (ego rational filtering mechanisms of information) and an unconscious: unconscious nature is regularly emotional and unconscious reactions to stimuli are extremely charged emotionally.

• **Affective events theory** *(Weiss & Cropanzano, 1996)*

The affective events theory disputes that emotions in organizations are caused by the intervention of workplace proceedings. No events conclude the strength of emotions, attitudes and behaviors at work, and especially the frequency of events. For instance, in spite of the fact that people are able to face negative circumstances at work, their resistance decreases due to the emergence of a series of negative events.

• **Narrow reinforcement model of emotion** *(Griffiths, 1997)*

Other perspectives regarding the way that affect persuades emotional development is permitted by a divergence from a narrow reinforcement model of emotion. Consequently, temperament, cognitive development, socialization patterns, and the idiosyncrasies of one's family or subculture can cooperate in non-linear ways. For instance, the disposition of an extremely reactive/low self-soothing infant may disproportionately affect the process of emotion regulation in the early months of life *(Griffiths, 1997)*.

In the study relating to social and psychological affective preferences (i.e., what people like or dislike) a number of trials have been accomplished. Precise research has been carried out on preferences, attitudes, impression formation, and decision-making. This research contrasts findings with recognition memory (old-new judgments), and permits allowing examiners the facility of showing dependable
distinctions between the two. Affect-based judgments and cognitive procedures have been checked with prominent differences indicated, and some contend that affect and cognition are under the charge of disconnected and partially independent systems that can sway each other in a number of ways (Zajonc, 1980).

Both affect and cognition may constitute self-governing foundations of effects within systems of information processing. Others propose that emotion is the outcome of a predictable, knowledgeable, or expected result of an adaptable transaction between organism and environment. Consequently, cognitive appraisal procedures are the keys to the growth and expression of an emotion (Lazarus, 1982).

- **Neuropsychological theory of positive affect (Ashby, Gregory, Isen & Turken, 1999)**

  The performance on many cognitive everyday jobs is persuaded by positive affect methodically. A new neuropsychological theory has been recommended that accounts for many of these effects by presuming that positive affect is linked with increased brain dopamine points. The theory foresees or accounts for controls of positive affect on olfaction, the consolidation of long-term (i.e., episodic) memories, working memory, and resourceful problem solving. For instance, the theory presupposes that creative problem-solving gets developed, in part, owing to enhanced dopamine release in the anterior, cingulate improves cognitive flexibility and makes possible the choice of cognitive perspective (Ashby et al., 1999).