Chapter Two
Review of Relevant Literature
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Though Psycho-oncology is a relatively emerging area in clinical psychology, there are a lot of concerns studied by psychologists on cancer patients in relation to different variables. In the present chapter it is attempted to capture how cancer is studied and understood in relation to anxiety, stress and biofeedback as variables.

Anxiety

According to Hopko, D. R., Hopko, S. D. & Lejuez, C. W. (2007), the terms “Anxiety”, “Stress”, “Fear”, and “Panic” often are used interchangeably. It is true that in many ways these terms are very similar. For example, all of these labels refer to very normal human experiences that can occur under given life situations or circumstances. Anxiety refers to apprehension that may come in the form of feeling tense or keyed up, physical change in the body, worrying and having a persistent but somewhat vague feeling of threat or discomfort.

Anxiety disorders take several forms. The anxious adjustment disorder is a quantitatively excessive response starting within 1 month of a stressful event. Generalized anxiety disorder (GAD) requires more symptoms than anxious adjustment disorder and persistence of symptoms over 6 months. Often the anxiety seen in these disorders is free floating, meaning that it occurs without a particular trigger or a crescendo pattern. In panic disorder, anxiety builds up to a rapid crescendo. Phobic anxiety only occurs in relation to a provoking stimulus, so anticipatory avoidance is common. Phobias may arise in relation to hospitals or treatments, or simple phobias of animals or social settings may predate the cancer (Stark, D. et al. 2002). One month prevalence for Generalized Anxiety Disorder (GAD) was 2.8%, and twelve months prevalence was 3.6% (Hunt, I. & Andrews, 2002). And lifetime prevalence rates of 5.7% were found by Kessler, R.C. et al. (2005).

Generally, anxiety is classified in two ways:

1. Acute anxiety: Lasting for a relatively short period of time, is characterized by an array of physical symptoms. Acute anxiety symptoms include rapid heartbeat,
elevated blood pressure, chest pain, shortness of breath, feelings of suffocation, sweating or chills, dizziness, trembling, and nausea. Sometimes this is called a "panic attack" because the obvious physical stress of the person enduring such an attack resembles the symptoms of panic.

2. **Chronic anxiety**: Chronic anxiety is marked by symptoms that linger on, sometimes for weeks or longer, including excessive, constant worrying, tension, insomnia, irritability, fatigue, difficulty concentrating and inability to make decisions (National Coalition for Cancer Survivorship, 2007).

Anxiety may also be known as uneasiness, nervousness, worry, or fear.

- Anxiety is a disturbing feeling or sensation often experienced when facing overwhelming stress & uncertainty.
- Anxiety can involve fear of the unknown (not knowing what to expect) or fear of the known (knowing what to expect).
- Anxiety is experienced at some time by all human beings, but the cause is very different for each person.
- Anxiety can be mild, moderate, or severe. Severe anxiety cause physical effects such as nausea, diarrhea, irritable bowel, and may even affect immune system (lowering resistance to illness). Severe anxiety may also have an effect ability to think clearly, job performance, relationships, & daily activities (Berg, D. 2001).

Common somatic symptoms of generalized anxiety disorder include: Muscular, Back and neck pain, Gastrointestinal, Upset stomach, Nausea, Heartburn, Belching, Flatulence, Diarrhea, Dry mouth, Abdominal pain, Cardiovascular, Shortness of breath, Tachycardia / Palpitations, and Chest pain. Other somatic symptoms include Fatigability, Perspiration, Frequent urination, Dizziness, Tension headaches, and Tremor. (Schulz, J., Gotto, J.G., & Rapaport, M.H. 2005). Furthermore, Gliatto, M.E. (2000) reported that symptoms and behaviors associated with generalized anxiety disorder include: Excessive physiologic arousal, Muscle tension, Irritability, Fatigue, Restlessness, Insomnia, Distorted cognitive processes, Poor concentration, Unrealistic assessment of problems, Worries, Poor coping strategies, Avoidance, Procrastination, and Poor problem-solving skills. Besides, Watson, D. & Pennebaker, J.W. (1989) reported that negative mood states such as anxiety and depression are related to physical complaints and headache.
Anxiety and cancer

Stark, D. et al. (2002) hold the view that anxiety symptoms are common in cancer patients. Anxiety has been defined as a reaction to a threat, and cancer is a very serious threat to a person's well-being and life itself. A person's initial response of anxiety and fear is part of a coping mechanism common to most of us: recognize the threat and react to the implications of that threat. Then, as time passes, we move forward into coping with the threat. For some people, the intensity level of anxiety about cancer may not subside, and it becomes the dominant emotion of life. If anxiety is great and continuing, it can interfere with the quality of life and ability to make sound decisions and interact with others in the life (Taylor, S.2004).

In an interesting study conducted by Friedman, L.C., Lehane, D., Webb, J.A., Weinberg, A.D. & Cooper, H.P. (1994) they have found that patients who reported more communication problems with friends or relatives reported more anxiety in medical situations. Alder, J. & Bitzer, J. (2003) have found an association between negative experience of all treatment phases, doctor-patient relationship, communication and impaired adjustment process reflected by high anxiety and depression scores and more problematic coping strategies. For most patients, cancer requires facing uncertainty, worries about cancer treatment effects, fear of cancer progression and death, guilt, and spiritual questioning (Mehnert, A. & Koch, U.2007).

Hopko, D. R., Hopko, S. D. & Lejuez, C. W. (2007) concluded that 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 cause nausea and vomiting, interfere with one’s ability to sleep, and interfere with the patient’s (and his or her caregiver’s) quality of life. If left untreated, severe anxiety may even shorten a patient’s life. Anxiety disorders in cancer patients include adjustment disorder, panic disorder, phobia, obsessive-compulsive disorder, post-traumatic stress disorder, generalized anxiety disorder, and anxiety disorder caused by other general medical conditions (Velikova, G., Selby, P.J. & Snaith P.R.1995). Oncology patients often experience anxiety, for example, while waiting to hear their diagnosis, before procedures, treatment and diagnostic tests, and while waiting for test results (Jenkins, P.L., May, V.E.& Hughes, L.E. 1991). It may be
difficult to distinguish between normal fears associated with cancer and abnormally severe fears that can be classified as an anxiety disorder (Hackett, T.P. & Cassem, N.H. 1987). For some patients, particularly those who have experienced episodes of intense anxiety before their cancer diagnosis, feelings of anxiety may become overwhelming and interfere with cancer treatment. Most patients who have not had an anxiety condition before their cancer diagnosis will not develop an anxiety disorder associated with cancer (Hopko, D. R., Hopko, S. D. & Lejuez, C. W. 2007).

Ramsden, E. & Taylor, L. J. (1988). Indicated to these physical and emotional symptoms of cancer-related anxiety as Expression of anxiety, Denial of obvious tension or anxiety, Uncontrolled worry, Difficulty solving problems and concentrating, Muscle tension, Trembling, Shaking, other signs of restlessness, Shortness of breath, Racing heart, Sweating, Dry mouth, Angry outbursts, and Irritability. But felt and seen by people with serious anxiety and those close to them is that extreme anxiety appears to almost possess the person experiencing it. The rest of the world fades away, and mind is caught up in what feels like an endlessly-repeating cycle of fear and worry, fear and worry, with no way to interrupt the spinning. They feel they cannot control thoughts, and their body responds to this extreme tension, tightening and constricting the lungs, muscles and stomach. Extreme anxiety is a prison of fear for body, mind and spirit (Kaptchuk, T.J. 1999).

Diagnosis of anxiety in the context of cancer and chronic pain is difficult for many reasons. There is an overlap of anxiety symptoms, cancer symptoms, and adverse effects of cancer treatment. Problems with concentration, fatigue, shortness of breath, sleep, and appetite are common and nonspecific. All can be caused by anxiety, and all can be worsened by anxiety. One must differentiate an acute anxiety reaction associated with pain from a more maladaptive anxiety reaction that may become chronic. Psychiatric symptoms in patients with severe pain must be considered a direct result of pain and must be treated before an accurate psychiatric assessment can be made (Bishop, S.R., & Warr, D. 2003; and Wilkie, D.J., & Keefe, F.J. 1991). Furthermore, the somatic symptoms of anxiety often overlap with symptoms related to underlying disease processes or treatment effects. The degree of disruption in a patient’s life often is the critical factor in distinguishing normal from maladaptive anxiety. Making an accurate diagnosis will help guide anxiety treatment and screening instruments can facilitate the recognition of those patients in need of further
assessment (Thielking, P.D.2003). In the study conducted by Pandey, T. (2002) it was found that the Construct of distress as evaluated by distress inventory for cancer may have a possible overlap with anxiety. An overall picture indicates that cancer & anxiety have been found to be related.

Mehnert, A. & Koch, U. (2007) explored anxiety and distress among cancer patients and reported that the most prevalent symptoms are changes in urination, sexual problems, difficulties getting around, pain, fatigue and sleep problems. Emotional problems such as nervousness, worries, fears and sadness are prevalent in at least 53% of patients. Patients with distress and anxiety are confronted with a higher number and a wider range of problems and experience significantly lower levels of quality of life.

Ciaramella, A. & Poli, P. (2001) concluded that cancer patients who are most anxious are also more likely to report feeling of sleep problems, symptoms of nausea and vomiting, poorer relationships, and decrease in the quality of life. Many risk factors that include medical illness such as cancer may increase the likelihood of developing emotional problems. Among people diagnosed with cancer, the first six months after being diagnosed appear to be a critical time period for determining whether or not an anxiety disorder develops (Hopko, D. R., Hopko, S. D. & Lejuez, C. W. 2007). Further, they also reported that general anxiety disorder may occur among cancer patients. For example, patients with supportive family and friends may come to develop fears that nobody will be willing or able to provide them with the care and support they need throughout their experience. Patients may worry excessively about being unable to pay for their treatment, even though they have adequate financial resources and insurance. They may worry that they’ll lose their job due to time spent in treatment and recovery. Following treatment, they may greatly fear their cancer will return or that a loved one may develop cancer.

Noyes, R.J., Holt, C., & Massie, M. (1998) reported that the demographic differences that predispose to anxiety disorders after life events in the general population become less relevant when a very severe stressor occurs, such as cancer. American Psychological Association (APA), states that drastic changes in lifestyle and the fear and anxiety that accompany a chronic, sometimes fatal, disease can
impact the emotional well being of the sturdiness of patients. Cancer or the treatments effect the functioning of the patients. Cancer patients undergoing chemotherapy encounter various side effects depending upon the chemotherapeutic agent chosen (Burish, T.G. & Lyles, J.N. 1981; Holland, J. C. 1977; Maule, & Perry, 1982; Morrow, G.R.. & Arseneau, J.C.1982; and Nesse, R.M.& Carli, T. 1980).

According to Hopko, D. R., Hopko, S. D. & Lejuez, C. W. (2007) person with cancer will find that their feeling of anxiety increase or decrease at different times. A patient may become more anxious as cancer spreads or treatment becomes more intense. The level of anxiety experienced by one person with cancer may differ from the anxiety experienced by another person. Likewise, intense anxiety associated with cancer treatment is more likely to occur in patients with a history of anxiety disorder and patients who are experiencing anxiety at time of diagnosis (Morrow, G.R. 1981).

Latimer, P.R. (1981) investigated the treatment of adult patients with vomiting disorders, and concluded that subgroup of adult vomited in response to unpleasant internal sensations such as nausea, pain, and anxiety associated with eating. Vomiting involves the avoidance of these internal sensations. Treatment generally involves the gradual exposure of these patients to the anxiety or fear producing stimuli. Anticipatory nausea and vomiting is thought to be the result of classical conditioning in which cancer patients associate various stimuli of the chemotherapy setting with chemotherapy induced nausea and vomiting (Kutz, I., Borysenko, J.Z., Come, S.E., Benson, H.1980; and Nesse, R.M., Carli, T. 1980). The chemotherapeutic agent is an unconditioned Stimulus. The chemotherapy induced nausea and vomiting are unconditioned responses. Environmental cues become associated with chemotherapy and become conditioned stimuli. Anticipatory nausea and vomiting become conditioned responses. The cancer patient then develops anticipatory nausea and vomiting when environmental cues associated with chemotherapy are presented. When chemotherapy is mentioned in connection with cancer, the term generates a lot of fear; almost everyone has heard horror stories about serious side effect. These side effects can be unpleasant (Malin, D., Andrew, H. & Ernest, H.R. 2002).
Cancer treatments themselves can be anxiety provoking and may contribute to the actual psychological morbidity of patients with cancer (Carey, M.P. & Burish, T.G. 1988). Likewise, Schag, C.A., & Heinrich, R.L. (1989) concluded that cancer treatments are associated with anxiety, but this is highly dependent on the specific circumstances. The prevalence of clinically-significant anxiety disorders among cancer patients is approximately 4% and consists of panic disorder, simple phobia, and generalized anxiety disorder. Cancer patients are also at high risk for cognitive impairment (Tope, D.M., Ahles, T.A. & Silberfarb, P.M.1998). High levels of anxiety were associated with psychological maladjustment, including hopelessness and helplessness in response to the diagnosis of cancer and low internal locus of control (Burgess, C., Morris, T. & Pettingale, K.W. 1988). Cancer patients with emotional suppression tend to adopt an attitude of fatalism and helplessness in relation to cancer. These responses toward cancer were, in turn, related to higher levels of depression and anxiety (Watson, M. et al. 1991). In the cancer treatment trajectory, anxiety tends to increase at nodal crisis points: initial diagnosis, initiation of cancer treatment, cancer recurrence, failure of treatment, and perception of dying (Miller, K. & Massie, M.J. 2006). Patients can describe ruminative worry and fear about the future (Massie, M.J. & Holland, J.C. 1992).

Andrykowski, M.A. & Cordova, M.J. (1998) concluded that state anxiety can play a causal role in the development of anticipatory nausea and vomiting (ANV) in some cancer patients. In particular, the hypothesis that state anxiety exacerbates post-treatment nausea and vomiting and thus increases the risk for ANV appears best supported by the data.

Rao, M. et al. (2008) reported that there was a positive correlation between states traits anxiety with cancer symptom severity and distress.

In another study by Dahlquist, L.M. (1993) it was found that marital distress was predicted by a combination of general emotional distress, the discrepancy between the couple's state anxiety levels, and the couple's use of sensitizing coping strategies. Greater differences in anxiety levels between the parents and greater stimulus approach coping activity in the marriage were associated with greater reported marital distress.
Likewise, Aro, A.R., de Koning, H.J., Absetz, P. & Schreck, M. (2001) concluded that comparisons of screeners and non-screeners have suggested that trait anxiety was significantly more pronounced among women who did not attend a screening in response to an invitation than among those who did.

Although other research has indicated no relation between screening behavior and trait anxiety (McCaul, K.D., Branstetter, A.D., O'Donnell, S.M., Jacobson, K. & Quinlan, K.B. 1998).

Furthermore, Allen, K. (1997) reported that experimental group which received additional cancer diagnosis information had lower scores in state anxiety, the intervention explained 43% of the variance in state anxiety. Study conducted by Kaezorowi, J.M. (1989) found a consistent inverse relationship between spiritual well-being and state-trait anxiety, regardless of influences of gender, age, marital status, diagnosis, group participation, and length of time since diagnosis. This supports the theory that persons with high levels of spiritual well-being have lower levels of anxiety.

In another Spielberger, C.D., Auerbach, S.M., Wadsworth, A.P., Dunn, T.M. & Taulbee, E.S. (1973) assessed the male surgical patients’ pre- and post-operative condition and found that the state anxiety significantly declined at the post-operative assessment for patients that had reported either low or high pre-treatment anxiety. In contrast, trait anxiety remained relatively stable for all patients from pre- to post-surgery. Thus, the level of pre-operative state anxiety was linearly related to post-operative adjustment.

Although Kendall, P.C., Finch, A.J., Auerbach, S.M., Hooke, J.F. & Mikulka, P.J. (1976) concluded that individuals with low levels of pre-treatment anxiety reported the lowest anxiety post-treatment and had the fewest complications, whereas patients with high levels of pre-treatment anxiety reported the highest anxiety and the most difficulties in the post-treatment.

Researchers concluded that levels of anxiety and depression at diagnosis could predict a similar status 6 months later (Nordin, K., Glimelius, B.1996).
Epidemiology of Anxiety

According to Schag, C.A., Heinrich, R.L. (1989) on the average, 44% of cancer patients reported some anxiety in medical situations; and 23% reported significant anxiety. Li, A. (2009) investigated the rate and epidemic characteristics of anxiety and depression of cancer patients and reported that the anxiety rate was 32.7%. The rate for anxiety and depression was 30.1%; and the ratio of depression accompanying with anxiety was 58.8%; the ratio of depression accompanying with sub-anxiety was 4.35%. Furthermore researcher concluded that psychological intervention is necessary for cancer patients, with comprehensive measures to improve life qualities and healing effects. Besides, Delgado-Guay, M., Parsons, H.A., Li, Z., Palmer, J.L., Bruera, E (2009) in their research reported that 44% of cancer patients had anxiety, 64% had depression, and in addition, patients with anxiety expressed higher frequency of nausea (57%). In another study Korfage, I J., Essink-Bot, M.L., Janssens, A. C. J.W., Schröder, F. H. & de Koning, H. J. (2006) reported that in pretreatment 28% of all patients were classified as ‘high-anxiety’; their average anxiety scores decreased significantly in the post-treatment phase. At all assessments, high-anxiety men treated by prostatectomy reported less depression than high-anxiety men treated by radiotherapy. Researchers recommend clinicians to attempt early detection of patients at risk of high levels of anxiety and depression after prostate cancer diagnosis since prevalence is high. Being diagnosed with prostate cancer leads to anxiety, but not to the same extent in every patient (Balderson, N. & Towell, T. 2003; Carlson, L.E. et al.2004; and Steginga, S.K., Occhipinti, S., Gardiner, R.A., Yaxley, J.& Heathcote, P. 2004). In another study by Sally, F., Thomas, Rob., Glynne, Jones., Ian, Chait., David, F. Marks.(2003) they have found that 75% of cancer patients were anxiety cases. The study conducted by Craig, W., Katherine, A. M. & Prathana, K. (2007) indicated that measure of cancer anxiety is sufficiently reliable and robust to be recommended for use in circumstances involving hazards associated with cancer. According Tope, D.M., Ahles, T.A.& Silberfarb, P.M. (1998) the prevalence of clinically-significant anxiety disorders among cancer patients is approximately 4% and consists of panic disorder, simple phobia, and generalized anxiety disorder. Furthermore, Utne, I., Miaskowski, C., Bjordal, K., Paul, S.M., Rustoen, T. (2010) concluded that 44% of the cancer patients had both anxiety and depression. Almost half of cancer patients reported sufficient anxiety by questionnaire for a diagnosis of anxiety disorder to be considered. When validated with semi-structured interviews and standardized ICD-10 diagnoses, 70% of this anxiety did not meet criteria for anxiety disorder. Sometimes the number of symptoms was insufficient, but also disruption caused by the anxiety frequently distinguished normal
anxiety from anxiety disorder. This may be due to the features of the questionnaires (Stark, D. et al. 2002). Measure of cancer anxiety is sufficiently reliable and robust to be recommended for use in circumstances involving hazards associated with cancer (Craig, W., Katherine, A. M. & Prathana, K. 2007).

Stark, D. et al. (2002) explored the Anxiety Disorders in Cancer Patients and reported that 48% of subjects showed sufficient anxiety for anxiety disorder. At subsequent diagnostic interview, 18% fulfilled International Classification of Disorders, 10th Revision criteria for anxiety disorder, including 6% of patients who reported low levels of anxiety by questionnaire. Researchers added that panic disorder was present in 16 subjects, GAD in 15, and phobia in 24, which indicates the considerable overlap. When subjects reported anxiety by questionnaire, if disruptive somatic anxiety was present, this increased the probability of diagnosable anxiety disorder from .31 to .7. Anxiety disorder was independently associated with a deficit in quality of life (QOL), particularly insomnia. Researchers added that screening by questionnaire seems to assess anxiety symptoms adequately but discriminates abnormal anxiety inadequately. To improve this, we may need to use criteria such as disruption from anxiety, as illustrated by the impact of anxiety disorders on QOL. There seem to be few oncologic variables that could target screening for anxiety disorders. Likewise, Utne, I., Miaskowski, C., Bjordal, K., Paul, S.M., Rustoen, T. (2010) reported that among four mood groups (Anxiety, Stress, Both and neither of cancer patients, significant differences were found in scores between the patients in the neither group and the both (Anxiety and Depression) group. In addition, patients with both mood disorders reported significantly poorer QOL scores. They concluded that because 44% of the patients had both anxiety and depression, clinicians need to evaluate patients for the co-occurrence of these two symptoms, evaluate its impact on pain management, hope, and QOL and develop appropriate interventions to manage these symptoms.

Research indicates that between 25 and 50% of people diagnosed with cancer will develop an anxiety disorder in the first six months following diagnosed. The anxiety disorders, PTSD and generalized anxiety disorder seem most likely to emerge during this period (Hopko, D. R., Hopko, S. D. & Lejuez, C. W. 2007). Besides, Mehnert, A. & Koch, U. (2007) concluded that a growing body of research points
towards a substantial number of prostate cancer patients experiencing distress and anxiety. They resulted that 88% of patients report cancer or treatment related problems with a mean of 5 problems, and 53% of patients experience distress and/or prostate cancer related anxiety. Research findings emphasize the role of cancer rehabilitation and underline the importance of psychosocial screening measures and the provision of psychosocial support in prostate cancer patients. Likewise, among cancer patients who had received at least four cycles of chemotherapy treatments, 41% reported at least mild anticipatory nausea (AN). For 24% this was a moderate to severe problem, which was significantly associated with a high level of anxiety treatment (Boakes, R.A., Tarrier, N., Barnes, B.W., Tattersall, M.H. 1993). In addition, researchers in their studies of gastrointestinal cancer patients have shown that overall 17% of gastrointestinal patients suffer from anxiety (Nordin, K., Glimelius, B. 1996). The study aimed at describing the percentage of cancer patients in mood groups, researchers have found that 32% of patients were categorized in neither group, 12% in the anxiety group, 12% in the depression group, and 44% of cancer patients in the both groups. (Utne, I., Miaskowski, C., Bjordal, K., Paul, S.M., Rustoen, T. 2010). The prevalence of psychiatric disorders in cancer patients varies greatly among studies ranging from 9% to 60 % (Aass, N., Fossa, S.D., Dahl, A.A.& Moe, T.J.1997; Montazeri, A., Milroy, R., Hole, D., McEwen, J. & Gillis, C.R..1998). Researchers demonstrated that psychiatric disorders occur to lesser extent in patients who are not aware of their cancer diagnosis. The researchers concluded that these patients had a more hopeful outlook to the outcome of treatment (Chandra, P.S., Chaturvedi, S.K. & Kumar, A. 1998). Furthermore, Barbara, L., Anderson,J.K., Kiecolt,G.R.G. (1984) concluded that internal radiation therapy can produce significant anxiety, physiological arousal, discomfort, and fatigue for cancer patients, in contrast to the decline in anxiety that non cancer medical patients report at the conclusion of a diagnostic procedure or during recovery, but cancer patients report continued or even increased anxiety. Finally, individual differences among cancer patients in their level of pre-treatment anxiety may influence subsequent outcomes, and interact with an individual’s experience with the medical stressor.

Seitz, D.C. et al.(2010) reported that a total of 22.4% of the survivors reported clinically relevant symptoms of posttraumatic stress, anxiety and/or depression compared to 14.0% of the controls. Besides Aass, N., Fossa, S.D., Dahl, A.A.& Moe, T.J. (1997) reported that the prevalence of anxiety among cancer patients was 13% respectively, and the risk of psychiatric distress was approximately twice among
inpatients compare to the outpatient clinic. Impaired ability to continue professional work and/or daily life activities, impaired social life and previous psychiatric problems were significantly correlated with anxiety and depression as were impaired physical function. In another study purposes were to describe the percentage of cancer patients in mood groups, researchers resulted that younger patients were more likely to be in the anxiety and depression group (Utne, I., Miaskowski, C., Bjordal, K., Paul, S.M., Rustoen, T.2010). Furthermore, Seitz, D.C. et al. (2010) concluded that survivors of cancer during adolescence show an elevated risk of presenting symptoms of posttraumatic stress, anxiety and/or depression during adulthood which is also reflected in a greater number of DSM-IV diagnoses when compared to controls. Nordin, K. & Glimelius, B. (1996) reported that cancer patients’ anxiety and depression close to the diagnosis were found to explain approximately 35% of the variance in anxiety and depression that was found 6 months later too. The addition of coping and subjective distress measures did little to improve that prediction. Furthermore, Payne, S.A.(1992) concluded that anxiety and depression accounted for most of the variance in quality of life. Cancer patients who died during the study 13 (24%) experienced considerable psychological and physical morbidity. Seiegel, D. (1995) concluded that anxiety and depression are very common (and treatable) problems among cancer patients. Among cancer patients who had received at least four cycles of chemotherapy treatments, 41% reported at least mild anticipatory nausea (AN). For 24% this was a moderate to severe problem, which was significantly associated with a high level of anxiety about treatment( Boakes, R.A., Tarrier, N., Barnes, B.W., Tattersall, M.H.1993).

Anxiety and Sex differences:

Females are twice as likely to develop GAD compared to males. The possible explanations for this discrepancy include hormonal differences, cultural pressures and a higher rate of reporting anxiety (Catherine, N. D. & Lisa A. R.2005). High proportion of women in a general population, approximately one out of three, has anxiety about breast cancer. Breast cancer anxiety among women who were invited to the mammographic screening can be compared with that of women who were not invited. Women who were anxious before the screening were more likely to remain so. Discouragingly, perceived adequate information does not seem to prevent anxiety about breast cancer among those who had to go through a workup examination. Additional measures need to be found to minimize this negative effect of the
screening (Gram, I.T., & Slenker, S.E. 1992). According to Schag, C.A., Heinrich, R.L. (1989) Females were more likely to report anxiety and with greater intensity than males in situations such as watching other patients receive treatments, waiting to see the doctor, waiting to find out the results of tests going to the hospital, and receiving chemotherapy. Likewise Aass, N., Fossa, S.D., Dahl, A.A. & Moe, T.J. (1997) concluded that female cancer patients reported significantly more anxiety than men. Stark, D. et al. (2002) have found that female with negative aspects of social support were found to be significantly associated factors of anxiety. The study conducted by MacFarlane, M. E., & Sony, S. D. (1992) indicated that anxiety levels of women after the discovery of a breast lump and prior to knowledge of biopsy results were extremely high. In the study of Pandey, M. et al., (2006) female gender was found to influence depression. They also concluded that distress might overlap with anxiety. From the above studies, one can infer that the female patients in their cancer condition tend to show more anxiety.

Research findings indicate that the anxiety levels of women after the discovery of a breast lump and prior to the knowledge of biopsy results were extremely high. Age and time delay in contacting the physician had a statistically significant relationship on the participants' stress levels (MacFarlane, M. E., & Sony, S. D. 1992). Hall, A., AHern, R., Fallowfield, L. (1999) showed that the majority of women with early breast cancer experienced anxiety and/or depression within 3 months of their initial surgery. In addition, they identified anxiety disorder in 49.6% of women with breast cancer and depressive illness in 37.2% during the first 3 months after their initial surgery. Concerns have been raised that anxiety experienced as a result of increased breast cancer risk may cause women to avoid screening (Dean, C., Roberts, M.M., French, K. & Robinson, S. 1986). Among 22 individual with breast cancer patients (45%) of the recurrence group had current psychiatric illness (anxiety and depression) at the time of local recurrence, a similar prevalence to that described by others at mastectomy. The study purposes were to describe the percentage of cancer patients in mood groups, researchers found women patients were more likely to be in the both anxiety and depression groups (Utne, I., Miaskowski, C., Bjordal, K., Paul, S.M., Rustoen, T.2010).
While, Koopman C. et al. (2001) have interestingly found that gender had no specific influence on anxiety. Thus, analyses of the above research studies indicate a heavy concurrence to the statement that women are more prone to anxiety in comparison to men.

**Anxiety and Stages of cancer:**

There was a significant difference between first stage and advanced stage cancer patients in anxiety, somatic symptoms and depression. Furthermore, there was a negative significant relation between stage of cancer and mental health level of cancer patients (Kalantari, F. & Kumar, S.K.K. 2006). Morasso, G. et al. (2001) have found that the wide range in prevalence of anxiety and depression in breast cancer was due to the different stages of disease, the different time of evaluation, the different measurements, and the different population studied.

Brandberg, Y., Bolund, C., Sigurdardottir, V., Sjoden, P., & Sullivan, M. (1992) reported that 28% of patients with advanced melanoma were anxious to a clinically significant extent. Anxiety and depression varied across the course of the illness in that patients who had been diagnosed for less than three months displayed greater anxiety than those who had been diagnosed for longer periods of time (Cassileth, B.R. et al. 1984). Roth, A.J. & Massie, M.J. (2007) concluded that in advanced cancer, as patients enter the palliative phase of their illness, both physical and psychological burdens change. Anxiety commonly increases as patients become aware of both the relative ineffectiveness of medical treatments in halting the progress of their disease and consequently, their limited life expectancy. Anxious cancer patients facing death may often be plagued with recurrent unpleasant thoughts including fears of pain, of death and of dependency on others. In the palliative care setting it may not be easy to distinguish the somatic causes of anxiety from the psychological ones; in addition, anxiety may be a manifestation of either depression, delirium or another medical problem. In another study conducted by Rao, M. et al. (2008) researchers reported that there was a positive correlation between states traits anxiety with cancer symptom severity and distress in breast cancer patients of II and III stage, during conventional treatment intervals. In addition Delgado-Guay, M., Parsons, H.A., Li, Z., Palmer, J.L., Bruera, E. (2009) concluded that expression of physical symptoms may vary in frequency and intensity among advanced cancer
patients with anxiety and depression. Researchers reported that among a sample group of advanced cancer patients, 44% had anxiety, 64% of patients with depressive mood expressed had higher frequency of drowsiness, 66% patients had nausea, 94% pain, 91% worse appetite and 99% worse well-being. Furthermore patients with anxiety expressed higher frequency of nausea (57%) and pain (89%). Most individuals with cancer are fearful and sad. Symptoms of clinically significant anxiety often become more prominent with the realization that the disease no longer responds to curative treatment. As the disease progresses, worsening physical symptoms, fear of death, and fear associated with further deterioration of their condition may lead to a heightened sense of anxiety (Payne, D.K. & Massie, M. J. 2000).

**Organic anxiety**

When abnormal anxiety is clearly linked to an organic trigger, with whatever its features, it is called organic anxiety (Stark, D. *et al.*, 2002). Organic anxiety in cancer care can be caused by drug treatments including interferon (Trask, P.C., Esper, P., Riba, M. 2000). Any medication or other organic factors (e.g., involvement of the central nervous system; systemic factors such as anemia, abnormal glucose levels, or atrial fibrillation; endocrine factors such as thyroid, pituitary, and parathyroid abnormalities; medications such as corticosteroids and interferon-withdrawal syndromes; and substance abuse) producing an ongoing anxiety state must be identified (Bishop, S.R. & Warr, D. 2003; Wilkie, D.J. & Keefe, F.J. 1991). As with non-cancer pain, the relationship between pain catastrophizing and increased experience of pain and anxiety in cancer patients has been demonstrated. In addition, an enhanced sense of control over pain is associated with a reduction in cancer pain perception (Bishop, S.R. & Warr, D. 2003; Wilkie, D.J., & Keefe, F.J. 1991). Mood disturbances in cancer patients have been found to occur in tandem; for example, patients with anxiety also are likely to experience depression (Robinson, J., Boshier, M., Dansak, D., & Peterson, K. 1985). Anxiety sensitivity has to do with fear as a consequence of feeling the physical manifestations of anxiety. It is a trait that involves interpreting anxiety as having to do with an underlying danger or threat (e.g., cancer recurrence). In the research among 259 cancer patients with chronic pain, Asmundson, G.J.G., Coons, M.J., Taylor, S. & Katz, J. (2002) found that anxiety sensitivity led to an increase in pain avoidance behavior.
Anxiety and pain

The interaction between pain and anxiety in the setting of somatic illness is a widely recognized association. More accurate knowledge about the association and also about the means of assessing anxiety in a clinical setting is of use to the clinician. The relationship between pain and anxiety was found to be significant, even when the possible mediating effect of the variables of illness severity and age were removed (Velikova, G., Selby, P.J., Snaith, P.R., Kirby, P.G, 1995). Anxiety and pain can be understood with a multidimensional framework that accounts for somatic, emotional, cognitive, and behavioral aspects of these conditions. Patients who have cancer or treatment-related pain are more likely to be anxious than cancer patients without pain. The primary responsibility for the recognition of anxiety disorders in cancer patients remains with cancer care specialists. Cancer care clinicians remain poor at detecting their patients’ psychological problems (Fallowfield, L., Ratcliffe, D. & Jenkins, V., 2001). Patients with cancer pain and anxiety cause difficult diagnostic dilemmas because some degree of anxiety is a normal response to having a severe medical illness. Glover, J., deCharms, R.C. & Maeda, F. (1995) found that there is a relationship between pain and mood in oncology outpatients and that healthcare professionals need to assess for mood disturbances in this population and develop appropriate treatment strategies. Subjects who are highly fearful of pain exhibit a selective attentional bias toward pain-related stimuli compared with those with low fear of pain. Further, those with high anxiety sensitivity misinterpret innocuous body sensations as threatening (Keogh, E. & Cochrane, M. 2002). Anxiety in cancer patients with pain must first be regarded as a consequence of inadequate pain control (Breitbart, W. 1989). One of the challenges that may occur when assessing a patient with cancer pain is distinguishing pathologic anxiety from normal distress. Anxiety associated with cancer may increase feelings of pain (National Cancer Institute, 2006). Ciaramella, A. & Poli, P. (2001) concluded that cancer patients who are most anxious are also more likely to report feeling of pain. Selby, P.J., Snaith, P.R., Kirby, P.G. (1995) concluded that the relationship between pain and anxiety was significant, even when the possible mediating effect of the variables of illness severity and age were removed. The need for detecting anxiety in order to plan treatment strategy is emphasized. Likewise, Utne, I., Miaskowski, C., Bjordal, K., Paul, S.M., Rustoen, T. (2010) reported that among four mood groups (Anxiety, Stress, Both and Neither of cancer patients, only minimal differences were found on pain intensity scores, patients in the neither group in general, reported lower pain interference scores than those in the other three groups. Ciaramella, A. & Poli, P. (2001) reported that cancer patients
who are most anxious are also more likely to report feeling of pain. Besides, Delgado-Guay, M., Parsons, H.A., Li, Z., Palmer, J.L., Bruera, E. (2009) reported that among cancer patients, 44% had anxiety, and patients with anxiety expressed higher frequency pain (89%). Thielking, P.D. (2003) found that the relationship between pain and anxiety is complex and bidirectional, with interactions occurring on physiologic and psychological levels. Anxiety that is caused by pain or another medical condition, a specific type of tumor, or as a side effect of medication, is usually controlled by treating the underlying cause (Hackett, T.P. & Cassem, N. H.1987). Psychological assessment and intervention with psychopharmacological and psychotherapeutic modalities is an essential part of the comprehensive anxiety treatment approach to ongoing cancer pain (Ruth, H.S. (2009).

**Treatment for Anxiety**

There are a variety of psychopharmacologic, psychotherapeutic, and complementary / alternative treatments available for anxiety or anxiety along with pain among cancer patients. Cancer anxiety treatment depends on how the anxiety is affecting daily life for the patient (Hackett, T.P. & Cassem, N. H.1987).

According to Roth, A.J. & Breitbart, W.S. (1996) treatment for anxiety begins by giving the patient adequate information and support. Developing coping strategies such as the patient viewing his or her cancer from the perspective of a problem to be solved, obtaining enough information in order to fully understand his or her disease and treatment options, and utilizing available resources and support systems, can help to relieve anxiety.

Patients expressing high frequency and intensity of physical symptoms should be screened for mood disorders in order to provide treatment for these conditions. Furthermore, Bruns, D. & Disorbio, J.M. (2009) reported that there is a growing body of evidence that psychosocial variables have a significant ability to predict the outcome of medical treatment procedures. Some degree of anxiety is a normal response to having a severe illness, but some patients will have maladaptive or pathologic anxiety. These anxiety problems often respond well to treatment; therefore, it is important for the clinician to promptly recognize excessive anxiety and treat it appropriately (Thielking, P.D. 2003).
Ruth, H.S. (2009) concluded that along with adequate pain management, a multimodal approach to anxiety treatment is critical to achieving a return to function and improving quality of life. Seiegel, D. (1995) concluded that most of the cancer patients with anxiety and depression can benefit from intervention. Furthermore, Spiegel, D. & Giese-Davis, J. (2003) found that if anxiety left untreated, severe anxiety may even shorten a patient’s life. Most patients are able to reduce anxiety by learning more about their cancer and the treatment they can expect to receive (Hopko, D. R., Hopko, S. D. & Lejuez, C. W.2007). In advanced cancer, as patients enter the palliative phase of their illness, both physical and psychological burdens change.

The most effective management of anxiety often involves psychotherapy, behavioral therapy and pharmacological management (Roth, A.J., Massie, M.J. 2007). Likewise, Roth, A.J. & Breitbart, W.S. (1996) concluded that patients may benefit from treatment options for anxiety, including: psychotherapy, group therapy, family therapy, participating in self-help groups, hypnosis, and relaxation techniques such as guided imagery (a form of focused concentration on mental images to assist in stress management), or biofeedback. Medications may be used alone or in combination with these techniques. Patients should not avoid anxiety-relieving medications for fear of becoming addicted.

To some of the terms “Anxiety”, ”Stress”, ”Fear”, and “Panic” often are used interchangeably and in many ways these terms are very similar. Since anxiety is defined as a reaction to a threat, and cancer is a very serious threat to a person’s well-being and life itself, Anxiety symptoms are common in cancer patients. Evidences support that there is correlation between cancer and anxiety symptoms. It is also found by researchers that women are more prone to anxiety in comparison to men. Interestingly, pain is found to be related to anxiety. In order to handle anxiety among cancer patients, there are a variety of psychopharmacologic, psychotherapeutic, and complementary / alternative treatments including biofeedback techniques. Thus, patients can benefit from them.
Stress

Stress is a biological term which refers to the consequences of the failure of a human or animal body to respond appropriately to emotional or physical threats to the organism, whether actual or imagined (Selye, H. 1956). Stress is the physical, mental, or emotional tension caused by an event. When we feel this tension, we say we are feeling distressed or stressed out. Stress has been characterized as a situation in which the demands on an individual are appraised as taxing or exceeding their coping resources (Lazarus & Folkman, 1984). Psychological stress refers to the emotional and physiological reactions experienced when an individual confronts a situation in which the demands go beyond their coping resources. Examples of stressful situations are marital problems, death of a loved one, abuse, health problems, and financial crises (Venes, D. & Thomas, C. 2001). Increased psychological distress has been shown to correlate with disease progression and poorer health (Cohen, S. & Williamson, G. 1991).

To comprehend the physiology of stress, it is necessary to acquire an understanding of the autonomic nervous system (ANS) that controls basic, elementary body processes such as hormone balance, metabolism, body fluid regulation, vascular (blood vessel) activity, and reproduction. The hypothalamus, a small collection of nerve cells at the base of the brain, provides the link between the nervous system and the endocrine system, and regulates the activities of the ANS. Hypothalamus stimulation prepares the body for possible action by increasing the discharge of hormones, increasing the availability of energy, preparing the cardiovascular system by shifting blood flow to essential organs, and tensing the muscles. The impulses that originate from the ANS are carried throughout the body through two systems, the sympathetic and parasympathetic. The sympathetic system stimulates the adrenal glands causing them to secrete epinephrine (adrenaline) which, in turn, increases the activity of the organs that are needed for the fight or flight response, while inhibiting the organs that are not needed. The parasympathetic system also increases the activity of some organs, while inhibiting the action of others, but contrary to the action of the sympathetic system. It slows the action of the heart while expanding the blood vessels (Girdano. & Everly. 1986). Stress has a direct impact on the body's responses. Conceptually, stress response is intended as a short-term response resulting in an increased capacity to "fight" or "flee" a threat (Calderon, K. S. & Thompson, W. W. 2004).
The body responds to stress by releasing stress hormones, such as epinephrine (also called adrenaline) and cortisol (also called hydrocortisone). The body produces these stress hormones to help a person react to a situation with more speed and strength. Stress hormones increase blood pressure, heart rate and blood sugar levels. Small amounts of stress are believed to be beneficial, but chronic (persisting or progressing over a long period of time) high levels of stress are thought to be harmful. Stress that is chronic can increase the risk of obesity, heart disease, depression and various other illnesses. Stress also can lead to unhealthy behaviors, such as overeating, smoking, or abusing drugs or alcohol, that may affect cancer risk (Segerstrom, S. & Miller. G.2004).

Long-term stress is negative to an individual. It consists of increasingly higher levels of prolonged and uninterrupted periods of stress where the body cannot return to its homeostatic state. The results of long-term stress are a higher pulse rate and increased blood pressure, both of which are known to lead to heart disease. Other illnesses, which can be generated by stress, include gastric or duodenal ulcers (the stress ulcers), and various types of mental illnesses (Selye, 1974). The complex relationship between physical and psychological health is not well understood. However, it is not yet known whether stress increases a person’s susceptibility to disease (Segerstrom, S. & Miller. G. 2004).

**Stress and cancer:** There is a relationship between stress and cancer. This has been articulated by many researchers in different contexts. Barbara, L.,Anderson,J.K.& Kiecolt,G.R.G (1994) emphasized those psychological or behavioral effects of cancer treatments can be so disruptive that patients become discouraged and fail to complete, or even refuse treatment.

A cancer diagnosis and cancer treatments are objective, negative events. Although negative events do not always produce stress and an altered quality of life, data from many studies document severe emotional distress accompanying these cancer-related events. However, it is clear that lengthy cancer treatment and the disruptions in major life areas that sequentially occur can produce chronic stress (Barbara, L.,Anderson,J.K.& Kiecolt,G.R.G.1994).
The distress associated with the prospect of death can be conceptualized as arising from four dimensions, encompassing physical, social, psychological and existential problems & concerns (Corr, C. A., 1992). Every dying person is a complex and unique individual and consequently, while some of the needs or stressors facing the terminally ill cancer patient will be universal, others will be highly personal (Corr, C.A., Nabe.C.M. & Corr, D.M.1994).

Antoni, M.H. et al. (2006) in their studies have indicated that stress can affect tumor growth and spread, but the precise biological mechanisms underlying these effects are not well understood. Andersen, B.L., Farrar, W.B. & Golden-Kreutz, D. (1998) in their research indicates that the body’s release of stress hormones can affect cancer cell functions directly. Likewise, some studies have indicated an indirect relationship between stress and certain types of virus-related tumors (Garssen, B. 2004). Although Research conducted by Thaker, P.H., Han, L.Y., Kamat, A.A.(2006) using animal models indicated that the body’s release of stress hormones can affect cancer cell functions directly. Researchers added that a wide variety of stressors can alter the stress response. Likewise, Reiche, E.M., Nunes, SO. & Morimoto, H.K.(2004) in the research with animal models (animals with a disease that is similar to or the same as a disease in humans) suggested that the body’s neuroendocrine response (release of hormones into the blood in response to stimulation of the nervous system) can directly alter important processes in cells that help protect against the formation of cancer, such as DNA repair and the regulation of cell growth.

According to Pandey, T. (2002) stressors and stress responses may have very different ways of influencing physical illness, and do require very different types of measurement. Both stressors and stress responses may have relevance in cancer patients and have been related to cancer outcomes. Further, he has highlighted high psychological morbidity of cancer patients.

According to Antoni, M.H. et al. (2006) these stress responses can include the following as a response to Cancer situation:

a. Changes in thought patterns (cognitive appraisals)
b. Changes in emotional state (becoming more depressed or anxious)
c. Changes in typical work and home behaviors
d. Changes in physical sensations, increased tension levels
e. Changes in the ways in which patients relate to others around them
According to Barbara, L., Anderson, J.K., & Kiecolt, G.R.G. (1994) many chronic stressors (e.g., continued emotional distress, disrupted life tasks, social and interpersonal turmoil, and fatigue and low energy) can occur with cancer. They have considered the qualities of stressors that not only cause distress and a lowered quality of life, but that are also powerful enough to produce biological changes. Data suggest that stress sets into motion important biological effects, including those influencing the autonomic and endocrine systems.

Cancer survivors may respond to the psychological distress and uncertainty about the future by displaying post-traumatic stress disorder (PTSD)-like symptoms similar to those experienced by victims of war or environmental disasters (Henderson, P., 1997). About 5% to 8% of patients with advanced cancer choose to die by legal acts of euthanasia or physician-assisted suicide (Van der Mass, P.J., van Delden, J.J.M., Pijnenborg, L., & Looman, C.W.N., 1991). The study conducted by Lynne, P. et al. (2005) researchers has found the majority (87%) of participants in the study, consent and supported the idea of euthanasia.

A systematic review of 19 studies conducted by Zaza, C. & Baine, N. (2002) has found a strong degree of evidence supporting an association between pain and psychological distress in cancer patients. Likewise, Gold, J. et al. (2005) reported that there is significant association between the presence of PTSD and the degree of pain severity.

According to Lebel, S. et.al. (2003) using cognitive-avoidant coping strategies, being employed, history of previous biopsies and having a family history of breast cancer were associated with greater distress. The affective status of breast cancer patients who openly expressed negative emotions was not altered after the disclosure of the diagnosis, compared with before the diagnosis. Emotional distress was significantly increased in the patients who inhibited negative emotions, particularly those who inhibited anxiety after disclosure of the diagnosis (Iwamitsu, Y., Shimoda, K., Abe, H., Tani, T. & Okawa, M. 2003).
Primary treatment for cancer has been associated with psychosocial distress, among patients with advanced breast cancer or ovarian cancer. Payne, S.A. (1992) concluded that hospital administered chemotherapy was perceived to be most distressing and regression analysis indicated that anxiety and depression accounted for most of the variance in quality of life.

The diagnosis and treatment of breast cancer are stressful, and stress may be associated with a poorer response to chemotherapy. (Walker, L.G. et al. 1999). The increase of chemotherapy cycles is the sign of disease severity, and the disease severity is associated by increasing the degree of stress (Sheldon, Cohen, William, J. D. & David, P. S. 1999). Likewise, Barbara, L., Anderson, J.K. & Kiecolt, G.R.G. (1994) reported that stress (quality of life), health behaviors, and compliance are the major factors in adjustment to the cancer stressor. Likewise, Garssen, B. (2004) in a review of studies concluded that there is a link between various psychological factors and an increased risk of developing cancer. Furthermore, there is an association between certain psychological factors, such as feeling helpless or suppressing negative emotions, and the growth or spread of cancer, although this relationship was not consistently seen in all studies.

Antoni, M.H. et al. (2006) reported that in general, stronger relationships have been found between psychological factors and cancer growth and spread than between psychological factors and cancer development. Although in another study researchers concluded that there is a link between various psychological factors and an increased risk of developing cancer, a direct cause-and-effect relationship has not been proven (Dalton, S.O., Boesen, E.H., Ross, L., Schapiro, I.R. & Johansen, C. 2002).

Research in psychological adjustment in survivors of bone marrow transplantation (BMT), found that after controlling for physical functioning, stressor severity, and gender, global meaning was inversely related to global psychological distress and BMT-related psychological distress (i.e. posttraumatic stress disorder-like symptoms related to the cancer treatment). Global meaning was also positively related to mental health aspects of quality of life, for example emotional functioning and social functioning (Johnson, V.S.M. et al. 2001).
**Stress and life events:** Cancer does not occur in isolation. Cancer occurs within the context of other past or ongoing life stressors. The experience of undergoing cancer diagnosis and treatment has been associated with increased psychological distress. Most research in cancer patients has focused on stress related to cancer diagnosis and treatment while little attention has been paid to the effects of other stressful events in cancer samples (Golden-Kreutz, D.M. 2005).

Life events and accompanying psychological and behavioral reactions frequently have an impact upon people’s daily lives and are believed to predispose them to disease. There is a relation between the accumulation of life events during the 5 years before baseline assessment and an increased risk of breast cancer during 15 years of follow-up. Divorce/separation, death of a husband, and death of a close relative or friend—the individual life events of the greatest a priori interest—were each associated with increased risk (Kirsi, L. et al. 2002).

Few studies distinguish between different forms of stress including stressful life events, perceived stress, psychological distress and physiological stress responses. Most studies of psychosocial stress and cancer ignore crucial distinction between stressors (life events) and stress responses (perceived stress, psychological distress, and endocrine responses). It has been suggested that the diagnosis and treatment of cancer can be seen as an ‘objective negative event’ that entails extensive demands on the individual (Andersen, B.L., Anderson, B., deProsse, C. 1989). Research has supported the clinical finding that pre cancer mental disorders worsen cancer-related distress (Mehnert, A. & Koch, U. 2007).

Breast cancer patients who had experienced more stressful past life events as reported by checklist measures reported higher levels of cancer related psychological distress as evidenced by intrusive and avoidant thoughts (Spiegel, D. 2007). Several review study including review studies by Kiecolt-Glaser, J.K.& Glaser, R. (1988) have concluded that psychological distress and stressors (i.e., negative life events, both acute and chronic) are reliably associated with changes, that is, down regulation, in immunity. A cancer diagnosis and cancer treatments are objective, negative events. Although negative events do not always produce stress and an altered quality of life, data from many studies document severe emotional distress accompanying these cancer-related events (Barbara, L.,Anderson,J.K.& Kiecolt,G.R.G 1994).
The study conducted by Baider, L., Cooper, C.L. & Kaplan, De-Nour, A. (1996) indicated couples experiencing high psychological distress reported lower levels of perceived family support than couples in whom both spouses reported normal levels of psychological distress. The findings support the notion that perceived family support is associated with the psychological distress in both patients and spouses lead to medical consultation about benign breast cancer or even contribute development. The indication of severe depression was less common in the 33 patients (out of 75 patients) who turned out to have breast cancer, though more of them had minor depression and they reported fewer recent life events. Thus, life events do contribute.

**Prevalence of stress among cancer patients:** The prevalence of emotional distress is well documented in cancer populations (Carlson, L.E. *et al.*2004). The prevalence of emotional distress increases in frequency and severity with advancing stages of illness (Potash, M. & Breitbart, W. 2002). A review of studies of PTSD in cancer patients found that a prior history of trauma, low levels of social support, and prior history of a psychiatric disorder to be predictive of PTSD occurrence following cancer diagnosis and treatment (Smith, M.Y., Redd, W.H., Peyser, C. & Vogl, D.1999). Tests of the stress and coping model of Lazarus, R. & Folkman, S. (1984) suggest that those who view disease as more threatening or who have little confidence in their ability to handle illness-related problems are more likely to be distressed (Delongise, A., Folkman,S. & Lazarus, R. 1988).

Scores on the Profile of Mood States Scale indicated that these bone marrow transplantation (BMT) candidates were experiencing a high level of psychological distress. This distress was found to be predicted by low scores on the Self-Rated Karnofsky Performance Scale, on scales measuring mastery and dispositional optimism and (31%) of patients showed some degree of depression on the center for Epidemiologic Studies Depression Scale (Baker, F., Marcellus, D., Zabora, J., Polland, A. &Jodrey, D.1997). The psychological distress that patients with cancer experience has been found to encompass a range of mood disturbances, including fear, anxiety, and hopelessness (Coss, R., McGrath, P., & Caggiano, V. 1998).
According to Nina, S., Lauren, C. V., Susan, D. B., Baohui, Z., Holly, G. P. (2005), among cancer patients, overall, 12% met criteria for a major psychiatric condition and 28% had accessed a mental health intervention for a psychiatric illness since the cancer diagnosis. Seventeen percent had discussions with a mental health professional; mental health services were not accessed by 55% of patients with major psychiatric disorders. Further, psychological morbidity has been proposed as sources of distress in cancer patients and 90% of cancer patients were willing to receive treatment for emotional problems. They reported that advanced cancer patients experience major psychiatric disorders at prevalence similar to the general population, but affected individuals have a low rate of utilizing mental health services. Oncology providers can enhance utilization of mental health services, and potentially improve clinical outcomes, by discussing mental health concerns with their patients.

While, Annunziata, M.A., Muzzatti, B. & Bidoli, E. (2010) reported that the diagnosis of cancer marks an immediate passage from a condition of health to one characterized by uncertainty, threat of death, and changes. The psychological distress is recognized as a peculiar component in the process of disease adjustment and it seems to change over time together with needs. Researchers found that in the diagnostic phase, the prevalence of probable psychological morbidity due to anxiety was 23.5% and 14.1% due to depression. When the inpatients identified as possible cases were included, the respective proportions for anxiety and depression were 56.5% and 36.5%. Furthermore, progressing from diagnostic to therapeutic phase, anxiety seems to decrease, while no statistically significant difference has been found in depression levels. In both phases, the most frequently mentioned needs were the informative ones; although the decrement in time is significant only for this type of needs.

In their study, Hawkes, A.L., Hughes, K.L., Hutchison, S.D., Chambers, S.K. (2010) have reported that up to one-third of people affected by cancer experience ongoing psychological distress and would benefit from screening followed by an appropriate level of psychological intervention. 73% of participants met the Distress Thermometer cut-off for distress and optimal sensitivity (83%, 77%) and specificity (51%, 48%) were obtained. Distress was significantly associated with the Hospital Anxiety and Depression Scale scores (total, as well as anxiety and depression
subscales) and level of care in cancer patients, as well as with the Hospital Anxiety and Depression Scale anxiety subscale for caregivers. While, Mundy, E.A., Blanchard, E.B.& Cirenza, E.(2000) Concluded that high rates of stress response syndromes are reported by patients with cancer who exhibit low levels of depression and/or anxiety.

In another study researchers reported that posttraumatic symptoms ranging in frequency from 20% in patients with early-stage cancer (Green, B.L., Rowland, J.H., Krupnick, J.L. 1998) to 35% in patients after treatment (Mundy, E.A., Blanchard, E.B.& Cirenza, E.2000) and 80% in those with a recent recurrence of cancer (Cella, D.F., Mahon, S.M.& Donovan, M.I. 1990). In another study conducted by Bleiker, E.M.A., Pouwer, F., van der Ploeg, H.M. (2000) to assessed stress responses in patients with early-stage breast cancer 2 months and then again on average 21 months after surgery. Intrusive thought levels remained relatively stable across the 2 month and after average 21 months periods, with 16% of women reporting high levels of distress at both times and 31% reporting moderate levels. High levels of avoidance were reduced, from 15% at time (after 2 months) to 8% at time (after 21 months). Likewise moderate avoidance levels were reduced from 31% at time (after 2 months) to 25% at time (after 21 months). Tjemsland, L., Soreide, J.A., & Malt, U.F. (1998) concluded that stress responses exist among early stage breast cancer 1 day before surgery and again at 6 weeks and 1 year post surgery. Medium to high intrusion (81%) and avoidance (75%) scores were common at time 1. Symptoms were significantly reduced by 6 weeks post surgery, and a further diminishment occurred 1 year post surgery. The most important risk factors for stress responses 1 year after surgery were pre morbid health problems, high emotional reactivity, and high intrusion levels at 6 weeks.

In another study, Edwin, B. (1995) concluded that chemotherapy can produce severe, sometimes intolerable side effects. A particularly distressing and aversive side effect that develops in 25 to 32% of all chemotherapy patients is anticipatory nausea and vomiting (ANV). Morrow, G.R. & Morrell, C.(1994) reported that the nausea and vomiting experienced by one in four cancer patients in anticipation of chemotherapy is probably a learned response to treatment. Furthermore, distressed individuals often have appetite disturbances that are manifested by eating less often or eating meals of
lower nutritional value. In a survey of 800 cancer patients being cared for at home, 38% reported regular problems with a loss of appetite, which they reported as unrelated to other problems they were having such as nausea or vomiting (Wellisch, D.K., Wolcott, D.L., Pasnau, R.O., Fawzy, F.I., Landsverk, J. 1989).

**Stress and immune system:** According to Segerstrom, S. & Miller, G. (2004) Psychological stress can affect the immune system, the body’s defense against infection and disease (including cancer). Scientists have suggested that the effects of stress on the immune system may in turn affect the growth of some tumors (Antoni, M.H. et al. 2006). Evidence from both animal and human studies suggests that chronic stress weakens a person’s immune system, which in turn may affect the incidence of virus-associated cancers, such as Kaposi sarcoma and some lymphomas (Garssen, B. 2004). Levy, S.M., Herberman, R.B., Maluish, A.M., Schlein, B., Lippman, M. (1985) concluded that data from healthy, HIV-infected and cancer subjects indicate that the occurrence and magnitude of stress accompanying time-limited stressors or acutely stressful periods is correlated with at least certain aspects of immune down regulation. Second, chronic stressors are associated with continuing down regulation of immune responsiveness rather than adaptation. Herbert, T.B. & Cohen, S. (1993) concluded that greater immune alteration (e.g., lower natural killer [NK] cell activity) occurred with objective events.

Stress sets into motion important biological effect, including those influencing the autonomic, endocrine, and immune systems. Stress may be routed to the immune system by the central nervous system (CNS) by activation of the sympathetic nervous system (Felten, D.L., Felten, S.Y. 1991).

In their study of Resaved, (1993) have found Physiological stress responses may involve bodily system and the immune system. Because of both physical and psychological side effects, chemotherapy may be considered severe stressors. The immune system may be one of the more important biological determinants in the control of certain malignant diseases. There is considerable evidence for both the classical and natural immune responses in host resistance against progression and metastatic spread of tumors (Barbara, L., Anderson, J.K., & Kiecolt, G.R.G. 1994). Felten, D.L., Felten, S.Y. (1991) reported that stress may be routed to the immune
system by the central nervous system (CNS) by activation of the sympathetic nervous system (adrenergic nerves terminating in the lymphoid organs or through neuroendocrine-immune pathways (i.e., the release of hormones). A variety of hormones released under stress have been implicated in immune modulation including the catecholamines epinephrine and norepinephrine, which are secreted by the adrenal medulla; cortisol, which is secreted by the adrenal cortex; and growth hormone prolactin (Sabharwal, P. J. et al. 1992), and endogenous opioid peptides produced by the pituitary (Morley, J. E., Benton, D., Solomon, G. F. 1991), the adrenal medulla, the brain, or the immune system itself (Rabin, B. S., Cohen, S., Ganguli, R., Lysle, D. T. & Cunnick, J. E. 1989).

Barbara, L., Anderson, J. K., & Kiecolt, G. R. G. (1994) reported that data from healthy samples suggest that stress variables are predictive of immune down regulation, and accumulating data with cancer groups support the same general conclusion. Researchers added that stress sets into motion important biological effects, including those influencing the immune systems. Further, many review articles concluded that psychological distress and stress (i.e., negative life events, both acute and chronic) are reliably associated with changes that are down regulation in immunity.

Likewise, Levy, S. M., Herberman, R. B., Maluish, A. M., Schlein, B., & Lippman, M. (1985) have found that as expected, cancer subjects exhibited greater psychological distress compared to healthy subjects across all measures. A multivariate analysis of variance (MANOVA) for the quantitative immune measures revealed significant differences between white blood cell (WBC) and natural killer (NK), with follow-ups indicating increased WBC counts and decreased numbers of large unclassified (NK) cells between the cancer group and healthy group.

**Perceived stress and cancer:** Perceived stress refers to stress as the perception of events as taxing or exceeding one’s coping resources and may include feeling of being overwhelmed or pressured. Psychological distress on the other hand, is a function of how well someone is handling the perception of stress. Psychological distress may be indicated by affective disturbance such as depression, anger, anxiety or by PTSD symptoms. Individuals may feel stressed but report no distress. Taken to
extremes, this pattern of response is considered denial or repression (Giese, D.J. 2001). According to Gary, L.E. (1999) prostate cancer cases were twice as likely to have moderate and 60% more likely to have high levels of perceived stress than were controls. This study provides support for an association between psychosocial stress and prostate cancer. Perceived personal risk of a positive biopsy finding was overestimated in one half of the cases and was correlated with greater distress (Lebel, S. et al. 2003). Prostate cancer cases were twice as likely to have moderate and 60% more likely to have high levels of perceived stress than were controls (Gary, L.E. 1999).

Pitman, R.K., Lanes, D.M., Williston, S.K. (2001) have reported that patients with current cancer-related PTSD exhibited higher heart rate, skin conductance, and corrugators electromyogram responses when presented with imagery of their own cancer experiences.

**Stress and cancer stage or severity:** Severity and advancing stages of illness increase the emotional distress among patients (Potash, M. & Breitbart, W. 2002). Maria, G., Gerald, M. D., Gary, M. R. (2002) concluded that symptom incidence and severity was affected by many factors, including the type and stage of cancer, treatment severity, prior trauma, current and past social support, and the personality and coping style of the affected individuals. Besides, Andrykowski, M.A. & Cordova, M.J. (1998) have found that higher stress response frequency was associated with more advanced disease. Among disease-free women who underwent one marrow transplantation for stage II–IV breast cancer, the severity of stress response symptoms was associated with more advanced disease at transplantation and longer hospitalization after transplantation (Jacobsen, P.B. et al. 1998).

Although stage IV reflects greater disease severity, there may be some accommodation to the illness by this time. This may explain the negative correlation of stress symptoms with time elapsed since diagnosis in this study and the high frequency of stress responses after recurrence (Cella, D.F., Mahon, S.M. & Donovan, M.I.1990), or after metastases (Kaasa, S., Malt, U. & Hagen, S. 1993). Likewise, research finding of the breast cancer stage (early and advanced) indicated that is not statistically significant in terms of rates of psychosocial distress and quality of life.

Furthermore, in a cross-sectional study of cancer patients across four disease stages (I–IV) researchers have found that the highest traumatic stress reaction were exhibited by patients with stage III disease. This stage, which is associated with more extensive treatments and may signal the transition to a less favorable prognosis, can be the most traumatic juncture in the illness course (Kelly, B., Raphael, B. & Smithers, M. 1995). In addition there is an association between stress and increased illness behavior (Cohen, S. & Williamson, G.M. 1991). In another study conducted by Kelly, B., Raphael, B. & Smithers, M. (1995) interestingly they have found that stress response symptoms are more directly related to disease stage than to anxiety and depression.

**Stress and demographic variables:** Dafna, K. (2006) concluded that no significant differences between men and women entrepreneurs emerged regarding positive perceived stress. Although researchers’ findings indicated that in cancer patients, female sex to be correlated with greater stress response symptomatology (Baider, L., Perry, S. & Sison, A. 1997; and Kaasa, S., Malt, U. & Hagen, S. 1993). Likewise, Naidich, J.B. & Motta, R.W. (2000) reported women with cancer have greater interference effects in response to cancer-related information on the emotional Stroop (cancer-related stress responses) compared with controls without cancer. Besides, Andersen, B.L., Anderson, B. & deProsse, C. (1989) have concluded that in women with gynecologic cancer, emotional distress within days of diagnosis and prior to their treatment was significantly greater than that for two relevant comparison groups. According to Cull, A., Fry, A., Rush, R. & Steel, C.M. (2001) on the General Health Questionnaire (GHQ-30) women exhibiting case-level distress were more likely to overestimate their risk.

Interestingly, it was found that younger patients typically exhibit higher rates and more persistent stress response symptoms than older patients over a 1-year period (McGarvey, E.L., Canterbury, R.J. & Koopman, C. 1998; and Baider, L., Perry, S. & Sison, A. 1997). According to Lebel, S. et.al. (2003) waiting period between
suspicious mammogram and breast biopsy may be a time of high distress for many women. There is a study by Koopman C. et al. (2001) which indicated that cancer specific traumatic stress experienced by women breast cancer was not reflected in more general mood disturbance such as depression and anxiety. Likewise, Nunes, D. et al. (2007) concluded that treatment of breast cancer is usually associated with significant psychological stress. In a self-report study of patients with breast cancer, stress response symptoms were more common soon after treatment (Cordova, M.J., Andrykowski, M.A., Kenady, D.E. 1995). Furthermore, Payne, S.A. (1992) reported that women patients over 60 years old with advance cancer, experienced less psychological and physical distress. In the case of education levels and income, some studies have found stress response symptoms to be associated with lower income and less education (Kornblith, A., Anderson, J. & Cella, D.F. 1992; and Green, B.L., Rowland, J.H.&Krupnick, J.L.1998). In addition, among patients receiving palliative care for cancer, the desire to receive euthanasia or physician-assisted suicide (PAS) is associated with religious beliefs, functional status, and physical, social, and psychological symptoms and concerns (Wilson, K.G. et al. 2007).

**Stress and Cancer Treatment:** Segerstrom, S. & Miller, G. (2004) reported that psychological stress can affect the immune system, the body’s defense against infection and disease (including cancer). Although no intervention strategies could be recommended for improving patients’ lengths of survival, some tentative recommendations were possible in relation to immune outcomes, with all the strategies for which trials were performed indicating medium- or long-term immune benefits (Sallie, A.N., Rob, W.S.& Nina, J.S.2002). Since anticipatory nausea and vomiting are believed to become conditioned responses through the learning process of classical conditioning, behavioral treatments may be particularly appropriate (Morrow, G.R.& Hickok, J.T. 1993).

The last 15 years have seen a proliferation of studies exploring the benefits of psychosocial interventions across the disease trajectory, from the time of initial biopsy, through diagnosis, treatment, adjustment, post-treatment, metastatic disease or recurrence, and through palliation and death. Research indicates that psychosocial intervention can lead to reductions in distress, anxiety, depression and fatigue, which in turn can lead to improvements in quality of life (Bultz, B.D. & Carlson, L.E. 2006.; Bultz, B.D.& Carlson, L.E.2005).
In another study conducted by Jacobsen, P.B. et.al. (2002), they have found that self administration stress management training has the potential to greatly improve patients access to psychological intervention during chemotherapy treatment. In another study among stage I to IV cancer patients, researchers reported that greater skill in stress management was associated with lower levels of anxiety and depression and better overall mental quality of life. Findings confirm that skill in stress management is related to pre-chemotherapy distress and quality of life and they suggested the importance of assessing this variable as part of efforts to link distressed patients to appropriate psychosocial services. Findings also raise the possibility that assessing extant stress management skills could be used to match patients to the type of intervention most likely to benefit them (Leigh, A.F., Heather, S.Jim., Charles, W., Loretta, L. & Paul, B. J. 2008).

According to Edwin, B.(1995) Chemotherapy can produce severe, sometimes intolerable, side effects, particularly distressing and aversive side effects. Several psychological interventions, including progressive muscle relaxation training, systematic desensitization, hypnosis, attentional distraction and stimulus control have produced promising results.

According to Fawzy, F.I. et al. (1993) many cancer survivors described the process of life and beating cancer as a life change experience. It is not uncommon for this experience to bring about a personal epiphany, which the person uses as motivation to meet goals of great personal importance, such as climbing a mountain or reconciling with an estranged family member. Researchers indicated that early, brief psychological efforts among cancer patients produced immediate (post treatment) effect as well as long term (six month) changes.

Thus, the stress and stressors are of different nature among cancer patients. It thus becomes the professional responsibility of the clinical psychologists to study and understand them and then on provide such interventions with which their coping abilities enhance and enable them to lead a lessened stress life.

To sum up, Stress is the physical, mental, or emotional tension caused by an event. The body responds to stress by releasing stress hormones, such as epinephrine (also called adrenaline) and cortisol (also called hydrocortisone). Long-term stress is negative to an individual. The same stressor is perceived differently by different
individuals in a population. A cancer diagnosis and cancer treatments are objective, negative events. Although negative events do not always produce stress and an altered quality of life, data from many studies document severe emotional distress accompanying these cancer–related events. The prevalence of emotional distress is well documented in cancer populations. Psychological stress can affect the immune system, the body’s defense against infection and disease (including cancer). Scientists have suggested that the effects of stress on the immune system may in turn affect the growth of some tumors. Evidence indicated that the benefits of psychosocial interventions across the disease trajectory, at different periods of life. Researches indicate that psychosocial intervention can lead to reductions in distress, anxiety, depression and fatigue, which in turn can lead to improvements in quality of life.

Biofeedback

Historically Biofeedback can be traced to experiments in 1960s. Donald Shearn in 1962’s first demonstrated biofeedback using operant conditioning of heart rate (David, S. G.1979). A new interdisciplinary paradigm emerged throughout the late 1960s, unifying developments from the diverse fields of psychology, neurophysiology, cybernetics, and medicine culmination. Neal Miller was a founding father in the field of Biofeedback. Miller, N. E. & Dicara, L. (1967), carried out a series of dramatic animal experiments, demonstrating the operant conditioning of a variety of internal autonomically regulated physiological processes, including blood pressure, cardiac function, and intestinal activity. A number of key publications were made in the final year of the decade. In 1969 Neal Miller published an article in Science on “Learning of Visceral and Glandular Responses.” Elmer Green was senior author of two classic articles in the same year — “Self-Regulation of Internal States”, and “Feedback Technique for Deep Relaxation”. Charles Tart also published his edited compendium Altered States of Consciousness (1969), including several articles on feedback techniques or operant conditioning modifying neuro-physiological processes. “Biofeedback” as a model and technique was ready to be born. A scientist applies sensitive electronic instruments to provide meaningful information about physiological processes to an animal or human subject. In turn, the subject gains greater awareness and control over the physiology and self-regulates more effectively. Bio-feedback, the providing of information back to a subject about life processes, contributes a powerful new tool for self-mastery, research and clinical intervention (Donald, M.1998).
A psychological strategy with which we can control our internal responses voluntarily is called biofeedback (BF) training. It consists of two components. The first is cognition or knowledge of internal responses and the second is learning control of these responses. These two are based on the operant conditioning principle. Generally, we do not use rewards or punishments when we apply the biofeedback training to clinical treatment, because it is considered that the release from their symptoms in itself brings a reward for patients. But this concept is not always right and can be one of the reasons that BF training brings us unsteady clinical effects. It is desirable that internal responses as a target for the BF procedure satisfy the next four conditions i.e. objectivity, quantitativeness, controllability and pathogenecity (Watanabe, Katsumi., Ohno, Yushiteru. 1981).

Biofeedback is a tool to help patients bring awareness to and understand body responses, and learn greater control over these responses, empowering patients to greater health and wellness. Biofeedback allows the invisible to be visible, and the undocumented to be documented. With equipment or enhanced guided sensory awareness, symptoms below conscious awareness may be observed and noted (Erik, P.2006). The immediate awareness of Sympathetic Nervous System reactivity through Galvanic Skin Response (GSR) feedback allows for retraining of maladaptive patterns (Hughes, W. G. & Shean, G. D.1971). For example, the electrical conductivity of skin changes rapidly in response to (even the slightest) emotional arousal. This phenomenon is the basis of lie detector tests, and is also used in biofeedback therapy as a kind of "mind-mirror"(Biofeedback & Neurofeedback in York, 2008).

Biofeedback training has several advantages including its relative low cost and provision of constant, quantifiable feedback, which is easily understood (Brown, 1977). As an active teaching and learning approach, clinical biofeedback techniques offer advantages such as: (a) providing a psychobiological model of the disease process to be coupled with a believable/congruent experience of positive change and hope; (b) an opportunity for reinforcing the biofeedback information with actual physiological and cognitive skills that supports self-healing; and, (c) an ongoing involvement with healing process through the practice of appropriate psychophysiological homework. In many cases, biofeedback treatment includes skill training to bring about effective change as well as to facilitate shifting any
feelings of helplessness and hopelessness into hope, empowerment and health, through the experience of physiological mastery (Erik, P. 2006). Like most behavioral treatments, biofeedback is most effective with patients willing to assume an active role in the treatment process, including home practice (Alan, B. 1999).

Although conventional Western human and veterinary medicine was bearing the legacy of French philosopher Rene’ Descartes (1970), who promoted the false dualism of the mind being separate from the body, and the belief that animal were unfeeling machines, interestingly biofeedback is founded on the mind-body connection: our body's physiological functioning is constantly changing in response to thoughts and feelings (Vickers, A. & Zollman.C. 1999). Biofeedback is an exciting and interdisciplinary field with many dimensions, integrating technology, psychology, medicine, human potential, biology, and much more (Erik P.2006). Biofeedback is a modern computer-related technique used mainly for assessment and therapy of psycho-physiological disorders. The bio-psycho-social framework, that recognizes the importance of the mind-body interrelationship for the developing human being, became relevant for the contemporary healthcare. Simultaneously, biofeedback has arisen as a modern computer-related operant conditioning technique used for assessment and therapy of many psycho-physiological disorders, especially the stress-related ones. Its objective is to increase the voluntary control over the physiological processes that are otherwise outside awareness, using the information about them in the form of an external signal. Various biofeedback approaches are increasingly used worldwide as non-pharmacological and cost-benefit effective research and therapeutic tools (Nada Pop, J. 2009).

Biofeedback instruments monitor responsive biological parameters like skin conductivity. The signals are "feedback" to patients via computer, either visually (through the monitor) or auditory (through computer generated sounds). They get to experience the mind-body connection in action. Biofeedback is the use of monitoring instruments such as computers to provide patients with physiological information through different stages of rest and daily activities. Physiological responses produced in biofeedback are similar to those produced in relaxation techniques (Ravinder, M. & Andrea, C. 2002). In the last half century, research in biofeedback has shown the extent to which the human mind can influence the functioning of the autonomic nervous system, previously thought to be outside of conscious control (Khazan, I.2009).
Although biofeedback was developed by psychologists, it has been most widely used in the treatment of psychophysiological and medical disorders and less frequently used to control symptoms of psychopathology and mental disorders. Schwartz, M.S. & Andrasik, F. (2003) concluded that biofeedback therapy can be used to treat different conditions. Some of them are asthma, ADHD, high blood pressure, incontinence, headaches, cardiac arrhythmias, Cancer, diabetes, Spinal cord injuries, Anorexia nervosa, epilepsy, Insomnia, Migraines, Phobia and anxiety. Research on the physiological effects of biofeedback therapy suggests that it decreases indicators of chronic stress responding such as muscle tension, peripheral vasoconstriction, anxiety, heart rate, skin conductance, cortisol, and catecholamines.

**Educational and Informational aspects:** Patients learn the causes of panic, the "fear of fear" cycle and the rationale for treatment. Various biofeedback modalities help in experiencing and understanding on a gut level the relationship between thoughts, feelings, images, bodily sensations and the actual body responses. "Biofeedback information seems to help patients 'get it' a lot faster,"

**Cognitive Restructuring:** This technique provides instruction and practice in constructive self-talk to reduce fears of anxiety sensations. Exaggerated fears of somatic symptoms or the probability of negative reactions and adverse outcomes are replaced with more realistic attitudes. Trainees are often surprised to see the biofeedback equipment demonstrate a striking difference between the responses from their fearul thoughts as compared to responses as a result of their restructured thoughts (Alan, B. 1999). Study results supported that cognitive changes underlie the effectiveness of relaxation and biofeedback therapies, at least in young adult tension-type headache sufferers (Rokicki, L.A. et al. 1997).

From the beginning biofeedback developed as a research-based approach emerging directly from laboratory research on psychophysiology and behavior therapy. The field of feedback therapies has maintained its close relationship with both pure and applied empirical research. Pure research takes place largely in laboratories, and seeks new understandings of neuro-physiological mechanisms underlying disorders such as panic disorder and hypertension. Better recognition of underlying mechanisms continues to inspire new biofeedback treatment approaches. In turn, many biofeedback applications have been tested and proven both in research and practice (Carolyn, Y. & Christopher, G. 2004).
Biofeedback is as efficacious as other forms of relaxation training, such as hypnosis, progressive muscle relaxation or transcendental meditation. However, most applications of biofeedback are used as adjuncts to other types of therapy, treating physiological as well as psychological disorders. Physiological disorders with credible research to support the ancillary use of biofeedback include headaches, chronic pain, rheumatoid arthritis, asthma, temporomandibular joint disorders, dysmenorrhea, epilepsy, hypertension, irritable bowel syndrome, intestinal motility, motion sickness, neuromuscular rehabilitation, Raynaud's disease and fecal incontinence (Crabtree, M., Kase, J.&Bland, A. 1995).

**Biofeedback modalities:** There are six commonly used biofeedback modalities which are as follows.

1. Electromyographic (EMG): Frontalis, masseter, trapezius and sternocleidomastoid are the most frequently monitored sites.
2. Skin Conductance Level (SCL): Also referred to Galvanic Skin Response (GSR). Finger electrodes register sweat gland activity.
3. Thermal: Finger thermistors measure vasoconstriction by minute changes in peripheral blood flow.
4. Respiratory: Strain gauges measure abdominal and thoracic excursions; a capnometer monitors exhaled CO2.
5. Heart Rate (HR): Finger photoplethysmography registers rate and pulse volume.
6. Brainwave/Neurofeedback (EEG): Multichannel equipment with more sophisticated software and new treatment protocols have replaced the simple single channel alpha training of earlier decades (Alan, B. 1999).

**Biofeedback Applications:** Used alone as relaxation therapy, biofeedback is as efficacious as other forms of relaxation training, such as hypnosis, progressive muscle relaxation or transcendental meditation. However, most applications of biofeedback are used as adjuncts to other types of therapy, treating physiological as well as psychological disorders (Alan, B. 1999).

Clinical applications of biofeedback are aimed at inducing relaxation, a state that has important psychotherapeutic potential. Marcus, N. & Levin, G. (1977) reported that biofeedback could be used to reduce a patient's general level of arousal or as an adjunct to behavior therapy or insight therapy. While there have been no reports in the literature of any harmful effects secondary to feedback training.
Physiological disorders with credible research to support the ancillary use of biofeedback include headaches, chronic pain, rheumatoid arthritis, asthma, temporomandibular joint disorders, dysmenorrhea, epilepsy, hypertension, irritable bowel syndrome, intestinal motility, motion sickness, neuromuscular rehabilitation, Raynaud's disease and fecal incontinence (Crabtree, M., Kase, J. & Bland, A. 1995).

Biofeedback training is a part of the behavioral treatment, which includes relaxation training, because of its additional specificity. Biofeedback offers a nonpharmacological approach to direct symptom reduction and can be tailored to the individual patient's psychophysiological profile. Those patients experiencing symptoms of muscle tension have EMG sensors attached to muscle sites showing the highest activity. Patients with mainly autonomic symptoms generally receive thermal, GSR, heart rate and respiration feedback. EEG feedback may be useful when an assessment documents brain wave pattern dysregulation (Alan, B. 1999).

Many clinical applications of biofeedback are aimed at inducing relaxation, a state that has important psychotherapeutic potential. Marcus, N. & Levin, G. (1977) suggest that biofeedback could be used to reduce a patient's general level of arousal or as an adjunct to behavior therapy or insight therapy, while there have been no reports in the literature of any harmful effects secondary to feedback training. In addition, Brown, B. (1977) reported that Biofeedback training has several advantages including its relative low cost and provision of constant, quantifiable feedback, which is easily understood. A significant increase in research has documented the efficiency of biofeedback for children and adolescents that manifest behavioral, emotional and cognitive problems (Pop-Jordanova, N.1999). Neurofeedback or Electroencephalograph (EEG) Biofeedback is a specialized field of biofeedback therapy with more than 30 years of research and clinical applications. Research has shown neurofeedback to be effective with a wide range of diverse conditions including attention deficit hyperactivity disorder (ADHD), anxiety, depression, post-traumatic stress disorder (PTSD), learning difficulties and sleep disturbances amongst others (Aroche, J.2009). Although Angelakis, E., Stathopoulou, S., Frymiare, J.L., Green, D.L., Lubar, J.F. et al. (2007); and Dohrmann, K., Elbert, T., Schlee, W., & Weisz, N. (2007) indicate that the evidence in the clinical trials has not established clinical efficacy and effectiveness of EEG biofeedback.
Biofeedback also seems to be a useful tool in the treatment of a broad range of problems commonly seen by psychiatrists. The adjunctive use of biofeedback is reasonably well-documented for the psychological disorders of anxiety and insomnia. Many forms of psychotherapy, including dynamic, behavioral and brief, appear to have enhanced efficacy when biofeedback-assisted. Both the patient and therapist benefit from a display of physiological responses, which can help identify resistance, denial and other defense mechanisms. Biofeedback monitoring can provide a uniquely vivid demonstration of the connection between thoughts and feelings. Brain wave feedback is showing promise in the treatment of attention-deficit/hyperactivity disorder, addictive disorders and posttraumatic stress disorder (Alan, B. 1999).

Needham, W. E. (1993) in a case study reported that a 39-year-old man who was blind, diabetic and had a double amputation with chronic renal failure and peripheral vascular disease was treated with thermal biofeedback to reduce his depression through increased self-control, to minimize pain and to facilitate healing of a pregangrenous hand. On treatment discharge, his mental and physical states were substantially improved.

To explore the effectiveness of EEG biofeedback on depression, it was found that among eight patients with depression disorder, one patient was judged to have improved from being severely depressed to being normal, and two improved from being seriously depressed to normal. Three of the patients were judged to have improved from a severe to a mild level of depression, and one improved from moderately depressed to mildly depressed. Researchers concluded that 77.8% of the case series made significant improvements (Corydon, H.D. 2005). EEG biofeedback (Neurofeedback) seems to involve minimal risk of side effects or adverse reactions and it is less invasive than antidepressant medication or transcranial magnetic stimulation (Hammond, D.C., Stockdale, S., Hoffman, D., Ayers, M.E. & Nash, J. 2001).

Researchers have used pre- and post-sleep laboratory evaluations on epilepsy, and they have documented that positive changes in EEG activity after EEG biofeedback training are not just a voluntary waking change associated with learning a certain mode of concentration on a computer screen. The positive changes in reduced epileptogenic activity were seen even during sleep (Whitsett, S.F., Lubar, J.F., & Holder, G.S. 1982).
Nagai, Y., Goldstein, L.H., Fenwick, P.B., Trimble, M.R. (2004) reported that the primary outcome measure was change in seizure frequency after one month of biofeedback. Ramaratnam, S., Baker, G.A. & Goldstein, L.H. (2008) reported that outcomes included quality of life and seizure frequency of the two trials including relaxation and behavioral therapy, one showed positive results by decreasing anxiety and enhancing adjustment. According to Lubar, J.F. (1995) EEG biofeedback (neurofeedback) has been found to be effective in modifying brain function and producing significant improvements in clinical symptoms in children, adolescents, and adults who have several different biologic brain disorders. These conditions include such things as epilepsy, attention deficit disorder and attention deficit hyperactivity disorder (ADHD), and learning disabilities and have included up to 10-year follow-ups of patients.

To explore effect of biofeedback training on stress incontinence, researchers suggest that the biofeedback method in pelvic floor training (PFT) has a good success rate of 68.8%. The change achieved in leakage index after 12 weeks of training predicted an effective outcome for conservative treatment (Pauliina, A. et al. 2004). Both biofeedback and active control treatments resulted in a reduction in systolic blood pressure (SBP) and diastolic blood pressure (DBP), but only biofeedback showed a significantly greater reduction in both SBP (6.7 mm Hg) and DBP (4.8 mm Hg) when compared to inactive control treatments (Yucha, C.B. et al. 2001).

Futterman, A.D. & Shapiro, D. (1986) in their review studies reported that biofeedback was used in the treatment of patients with schizophrenia, depression, anxiety disorders, insomnia, alcohol and drug dependence, and tardive dyskinesia. They indicated that biofeedback can help selected patients modify specific responses or response patterns associated with a mental disorder. Researchers emphasized that biofeedback to be most suitable for patients and disorders in which physiological processes can be identified as relevant. Physiological disorders with credible research to support the ancillary use of biofeedback include headaches, chronic pain, rheumatoid arthritis, asthma, temporomandibular joint disorders, dysmenorrhea, epilepsy, hypertension, irritable bowel syndrome, intestinal motility, motion sickness, neuromuscular rehabilitation, Raynaud's disease and fecal incontinence (Crabtree, M., Kase, J. & Bland, A. 1995; Schwartz, M.S. 1995).
Biofeedback made the bridge between mind and body. According to Khazan, I. (2009), research in biofeedback has shown the extent to which the human mind can influence the functioning of the autonomic nervous system, previously thought to be outside of conscious control. By letting people observe signals from their own bodies, biofeedback enables them to develop greater awareness of their physiological and psychological reactions, such as stress, and to learn to modify these reactions. Thus, biofeedback has a number of applications in varied situations.

**Biofeedback and Anxiety:** Anxiety in some form is a problem that all psychiatrists must deal with on a daily basis. It is one of the most frequently observed categories of emotional disorders in the American population and often seriously interferes with the quality of everyday life. All of the anxiety disorders are defined by the dual characteristics of physiologic hyperarousal and excessive emotional fear. Biofeedback has demonstrated value for hyperarousal reduction training in generalized anxiety disorder (GAD) and exposure desensitization in panic disorder (PD) and PTSD (Alan, B. 1999).

Rice, K.M., Blanchard, E.B., & Purcell, M. (1993), studied the effectiveness of biofeedback on General Anxiety Disorder (GAD) and found that compared to control group all treated subjects showed significant reductions in state trait anxiety and psychophysiological symptoms on the Psychosomatic Symptom Checklist. Added to that there was decreased self-report of anxiety maintained at six weeks post treatment. In another study Vanathy, S., Sharma, P.S.V.N., & Kumar, K.B. (1998) investigated applying EEG biofeedback and found it to be effective in decreasing symptoms.

Biofeedback is one of the most useful adjuncts in treating physiologic hyperarousal—both episodic and chronic—seen in anxiety disorders. It has also proved helpful for patients who are learning to reduce fearful anticipation triggers through cognitive and behavior therapies (Alan, B. 1999). In a review, Moor, N.C. (2000) concluded that biofeedback enhancement training provided additional effects beyond placebo and are effective treatments for anxiety disorders. Passini, F.T., Watson, C.G., Dehnel, L., Herder, J.& Watkins, B. (1977) used 10 hours of alpha neurofeedback training, comparing 25 anxious patients (23 of whom were alcoholics) with a control group of 25 anxious patients (22 of whom were also alcoholics), the alpha neurofeedback training produced significant changes in state and trait anxiety compared with controls.
In the studies that included random assignment, four alternative treatment control groups, and a wait-list control group. In one study, the group that received alpha EEG enhancement training produced 33% more alpha after treatment, and all three feedback groups (who received alpha enhancement biofeedback, electromyography [EMG] [muscle] biofeedback, and alpha plus EMG biofeedback) demonstrated significant reductions in test anxiety. In comparison, the untreated control group and the relaxation training group experienced no significant reduction (Garrett, B.L. & Silver, M.P. 1976). In most cases, anxiety and insomnia are readily treated with neurofeedback (Moor, N.C. 2000).

Biofeedback addresses anxiety and panic as mind-body phenomena. Anxiety manifests in the body as various typical biological patterns. One such pattern is hyperventilation or over-breathing. It’s extremely common and leads to the brain getting less oxygen than it needs - it can’t function optimally and anxiety can spiral out of control. Breathing training with biofeedback can rectify this vulnerability. On another level, psychotherapy techniques in conjunction with biofeedback can help you identify the thinking (cognitive) and behavioral patterns that predispose you to anxiety. Such patterns are learned, they are not cast in stone, and with practice you can develop new ways of thinking and acting (Ravinder, M. & Andrea, C., 2002).

Rice, K.M., Blanchard, E.B., & Purcell, M. (1993) in their study to examine the effectiveness of biofeedback on generalized anxiety, concluded that all treatment groups (EMG frontal feedback, EEG alpha-increase feedback, EEG alpha decrease feedback, a pseudo-meditation condition, and a wait-list control) had comparable and significant decreases in the State Trait Anxiety Inventory (STAI) as well as drops in Psychosomatic Symptom Checklist. In another study Researchers compared the generalized anxiety disorder response to pharmacotherapy and to biofeedback, they found that the two treatments had similar effects on symptom reduction (Sarkar, P., Rathee, S.P. & Neera, N. 1999). Similarly, According to Alan, B. (1999) biofeedback, offers an equally effective alternative to medications, particularly for patients who do not respond well, who have a potential for dependency or who refuse prescription of drugs. Researcher added that Optimum treatment outcome for general anxiety disorder (GAD) is more likely to be achieved with a combination of pharmacotherapy and CBT and biofeedback.
According to Corydon, Hammond. D. (2005) a robust body of research documents that there are biological predispositions that often exist for depression, anxiety, and obsessive–compulsive disorder and research has shown that medication is only mildly more effective than placebo in the treatment of these problems. In treating these conditions, neurofeedback (EEG biofeedback) may offer an alternative to invasive treatments such as medication, ECT, and intense levels of transcranial magnetic stimulation. Paper reviews the neurofeedback literature with these problems, finding particularly positive research support for the treatment of anxiety disorders.

Furthermore in review study of neurofeedback and placebo conducted by Moore, N.C. (2000), researcher concluded that alpha and theta enhancement training provided additional effects beyond placebo and is effective treatments for anxiety disorders. In generalize anxiety he reported seven studies of eight studies in neurofeedback effectiveness on generalize anxiety produced positive changes in clinical outcome. Likewise Wenck, L.S., Leu, P.W., D'Amato, R.C. (1996); in their research to explore effectiveness of EMG and thermal biofeedback found that the biofeedback group had significantly lower posttest states and trait anxiety.

In study conducted by Townsend, R.E., House, J.F. & Addario, D.(1975) to investigate effectiveness of biofeedback on chronic anxiety, researchers reported that significant decreases were found in the feedback group in electromyogram levels, mood disturbance, trait anxiety, and (to a lesser extent) state anxiety. No such decreases occurred in the control group. Researchers suggested that EMG feedback can be an important adjunct therapy for chronic anxiety. Likewise, Sherlin,L.,Gevirtz, R.,Wyckoff, S. & Muench, F. (2009), and Lars,D.,Sven, G.C., Elliot N.G.and Thomas,G.J.(1985) have reported that Biofeedback appears benefiting in reducing state anxiety and Heart Rate stress.

Although there is substantial improvement after biofeedback therapy in the severe degree but not in the moderate category in anxiety with assesses the anxiety levels by Taylor manifest anxiety scale (TMAS), researchers reported a total of 17.39% cases of experimental group after complete the full sessions of biofeedback therapy did not require any follow up. At the end of 12 weeks, 17 patients showed anxiety levels in the range of mild, 6 patients (26.08%) moderate, and 11 patients (47.8%) severity on Taylor manifest anxiety scale(TMAS) (Saldanha,D., Chaudhury, S., Pawar, A.A., Ryali, V.S.S.R.& Srivastava, K 2007).
In the same way to explore the EEG biofeedback effectiveness on trait anxiety, researchers reported that alpha changes were tightly linked to anxiety changes, but only in high anxiety subjects (for whom anxiety was reduced in proportion to alpha increases, and was increased in proportion to alpha suppression). Low trait-anxiety subjects were superior at both enhancement and suppression training, but their alpha changes were not related to anxiety changes. In both groups, anxiety changes were generally unrelated to either resting levels or changes in frontalis electromyograms and respiration rate. These results suggest that long-term alpha feedback training (at least 5 hours) may be useful in anxiety therapy (Hardt, J.V. & Kamiya, J.1978).

Anxiety could be as good a factor to predict biofeedback therapy acquisition. Researchers found that anxiety, coping strategies, gender, and clinic site predicted acquisition of hand-warming skills in biofeedback therapy (Middaugh, S.J. et al. 2001). Likewise Kathleen, M., Rice, E.B. & Blanchard (1982) concluded that the roles of factors other than physiological change that may render biofeedback a successful treatment are discussed. In Studies which have used various forms of biofeedback in the treatment of anxiety disorders they are summarized and examined in regard to whether biofeedback-mediated physiological changes are responsible for reductions in subjective reports of anxiety. The evidence suggests that frontal EMG biofeedback training to reduce muscle tension is the most promising biofeedback training technique to date. Studies of heart rate and EEG alpha biofeedback offer only minimal support for the use of these methods to facilitate anxiety reduction. The limited literature on the application of skin resistance level, finger pulse volume, and temperature biofeedback in the treatment of anxiety disorders suggests that these may be viable treatment techniques. Furthermore, La Vaque, T.J. et al. (2002), have evaluated the studies in the overall broad area of the EEG biofeedback treatment of anxiety disorders and reported that the EEG biofeedback qualifies for the evidence-based designation of being an efficacious treatment.

Although very few well-controlled, randomized studies have shown biofeedback to be superior to other relaxation and self-control methods for reducing anxiety. Most studies showed biofeedback (EMG, GSR, thermal, or neurofeedback) to be roughly equivalent to progressive relaxation or meditation. Researchers suggest
that this may be because anxiety is less a disorder of physiology than of attention and
cognition, and biofeedback monitors physiological changes. Biofeedback of various
modalities is effective for anxiety reduction; it is not specific, but shares
characteristics with other relaxation techniques (Carolyn, Y. & Christopher, G. 2004).
In the same way Hawkins, R.C., Doell, S.R., Lindseth, P., Jeffers, V., & Skaggs,
S.(1980) concluded from a study with 40 hospitalized schizophrenics that thermal
biofeedback and relaxation instructions had equivalent effect on anxiety reduction.
Despite Leboeuf, A.& Lodge, J.(1980) concluded that EMG feedback was much
superior in reducing frontalis EMG activity but this treatment was no more effective
than progressive relaxation in reducing symptoms of anxiety. They added that few
patients in each group showed more than marginal improvement.

Similarly Nestoriuc, Y., Rief, W.& Martin, A. (2008) reported that significant
effects were observed for muscle tension, self-efficacy, symptoms of anxiety,
compared progressive muscle relaxation to EMG biofeedback training in 30 children
and found an advantage for biofeedback. While, Scandrett, S.L., Bean, J.L., Breeden,
S., & Powell, S. (1986) have found some advantage of progressive muscle relaxation
over EMG biofeedback in reducing anxiety in adult psychiatric inpatients and
outpatients.

In the same way Hurley, J.D. & Meminger, S.R (1992) used frontal EMG
biofeedback to criterion and assessed anxiety over time using the State-Trait Anxiety
Inventory (STAI). State anxiety improved more than trait anxiety. Likewise, Wenck,
L.S., Leu, P.W., & D'Amato, R.C. (1996) found thermal and EMG biofeedback to
significantly reduce state and trait anxiety. Lehrer, P.M., Carr, R., Sargunaraj, D., &
Woolfolk, R.L. (1994) interestingly evaluated the hypothesis that biofeedback is most
effective when applied in the same modality as the disorder (autonomic feedback for
Autonomic Nervous System (ANS) disorders, EMG feedback for muscular, etc.).
They studied and concluded that self-relaxation techniques have in common the
process of using conscious intent to calm oneself, and for anxiety reduction it may
matter little which modality that is used, because the central component is the
cognitively-based conscious intent.
Biofeedback-assisted relaxation training can help people with anxiety to learn to relax. By seeing some aspects of their body on computer screen or hearing a tone that increases and decreases in pitch, they are able to relax their autonomic nervous system and calm down their body. Furthermore, biofeedback is sometimes used as an adjunct treatment for people with anxiety (Leonard, H. 2003). While, Alan, B. (1999) reported the adjunctive use of biofeedback as reasonably well-documented one for the psychological disorders of anxiety.

Latimer, P.R. (1981) concluded that after biofeedback therapy, patients develops vomiting behavior through operant conditioning involving attention from significant others or avoidance of anxiety producing situations. Treatment involves the elimination of reinforcement for vomiting and replacement with reinforcement of adaptive behavior. While, in another study conducted by Fehring, R.J. (1983) researcher found that adding GSR biofeedback to a Benson-type relaxation technique reduced anxiety symptoms more than relaxation alone.

Likewise Reed, M. & Saslow, C. (1980) reported that biofeedback and relaxation changed significantly from pre to post on the anxiety measures. This was true for specific test-taking anxiety and for general anxiety. Furthermore they indicated that the control group showed no change. While, In examining the effects of relaxation training including EMG biofeedback in HIV positive men, Taylor, D.N. (1995) concluded that there was significant improvement on anxiety, mood, self esteem, and T-cell count in comparison to a control group. Hipple, J. (1997) concluded that various forms of biofeedback have been utilized in the treatment of anxiety and this performance anxiety.

To assess the effectiveness of biofeedback on speech- anxiety to aid in the alleviation of speech anxiety, Mark, E. M. & Robert, J. G. (1982) indicated that heart rate biofeedback training and speech skills training were effective in lowering overt motor and self-report components of anxiety. Researchers reported that the biofeedback and combined group subjects demonstrated significantly less heart rate increase while speaking before an audience during the post treatment assessment. They added two individual difference variables examined in this study (cognitive/autonomic focus of anxiety and subjective confidence in treatment) were not found to significantly influence treatment effectiveness. Finally, factor analyses of the physiological data suggested that heart rate changes play a large role in the physiological component of anxiety.
One of the symptoms associated with generalized anxiety disorder is excessive physiologic arousal (Gliatto, M.E. 2000). Biofeedback enables patients to develop greater awareness of their physiological and psychological reactions (Khazan, I. 2009). Alan, B. (1999) concluded that since all of the anxiety disorders are defined by the dual characteristics of physiologic hyperarousal and excessive emotional fear. Biofeedback has demonstrated value for hyperarousal reduction training in generalized anxiety disorder (GAD). Additionally Biofeedback is one of the most useful adjuncts in treating physiologic hyperarousal-both episodic and chronic-seen in anxiety disorders. In the same way Platelet monoamine oxidase activity was measured in eleven subjects with chronic anxiety, before and after biofeedback-relaxation therapy. Post-treatment enzyme activity levels showed significant reductions as compared to the pretreatment values. Thus, biofeedback is found to very useful in handling anxiety cases.

**Biofeedback and Stress:** By letting people observe signals from their own bodies, biofeedback enables them to develop greater awareness of their physiological and psychological reactions, such as stress, and to learn to modify these reactions. Biofeedback practitioners can facilitate this process by assessing people's reactions to mildly stressful events and formulating a biofeedback-based treatment plan (Khazan, I. 2009). Diane, S. (2006) reported that the method of visualization including biofeedback is used to reduce all the symptoms of stress.

According to Malgaj, L. (2009) biofeedback helps realize when stress is underway, and employ relaxation exercises like visualizations, deep breathing, or meditation to control the body's stress response and calm physiological arousal. Researcher reported that from the many stress relief benefits of biofeedback, increased relaxation in the body and the lack of chronically triggered stress response is primary. In the absence of chronic stress that can cause several negative health problems, biofeedback relaxation response offers a significant improvement in the way bodies function and how people feel.

Likewise, McCain, N. L., Zeller, J. M., Cella, David, F. & Urbanski, Pamela A. (1996) have reported that stress management including relaxation therapy may have buffered illness-related psychological distress over time. Roberts, G. & McGrady, A. (1996) in their research concluded that the patients who have had more stress before biofeedback therapy, changed after intervention. Patrick,
J. L. & Claudia, J. S. (2000) concluded that the biofeedback group tended to do better than the stress inoculation group on blood pressure related to stress. Likewise researchers reported biofeedback was able to smooth the Blood Pressure (BP) response to stress. They concluded that biofeedback appears to be a suitable intervention for hypertensive patients chiefly for those whose BP increases with stress (Elisa, B., Daniela, P., Davor, P. & Paolo, P. 2005). Similarly, Steven, J. D.D.S., Kathleen, C. M.A. & Gene Huebner, D.D. (1984) reported experimental group showed a significant difference from the control group to the extent that blood pressure relates to stress.

Paul, D. T. (1996) explored the stress management including biofeedback between three groups, 15 female participants were either given EEG biofeedback pretraining without stress, pretraining while listening to infant crying, or no stress management pretraining while listening to crying, and concluded that stress management including biofeedback training may help ameliorate an aversive response. Likewise, in study conducted by Hudesman, J. (1987) results indicated that students using stress management including biofeedback techniques experienced less anxiety in a high pressure situation.

Interestingly, research supports skin temperature changes (increases) as indicators of stress reduction or relaxation. Results showed that wrist temperatures increased significantly during the relaxation exercises, and that the increases grew larger as the study continued, indicating that students learned to relax more fully with more practice in the program. The study helps validate the use of wrist temperatures as a practical measure of relaxation (or stress) for researchers or as a biofeedback technique for individuals (Matthews, D.B. & Casteel, J.F. 1985).

Patients about to undergo oral surgical procedures may be fearful and anxious. It is thought that stress reduction can be attained by relaxation and reassurance. Steven, J. D.D.S., Kathleen, C. M.A. & Gene Huebner, D.D. (1984) interestingly reported that the biofeedback relaxation procedure, among patients who undergoing to mouth surgery shown was an enjoyable experience to all patients and the cognitive experience of being shown how biofeedback relaxation is a practical benefit to the entire public and especially to that part of the public that is being stressed.

Similarly, there is significant association between Post Traumatic Stress Disorder (PTSD) and low heart rate variability (HRV), a biomarker of autonomic dysregulation. Research in the effectiveness of biofeedback indicates significantly reduced PTSD and insomnia symptoms and a statistical trend was observed for reduced substance craving for the respiratory sinus arrhythmia (RSA) group (Zucker, T.L., Samuelson, K.W., Muench, F., Greenberg, M.A & Gevirtz, R.N.2009). Likewise, biofeedback has much therapeutic potential in cardiovascular diseases, since many of these diseases involve dysregulation of the autonomic nervous system and biofeedback is increasingly used as an adjunct to stress management in cardiac rehabilitation programs (Moravec, C.S.2008).

In order to assess the effectiveness of mind-body intervention including biofeedback on PTSD among students, the Students in the immediate intervention group had significantly lower PTSD symptom scores following the intervention than those in the wait-list control group. And the decreased PTSD symptom scores were maintained in the initial intervention group at 3-month follow-up. They concluded that Mind-body skills groups including biofeedback can reduce PTSD symptoms in war-traumatized people (Gordon, J.S., Staples, J.K., Blyta, A., Bytyqi, M. & Wilson, A.T.2008). In the same way Alan, B. (1999) reported that brain wave biofeedback is showing promise in the treatment of posttraumatic stress disorder (PTSD).

According to Linda, P. (2004) Biofeedback helps health problems like stress related disorders. In research conducted by Mariana, T. R. et al. (2007) researchers concluded that a relatively short-term intervention of biofeedback and Pelvic-floor muscle strength appeared to be helpful in relieving symptoms of stress urinary incontinence (SUI) in premenopausal women and represent a reasonable conservative management option. They added that objective cure was found in 61.5% of women and there was a significant improvement in the quality of life, in Pelvic-floor muscle strength, and in the biofeedback amplitudes of all contractions throughout the intervention.
In another study, it was attempted to explore the effectiveness of biofeedback therapy on urinary stress incontinence researchers reported that after biofeedback therapy, the daily urination frequency decreased 10% after 4 week of therapy and 5% after 3 months and the nocturnal urination frequency declined 36% after 4 week of therapy and 66% after 3 months. Subjective assessment after 3 months showed that 62% were free of incontinence episodes, and 38% improved. Researchers added that biofeedback therapy resulted in a better subjective outcome and higher contraction pressures of the pelvic floor muscles compared to physical therapy (Pages, I.H., Jahr, S., Schaufele, M.K.& Conradi, E.2001). Thus, there are sufficient evidences showing the relationship between biofeedback and stress.

**Biofeedback and Gender:** Although animal and human laboratory researches have shown that males and females often differ in their biological and behavioural responses to drugs (Glen, R. H.2002). In contrast, Vietta, E. W. & Evelyn, I. B. (1981) reported that there were no significant differences among male and female for rate of biofeedback and relaxation effectiveness. Since in biofeedback therapy acquisition there are no gender differences, it can be an advantage for biofeedback therapy. Likewise in study the therapeutic effect of EEG biofeedback for ADHD, Li, G., Wu, B., & Chang, S. (2003) found there was no significant difference in EEG biofeedback effectiveness between male and female children. Similarly, Iwao, S. & Yasuko, S. (1999) in their study to explore the self control of cardiovascular function by using biofeedback reported that there was no gender difference in the ability of biofeedback control on stress. Further, Jun, W., Mao-Hong, L., Qing-Hui, Q. & Zuo-Liang, D.(2003) also concluded that the gender of patients could not predict response to biofeedback treatment of chronic idiopathic functional constipation.

Kamarzarin, H. (1999) explored the effectiveness of Galvanic Skin Resistance (GSR) biofeedback treatment on stress, and found that there are not significant relation between GSR biofeedback treatment and sex. Likewise Nabil, G. E., Mohamed, E., Amin, A., Magdy, H. & Hala, H. (2008) reported that the age or sex was not predictive of a successful outcome in the effectiveness of biofeedback. Saito, I., Yashiroy, N., Okuse, S., Saito,Y.(1993) in their research to investigate biofeedback control reported that although before intervention the female subjects were higher than male subjects. But after intervention no gender difference was observed in
biofeedback therapy. Thermal biofeedback (BFB) training is used extensively in clinical psychophysiology. However, there are large individual differences in the ability to control peripheral skin temperature. Gender correlated significantly with learning ability. Females showed greater ability to control peripheral skin temperature than males. (Violani, C. & Lombardo, C. 2003). Roberts, G. & McGrady, A. (1996) reported that pretest temperatures of men patients were lower than other but interestingly in posttest result shown, men patients increased temperatures more than women. Furthermore, Vincent, A. P., Yahaya, M., Kwame, A. (2009) concluded that there are significant gender differences, in the effectiveness of biofeedback therapy on Somatic Coping Anxiety Strategies.

Contrary to the above trend, sex differences did differ in biofeedback. After EMG biofeedback therapy men had fewer manifestations of a physiological stress response, as indicated by bioinstrumentation parameters according to Russell, L. T. et al. (2004). In another study to assess gender effects on the relaxation response, Roberts, G. & Mcgrady, A. (1996) reported that in biofeedback temperature a significant effect of gender was observed. Males increased temperature more than females in hypertension patients.

There are some mixed trends also seen by researchers. Good, P. (2004) in a review study to explore the predictors of treatment response to behavioral therapy (including biofeedback therapy) and pharmacotherapy, found that for behavioral therapy, male gender predicted worse outcomes in 1 study, but it was not a predictor in 2 other studies. Likewise, Elmer, G. (1960) reported gender differences in the EEG and has reported that exceptional individuals often demonstrate remarkably distinctive EEG patterns. According to Porena, M., Costantini, E., Rociola, W. & Mearini, E. (2000) Biofeedback therapy was effective in treating enuresis condition significantly sooner in girls compared to boys.

Thus, there are more studies which indicate that gender has nothing to do with biofeedback while, there are some studies which contradict this too. Thus, it is still inconclusive.
**Biofeedback and Cancer:** According to Glasscoe, C.A. & Quittner, A.L. (2008) there is some evidence that behavioral interventions including biofeedback and relaxation, improve emotional outcomes in people with cancer and their care givers, and that psycho-educational interventions improve knowledge in the short term. There was no consistent effect on lung function, although one small study showed that biofeedback-assisted breathing re-training helped improve some lung function measurements. In a study conducted by Miller, M. et al. (1998) researchers found that up to 25% of participants expected the psychological therapy to cure their cancer and 75%–100% expected it to assist their traditional therapies.

Among cancer patients in general, there is very strong evidence that behavioral interventions, including biofeedback, can reduce side effects of therapy and alleviate psychological and functional disturbances. Some forms of psychological and psychosocial counseling have been shown to increase life expectancy and improve a range of psychological, quality of life and other functional outcomes (National Institute for Health and Clinical Excellence, 2002). Milos, P. (2009) reported that biofeedback therapy can be a very good complimentary therapy for cancer patients who are undergoing chemotherapy, radiation therapy, or surgery. Biofeedback cannot stop cancer. It can’t cure cancer either but it can provide a cancer patient with the ability to reduce their stress, muscle tension, and pain. Dimeo, F.C., Thomas, F., Raabe-Menssen, C., Pröpper, F. & Mathias, M. (2004) reported that psychosocial interventions (progressive relaxation training) have been shown to reduce the severity of fatigue in cancer patients after surgical treatment. Shibya, S., Saito, I., Kikuchi, H. & Takaoka, K. (2006) have found that a combination of biofeedback, counseling and image therapy is effective in the care of terminal cancer patients.

In the study of Su, X.Y., Tan, Y. & Zheng, M.C. (1997) it was seen that no significant difference was found between the average scores of SCL-90 (including F1, F3, F4, F5, F10) of the two groups before the intervention. However, lower average scores and less serious physical reactions (4 of the 6 items) were seen from the experimental group after the intervention. It is indicated that biofeedback relaxation training is effective in alleviating patient's unhealthy psychosomatic reactions during chemotherapy.
In a study to explore the effectiveness of relaxation combined with guided imagery on newly diagnosed large or locally advanced breast cancer, patients in the experimental group were more relaxed and easy going during the study. Quality of life was better in the experimental group. The intervention also reduced emotional suppression. The incidence of clinically significant mood disturbance was very low and the incidence in the two groups was similar. Finally, imagery ratings were correlated with clinical response. These simple, inexpensive and beneficial interventions should be offered to patients wishing to improve quality of life during primary chemotherapy (Walker, L.G. et al. 1999).

Michael, A. C., Giselle, D. C., Michael, E. G. & Elizabeth, H. (2004) in their study found the effectiveness of biofeedback on dysphagia following treatment for head/neck cancer. Researchers reported that biofeedback was effectiveness on cancer patients in experimental group. They reported that 80% of head/neck cancer patients increased their functional oral intake of food/liquid. In a separate study, Su, X.Y., Tan, Y. & Zheng, M.C. (1997) conducted a study and found that lower average scores and less serious physical reactions (4 of the 6 items) in the experiment group after the biofeedback intervention. They concluded that biofeedback relaxation training is effective in alleviating patient's unhealthy psychosomatic reactions during chemotherapy.

According to Milos, P. (2009) biofeedback therapy can be a very good complimentary therapy for cancer patients who are undergoing surgery. Burgio, K.L., Goode, P.S. & Urban, D.A. (2006) reported that after 6 months following prostate removal surgery, men in the biofeedback group reported an average of 73 days with no leakage, compared with 54 days reported by men in the comparison group. Researchers found that biofeedback cuts urine leak after prostate surgery. Furthermore among the patients who did not have the biofeedback training, nearly 20% had leakage six months after surgery.

In another study, Mathewson, C. (1997) explored the effectiveness of biofeedback on urinary incontinence after prostatectomy of cancer patients, and found that biofeedback group regained continence at a mean of 51 days but the control group at 56 days and they were not statistically significant difference.
The National Institute for Clinical Excellence (NICE, 2004) states that there is very strong evidence for cancer patients in general, ‘that cognitive and behavioural interventions including biofeedback’ can reduce side effects of therapy and alleviate psychological and functional disturbances. Some forms of psychological and psychosocial counselling have been shown to increase life expectancy and improve a range of psychological quality of life and other functional outcomes. Thus, biofeedback is found to be effective in many contexts among cancer patients.

**Biofeedback and cancer anxiety:** According to Roland, T. S. (2003) anxiety varies in its cause, severity and treatment. Length of distress is important to arise anxiety. Like depression, anxiety also amplifies pain. Researcher concluded that supportive therapy, relaxation tape, biofeedback, buspirone, gabapentin, and benzodiazepines are useful, for control anxiety among cancer patients. Besides, lower average scores and less serious physical reactions were seen from the experiment group after the biofeedback intervention. Researchers found that biofeedback relaxation training is effective in alleviating patient's unhealthy psychosomatic reactions during chemotherapy (Su, X.Y., Tan, Y. & Zheng, M.C. 1997). Arakawa, S. (1997) has found that effectiveness of progressive muscle relaxation (PMR) in reducing total scores used to measure nausea, vomiting, and retching and subjective feelings of anxiety.

With reference to the management of cancer pain, the National Cancer Institute (NCI, 2008) states that alternative therapies (e.g., biofeedback) may be used in conjunction with pain medication in an effort to control pain. NCI states that even though some of these “methods have not been tested in cancer pain studies; they may help to relieve pain, stress, and anxiety therefore, improving the patient’s quality of life. Diane, S. (2006) reported that biofeedback can effect positively on immune function for AIDS and cancer patients. In contrast, Nunes, D. *et al.* (2007) concluded that among I to III breast cancer patients, behavior intervention including biofeedback, the cortisol levels as well as proliferation remained unchanged following behavior intervention. But biofeedback was effective to reduce stress, anxiety, and depression scores.
According to Concha, L.P. *et al.* (2007) after relaxation and guided imagery among breast cancer patients, the study group demonstrated a statistically significant reduction in anxiety levels, depression and body discomfort compared to the control group. While, Arakawa, S. (1997) found the effectiveness of progressive muscle relaxation (PMR) in reducing subjective feelings of anxiety. According to Gruber, B.L. *et al.* (1993) the result of biofeedback intervention among the first stage breast cancer patients, indicated that reductions in psychological anxiety. Burish, T.G. & Jenkins, R.A. (1992) concluded that biofeedback and relaxation training (RT) patients showed decreased anxiety during chemotherapy and physiological arousal after chemotherapy. According to Vasterling, J., Jenkins, R.A., Tope, D.M. & Burish, T.G. (1993) the data supported the use of relaxation training for reducing the distress of chemotherapy with both high and low-anxiety patients. Arakawa, S. (1995) reported that after progressive muscle relaxation (PMR), there was an average decrease of 2.5 points in state-anxiety scores in the treatment group.

Lerman, C. *et al.* (1990) conducted a study to determine the relationship of coping style and cancer chemotherapy side effects and concluded that relaxation was effectiveness in reducing the anxiety among cancer patients with chemotherapy side effects. John, W.S. & Joseph, J. J. (2002) reported that Mind-body methods such as hypnosis, imagery techniques, biofeedback and relaxation seem to benefit cancer patients with pain, and anxiety. Likewise, Holroyd, K.A & Mauskop, A. (2003) concluded that biofeedback can help to manage anxiety commonly associated with stress reactions. In study conducted by Davis, H. (1986) explored the effects of psychological intervention on multilevel stress responding among breast cancer patients. Biofeedback and cognitive therapies were employed as treatments with 24-hr urinary cortisol and state anxiety as dependent variables. Researcher reported that cortisol levels among the 12 treated patients were reduced relative to those of controls. Furthermore, concluded that cortisol, state anxiety and stress are relevance to psycho immunology.

Kim, K.S. *et al* (2005) found that state anxiety, cancer physical symptoms and serum cortisol were reduced after four weeks of abdominal breathing training using biofeedback in patients with a mastectomy for breast cancer but, the mechanism of this beneficial effect and stress response was unclear. Besides, Gruber, B.L. *et al.*
(1993) reported that significantly lower levels of cortisol were found after biofeedback intervention among first stage cancer patients. Thus, there are many studies which have seen the relationship between and usefulness of biofeedback among cancer anxiety states.

**Biofeedback and cancer stress:** There are studies which have focused on the relationships between biofeedback and cancer stress. James, M. (2001) reported that Biofeedback is a technique that can be useful in a wide variety of conditions. It is not used to cure cancer. The greatest benefit from biofeedback for the cancer patient is relaxation and reduction of stress. This can undoubtedly improve the quality of life for those who are successful. It allows the cancer patient to take an active role in their treatment. Biofeedback is noninvasive, inexpensive and safe. National Cancer Institute (NCI, 2008) states that alternative therapies (e.g., biofeedback) may be used in conjunction with pain medication in an effort to control pain. NCI states that even though some of these “methods have not been tested in cancer pain studies”, they may help to relieve pain, stress, and anxiety therefore, improving the patient’s quality of life.

Forester, B., Kornfeld, D.S. & Fleiss, J.L.(1985) reported that statistically significant reduction was found in both emotional and physical manifestations of distress in the patients receiving psychotherapy during radiotherapy, compared with the control group. They added that this was true regardless of gender, Patient’s gender and knowledge of diagnosis did affect the pattern and magnitude of the response to psychotherapy.

According to Walker, L.G. *et al.* (1999) the diagnosis and treatment of breast cancer are stressful, and stress may be associated with a poorer response to chemotherapy. There is a need, therefore, to develop and evaluate interventions that might enhance quality of life and, possibly, improve treatment response. While, Yoo ,H.J., Ahn, S.H., Kim, S.B., Kim, W.K., Han, O.S. (2005) reported that, six months after chemotherapy (CT), the quality of life (QoL) of the progressive muscle relaxation training (PMRT) and guided imagery (GI) group was higher than that of the control group. In another study researchers concluded that abdominal breathing training using biofeedback, improves quality of life in breast cancer patients after a
mastectomy (Kim, K.S. et al. 2005). Dahlström, L. (1984) concluded that biofeedback among two stages of cancer patients was more effectiveness during experimentally induced stress than under baseline or resting conditions. In a research to investigate the effectiveness of behavior intervention for chemotherapy distress among children and adult, Lonnie, K. Z., Michael, J. D., Samuel, L. & Christine, L. (1991) concluded that distress scores change after intervention and they did not find age to be a significant contributor to overall symptom outcome. Arakawa, S. (1995) reported that most distressing of chemotherapy side effects are nausea and vomiting. Burish, T.G. & Lyles, J.N. (1981) concluded that after relaxation training, cancer patients’ feelings are less emotionally distressed. Patients with high initial levels of anxiety exhibited continually elevated levels of distress throughout the chemotherapy experience (Vasterling, J., Jenkins, R.A., Tope, D.M.& Burish, T.G.1993).

In study Burish, T.G., Snyder, S.L & Jenkins, R.A. (1991) compared four treatments consisting of (relaxation training with guided relaxation imagery (RT), general coping preparation package (PREP), both RT and PREP, or routine clinic treatment only, researchers concluded that one-session coping preparation intervention can reduce many different types of distress associated with cancer chemotherapy and may be more effective than often-used behavioral relaxation procedures. researchers results indicated that RT patients showed some decrease in negative affect and vomiting, whereas PREP intervention increased patients' knowledge of the disease and its treatment, reduced anticipatory side effects, reduced negative affect, and improved general coping.

According to James, M. (2001) the greatest benefit from biofeedback for the cancer patient is relaxation and reduction of stress. This can undoubtedly improve the quality of life for those who are successful. It allows the cancer patient to take an active role in their treatment. Biofeedback is non-invasive, inexpensive and safe. Winifred, W. T., Kristine, S. C., & Carolyn, B. Y. (2004) concluded that biofeedback assisted relaxation training is a mind-body approach that can be used to handle stress caused by the environment. This stress is linked to chronic health conditions such as cancer, asthma, and others. Researchers added that findings supported the use of BFRT for chronic health conditions, and can be a useful mind-body tool in conjunction with lifestyle intervention in targeting environmental stress-related public health.
To see whether stress could be alleviated in patients being treated for early breast cancer, Bridge, L. R., Benson, P., Pietroni, P. C. & Priest, R. G (1988) gave relaxation and imagery with biofeedback control to women with breast cancer stage I or II after first session of radiotherapy. They concluded that at six weeks total mood disturbance score was significantly less in the intervention groups, women in the combined intervention group including biofeedback, being more relaxed than those receiving relaxation training only; mood in the control group was worse.


In addition, Dahlström, L.(1984) found that the effectiveness of biofeedback and the biofeedback activity is greater in the patients than in matched controls. Furthermore, the more amount change in III stage cancer patients compare with II stage cancer patients, also effectiveness of biofeedback and the biofeedback activity is greater during experimentally induced stress than under baseline or resting conditions. Researcher concluded that these differences may be resulted in motivation of patients. In the study conducted by Lonnie, K. Z., Michael, J. D., Samuel, L. & Christine, L (1991) researchers found that the symptom duration rather than severity was most responsive to behavioural treatment for Chemotherapy Distress in cancer patients.

In a study to investigate the effectiveness of biofeedback on four groups of family caregivers, Sharon, L. L. (2006) reported that coping resources were similar among groups of family caregivers covering Mexican American females, white females, white males, and Mexican American males from 2 Southwestern cities. On stress reactivity biofeedback measurements, there were significant differences between Mexican Americans and whites. For example, Mexican Americans reacted to a think stressor with greater increases in skin conductance than whites.

Thus, biofeedback is studied and used as a very useful inexpensive intervention in reducing anxiety and stress. Biofeedback is a psychological strategy with which we can control our internal responses voluntarily is called biofeedback. Biofeedback is based on the operant conditioning principle, without the use of rewards or punishments, because it is considered that the release from their symptoms
in itself brings a reward for patients. Biofeedback is most effective with patients willing to assume an active role in the treatment process. In the last half century, research in biofeedback has shown the extent to which the human mind can influence the functioning of the autonomic nervous system, previously thought to be outside of conscious control. Biofeedback therapy can be used to treat different conditions. Some of them are asthma, ADHD, high blood pressure, incontinence, headaches, cardiac arrhythmias, Cancer, diabetes, Spinal cord injuries, Anorexia nervosa, epilepsy, Insomnia, Migraines, Dentistry disease, Phobia, anxiety and chronic stress responding. There is some evidence that biofeedback and relaxation, improve emotional outcomes among cancer patients, and cancer diagnosis or treatment side effects in cancer patients and their caregivers. Now a days, researchers are attempting the new ways in which to use biofeedback techniques in the way that will help people live healthier lives.

**Caregivers**

Any serious disease or disability will need the attention of someone who has to substantially attend to the patient or victim. This person who attends is a primary care giver. Caregivers are the most neglected segment in any research literature. Psychological studies cannot afford to ignore this segment. In a cancer situation too, caregivers play a crucial role as major source of support to the patient, such as lifting, turning him or her in bed, bathing, dressing, feeding, cooking, shopping, paying bills, running errands, giving medicine, keeping him or her company and providing emotional support.

Schachter, S. (1992) holds the view that because treatments for cancer and other life-threatening diseases are increasingly provided on an outpatient basis, much of the burden of care has shifted from health care professionals to patients and their families

People used to leave the hospital when they were well. Now, they are often discharged to the care of family members when they’re still sick. So, now family members have to provide very complex care in the home and many family members don’t feel prepared to do that. Investigators also found that caregivers experienced increased levels of emotional distress and encountered role problems, reporting difficulties with work, family and social situations (Northouse, et al. 2000).
It's archetypal knowledge, that people who care for a loved one with cancer will often neglect their own physical wellbeing, forgetting to eat, losing sleep, skipping exercise and also neglect their mental health. A diagnosis of cancer is an intensely profound experience for the patient but what’s not so apparent is how much the entire family is affected by that pronouncement. How much stress does the family member most responsible for helping and caring for the patient experience? Caregiver often experiences a higher level of stress than the patient and the combination of pressure, tension and anxiety had a direct impact on the patient’s health (Northouse, et al, 2000).

Some researches have focused on caregivers. To examine the levels of sexual, psychological and dyadic functioning of the prostate cancer 'couple', researchers found that partners' mean scores on the depression and distress measures were significantly higher than their patients (Soloway, C.T., Soloway, M.S., Kim, S.S.& Kava, B.R.2005). Furthermore, Davis-Ali, S.H., Chesler, M.A., & Chesney, B.K. (1993) reported that spouses and cancer patients worry equally about their own personal health, and that spouses worry more about patients’ future than the patients do about themselves. Haley, W.E., LaMonde, L.A. & Han, B.(2001) reported that care giving for a terminally ill loved one has been shown to have adverse effects on caregivers’ physical and mental health. According to Keir, S. T. (2007), evidence indicates that caregivers experience elevated levels of stress. The combined rates of psychiatric diagnosis and mental health service use among the cancer patient caregivers support substantial levels of psychological distress among the studied caregivers (Nina, S., Lauren, C. V., Susan, D. B., Baohui, Z.& Holly, G. P. 2005). Hensel, D.J. & Anderson. J. (2004) concluded that brain cancer caregivers were more likely to be pleased with the quality of both alternative and conventional treatment than patients.

The persistent stress of care giving produced degraded immune response and poorer physical health outcomes compared with demographically matched non-care giving controls (Freeman, L.2004). It is now likely that family caregivers might become ‘another patient’ (Takashi, H. & Yoko, S. 2003). The rates of psychiatric illness among advance cancer patients’ caregivers are likely to increase as the patients’ cancer progresses (Nina, S., Lauren, C. V., Susan, D. B., Baohui, Z.& Holly,
In a research conducted by Davis-Ali, S.H., Chesler, M.A., & Chesney, B.K. (1993) the results point to the need for expanded attention to the concept of cancer as a "Family disease," with special emphasis on the unique and often neglected experience of spouses of adult cancer patients. In addition, spouses and patients report participating equally in the treatment process, yet patients report receiving significantly more social support than do spouses. This study signifies the need and importance of studying cancer-care givers and to enable them to handle their stresses well.

When caregivers talk about their health-related problems, stress seems to be the most pervasive problem (Felisha, L. 2007). Stress over time can wear out a caregiver and what researchers finding is, as the stress on the caregiver increases, it has a negative effect on the patient, the caregiver becomes worn out, and they're less able to solve problems and manage some of the daily care responsibilities (Northouse, et al, 2000).

Researchers investigated feelings of relatives regarding the patient, indicated the following feelings: anxiety; worry; anguish and sadness; powerless; pain and sorrow; lost; fear and panic; stress; trust and security; insecurity; faith and hope and unexplainable feelings. Anxiety was the most common one and was related to the strange environment, the diversified procedures, fear of what will happen tomorrow and expectations of their relatives to get better (Almeida, A.S. et al. 2009). The study assessed and compared the psychosocial needs of patients with breast cancer and of their relatives, the patients' and relatives' burden of illness, anxiety, depression and distress and assessed the patients' cancer treatment-related symptoms and identified relevant factors influencing patients' and relatives' needs. Researchers indicated that patient's relatives' needs primarily concerned access to information and communication with health care professionals. Relatives compared to patients had higher levels of anxiety, depression and distress. Higher levels of depression, younger age and having a disease themselves were associated with relatives' need for help. Researchers concluded that patients' and relatives' substantial needs and psychological problems require professional support even after completion of the patients' treatment. Continued assessment of the patients' and their relatives' needs and of the patients' symptoms provide the basis for purposeful counselling and education.
Rehabilitation programs for patients and their relatives should be developed and implemented in clinical practice (Schmid-Büchi, S., Halfens, R.J., Dassen, T. & Vanden, Bo. B. 2010). Evidence indicates that caregivers experience elevated levels of stress and are willing to learn more about and participate in programs to reduce stress (Keir, S. T. 2007). Nina, S., Lauren, C. V., Susan, D. B., Baohui, Z. & Holly, G. P. (2005), reported that frequency of psychiatric disorders among advance cancer patients’ caregivers which applying DSM-IV diagnostic criteria are: 13.0% met criteria for one or more psychiatric disorders, the most common of which was panic disorder 8.0% followed by major depressive disorder 4.5%, posttraumatic stress disorder 4.0% and generalized anxiety disorder 3.5%. Furthermore, 8% frequency of panic disorder among cancer patients caregivers was higher than the 3% prevalence of panic disorder reported by Westenberg, H.G. & Liebowitz, M.R. (2004) in the general US population. Researchers concluded that the high rate of panic disorder suggests that the physical and psychological stresses of caring for cancer patients may create an increased risk for panic disorder.

Providing care for patients with cancer places caregivers at risk for experiencing elevated levels of stress (Jonas, J. S. & Stephen T. K. 2007). Caregivers are most likely to turn to physicians (64%), friends (62%), siblings (59%), religious leaders (59%) and support groups (53%) for support when they are feeling overwhelmed (Felisha, L. 2007). There are clear relationship between caregiver appraisal and patient quality of life and more so regarding patient stress (Keir, S. T. 2009). Nearly a quarter of all caregivers accessed some type of mental health intervention (eg, psychotherapy or antidepressants). However, less than half (46.2%) of the caregivers with a current DSM-IV disorder had discussed their mental health with a clinician since the patient’s cancer diagnosis (Nina, S., Lauren, C. V., Susan, D. B., Baohui, Z. & Holly, G. P. 2005).

**Sex Differences of caregivers:** In a study to understand sex differences in Emotional and Biological Responses in Spousal Caregivers, the degree of relaxation was determined measuring muscle tension (EMG) in the frontalis and trapezius muscles, skin conductance, skin temperature, and heart rate. Male spousal caregivers, as compared to female spousal caregivers, had significantly lower levels of stress, depression, caregiver burden (subjective), anxiety, anger-hostility, and somatic
symptoms and higher levels of mental health, sense of coherence, natural killer (NK) cell number, and social and physical functioning. Researchers added Men had fewer manifestations of a physiological stress response, as indicated by bioinstrumentation parameters (Thompson, R.L et al. 2004). Likewise, Northouse, et al, (2000) found that women who were thrust into the role of caregiver experienced stress to a greater degree than men in similar situations.

Females are significantly more likely than males to turn to siblings (61% vs. 50%), children (51% vs. 30%), friends (65% vs. 49%), and religious/spiritual leaders (61% vs. 50%) for support. Males are significantly more likely to seek out therapists for support than females (47% vs. 36%) (Felisha, L. 2007). Among women caregivers, because women typically take on more interpersonal relationships, especially within the family, they are at greater risk of emotional distress. "Women are responsible for managing more roles inside and outside the family and hence, they experience more role disruption and distress when illness occurs"(Northouse, et al, 2000).

**Treatment of caregivers:** Overall, after the patient’s cancer diagnosis, 25.5% of caregivers reported accessing at least one form of mental health service. Fewer than half of caregivers (46%; 12 of 26 caregivers) with a diagnosable psychiatric disorder accessed a mental health intervention. The most frequent mental health interventions used by the caregivers were psychotherapy (37%), antidepressants (35%), anxiolytics (28%), visits with clergy (20%), and support groups (14%) services were not mutually exclusive. Caregivers with a psychiatric diagnosis reported considerably more use of antidepressants than caregivers without a diagnosis (26.9% v 6.3%, respectively). The most frequent sources of mental health interventions for caregivers were mental health professionals (41.2%), primary care physicians (31.4%), and clergy (15.7%). only 5.9% of caregivers reported accessing support from oncology social workers. Caregivers reported having initiated 66.7% of mental health interventions (Nina, S., Lauren, C. V., Susan, D. B., Baohui, Z. & Holly, G. P. 2005).

Sharon, L. et al (2009) in their research, over the course of the study of stress busting program including relaxation and guided imagery, found that caregivers had significant decreases in perceived stress, depression, subjective caregiver burden, anxiety, and anger/hostility. In addition, caregivers also had improvements in general health, vitality, social function, and mental health scores. Furthermore, caregiver
interventions (including relaxation and imagery) that result in significant improvements in stress and depression have public health significance because ultimately they will promote the health, well-being, and longevity of caregivers. Time invested in caregivers can save healthcare time and money.

Structured intervention was effective for improving the emotional caregivers, who are likely to suffer from physical and mental symptoms, discomfort of cancer patients. Subjects who participated in relaxation sessions using biofeedback had significant improvement in psychological discomfort detected by the Profile of Mood States (POMS) and in immune functions (Fawzy, F. I., Fawzy, N. W., & Amdt, L. A. 1995).

Research among caregivers indicates that, biofeedback intervention revealed significant improvement in the scores of physical symptoms, immune function, anxiety–mood disorder, and sociality–depression (Takashi, H. & Yoko, S. 2003).

Keir, S. T. (2007) reported that caregivers are willing to learn more about and participate in programs, for example biofeedback to reduce stress. Brain cancer caregivers were more likely to be pleased with the quality of both alternative and conventional treatment than patients (Hensel, D. J. & Anderson, J. 2004). Intervention was used among spouse and children, who were primary caregivers of patients with Alzheimer disease and related dementia (ADRD). It was teaching simple biofeedback relaxation strategies (such as relaxation breathing and guided imagery). The result indicates effectiveness of the intervention and improving quality of life (Hale, J. M., Murphy, M. R., Blackwell, P. H., Bonner, P. N., & Lewis, S. L. 2003). Palliative care and oncology clinic staff should recognize the need to probe about mental health concerns among the dying patient’s caregivers, particularly among caregivers who seem to be the most distressed (Nina, S., Lauren, C. V., Susan, D. B., Baohui, Z., & Holly, G. P. 2005).

Caregivers in the self-instructional groups (including biofeedback and self regulation) showed a reduction in perceived stress. They were also showed a decrease in trait anger. The wait-list group showed no significant change in perceived stress and anger (Mark, C. & Jagdish, D. 1999). Biofeedback techniques have been used to
help caregivers understand more about themselves and to allow them to better understand how to control and regulate stress response (Webster, 1997). Sharon, L. et al (2009) in their research, over the course of the study of stress busting program including biofeedback relaxation and guided imagery, found that caregivers had significant decrease in perceived stress, depression, subjective caregiver burden, anxiety, and anger/hostility. In addition, caregivers also had improvements in general health, vitality, social function, and mental health scores.

Research in behavioral intervention to decrease caregivers' stress and improve management of care recipient behavioral problems, indicates a significant difference between intervention caregivers and control caregivers in hours providing care (Linda O. N.et al. 2008). Caregivers in the self-instructional groups (including biofeedback and self regulation) showed a reduction in perceived stress. They were also showed a decrease in trait anger. The wait-list group showed no significant change in perceived stress and anger (Mark, C. & Jagdish, D.1999). Learning a variety of techniques enables caregivers to identify those that work best for them. Some techniques work better for certain situations. Relaxation is the key component of any stress-management program. There are many methods to manage stress as a biologic response, but the common pathway is relaxation (Sharon L. L. et al.2009). Biofeedback techniques have been used to help caregivers understand more about themselves and to allow them to better understand how to control and regulate stress response (Webster, 1997).

To sum of, caregivers in any disease or disability segment need a careful consideration as they are the key players in the health and management of patients. Studying them becomes indeed the concern of psychologists.