CHAPTER II

REVIEW OF LITERATURE

SECTION – A: THEORETICAL OVERVIEW

Cancer can occur at any site or tissue of the body and may involve any type of cells. The major categories of cancer are: (a) Carcinomas, which arise from the epithelial cells lining the internal surface of the various organs (e.g. mouth, oesophagus, intestines, uterus and from skin epithelium. (b) Sarcomas, which arise from the mesodermal cells constituting the various connective tissues (e.g; fibrous tissue, fat and bone); and (c) lymphomas, myeloma and lukaemia arising from the cells of bone marrow and immune systems. (Park K., 2000)

The term ‘primary tumour’ is used to denote cancer in the organ of origin, while ‘secondary tumour’ denotes cancer that has spread to regional lymph nodes and distant organs. When cancer cells multiply and reach a critical size, the cancer is clinically evident as a lump or ulcer localized to the region of origin in early stages. As the disease advances, symptoms and signs of invasion and distant metastases becomes clinically evident.

CANCER – GLOBAL SCENARIO

Cancer afflicts all communities worldwide, approximately ten million people are diagnosed with cancer and more than six million die of the disease every year. About 22.4 million persons were living with cancer in the year 2000. (WHO, 2003). This represents an increase of around 19 percent in incidence and 18 percent in mortality since 1990.
In terms of incidence, the most common cancers worldwide are lung cancer (12.3% of all cancers), breast cancer (10.4%), and colorectal cancer (9.4%). Lung cancers accounts for most deaths from cancer in the world annually since it is most invariably associated with poor prognosis. Appropriate intervention is often effective in avoiding fatal outcome following diagnosis of breast cancer.

The most conspicuous feature of the distribution of cancers between the sexes is the male predominance of lung cancer. Stomach, oesophageal, liver and bladder cancer are also much more common in males. For the most part, differences in distribution between the sexes are attributable to differences in exposure to causative agents rather than to variation in the susceptibility.

In some western countries, cancer mortality rates have recently started to decline, due to the reduction in smoking prevalence improved early detection and advances in cancer therapy. (WHO, 2003)

In India, Indonesia, Sri Lanka and Thailand, the most common site of cancer in men are respiratory tract cancers, and cancer of cervix is the most common cancer in women in India and Indonesia. Cancers associated with the use of tobacco constitute nearly 44.6% of cancers in men, and 20% of cancers in women. Over 80% percent of cases come for treatment at a very late stage when survival rates are low.

**India**

It is estimated that there are approximately 2-2.5 million cases of cancer in India at any given point of time, with around 7-9 lakh new cases being detected each year. Nearly half of these cases die each year.
The six population based cancer registries in India cover a population of 34 million, i.e., 18.4 million males and 15.6 million females. Among males high incidence rates were reported for tobacco related cancers. The number of cancer cases among males is estimated as 3.9 lakh and among females 4.3 lakh. The estimated number of deaths from all the six population based registries are 25.19 per 100,000 population for males and 23.52 per 100,000 population for females. (WHO, 1999)

The four most frequent cancer in males in India are mouth/oropharynx, oesophagus, stomach and lower respiratory tract. For women cancers of the cervix, breast mouth/oropharynx and oesophagus are the most frequent. A number of these cancers are amenable to primary and secondary prevention. Tobacco, which is widely used in India, is a major cause of cancer upper digestive and respiratory tract.

Among Indian women cancers of the cervix, ovary and breast account for nearly 60 percent of all cancers. Several studies showed a close association of cervical cancer with poor genital hygiene, early consummation of marriage, multiple pregnancies and contact with multiple sexual partners. It is also reported that breast cancer is proportionately on the increase in a few metropolitan areas of India. This appears to be related to late marriage, birth of the first child at a late age, fewer children, and shorter period of breast-feeding, which are increasingly common practice among the educated urban women.

**Time Trends**

At the beginning of the century, cancer was the sixth cause of death in industrialized countries; today, it is the second leading cause of death. The
three main reasons for this increase being longer life expectancy, more diagnoses that are accurate and the rise in cigarette smoking.

There are wide variations in the distribution of cancer throughout the world. International variations in the pattern of cancer are attributed to multiple factors such as environmental factors, food habits, life style, genetic factors or even inadequacy in detection and reporting of cases.

**Causes of cancer**

As with other chronic diseases, cancer has a multifactorial aetiology.

Environmental factors are generally, held responsible for 80-90% all human cancers. The major environmental factors identified so far include; Tobacco, Alcohol, Dietary factors, Occupational exposures, Viruses, parasites, Customs, habits, life styles and numerous other environmental factors such as sunlight, radiation, air and water pollution, pesticides and certain medications. (WHO, 1983)

Tobacco is various forms of its usage (e.g. smoking, chewing) is the major environmental cause of cancers of the lung, larynx, mouth, pharynx, oesophagus, bladder, pancreas and probably kidney.

Excessive intake of alcohol beverages is associated with oesophageal cancer. Some recent studies are suggested that beer consumption may be associated with rectal cancer. (Kabat. et al. 1986) It is estimated that alcohol contributed to about 3% of all cancer deaths. (Rothman, 1980)

Dietary factors are also related to cancer. Smoked fish is related to stomach cancer, dietary fibre to intestinal cancer, beef consumption to bowel cancer and a high fat diet to breast cancer.
Occupation exposures include exposure to benzene, arsenic, cadmium, chromium, vinyl chloride, asbestos, polycyclic hydrocarbons etc., Occupational exposures are usually reported to account for 1 to 5% of all human cancers. (Doll et. al. 1981)

An intensive search for viral origin of human cancers revealed that hepatitis B and C Virus is causally related hepatocellular carcinoma. The relative risk of Kaposi’s sarcoma occurring in patients with HIV infection is so high that it was the manifestation of the AIDS epidemic to be recognized. The Epstein - Barr virus (EBV) is associated with two human malignancies, viz Burkitt’s lymphoma and naso pharyngeal carcinoma.

Parasitic infections may also increase the risk of cancer as for example, schistosomiasis in Middle East producing carcinoma of the bladder.

To the above causes must be added customs, habits and life-styles of people, which may be associated with increased risk cancers. The familiar examples are the demonstrated association between smoking and lung cancer. Tobacco and betel chewing and oral cancer, etc. (Reddy, 1968)

It is postulated that 80% of cancers may be due to environmental factors, and it is possible that some dietetic factors will be involved. Population surveys have shown a strong positive correlation between cancer colon and dietary intake of fat (Jain.M et.al. 1980). It has been suggests that the high fat in take accounts for the high incidence of colon cancer in western communities. In Japan, recent increases in fat consumption have been associated with striking increase in rates of colon cancer (Willet, 1984).

A positive correlation between per capita consumption of dietary fat and breast cancer rates have also been noted. A reduction in dietary fat may
alter the risk of breast cancer (Miller et.al. 1978), perhaps by increasing oestrogen production on prolactin release (Wynder et.al. 1977).

Several studies indicate that the risk of colon cancer is inversely related to the consumption of dietary fibre, which may protect against intestinal carcinogens or precursors by delusional or other effects (Burkitt, 1971). The weight of evidence generally supports the hypothesis that fibre protects against colon cancer (Willet, 1984). Micronutrients may also have a protective influence, since cancers of the lung and several other sites have been associated with a low intake of Vitamin A (Fraumenti, 1982). The risk of stomach cancer has been related to deficiency of Vitamin C (Weisburger, et.al. 1980).

Carcinogenesis is the process whereby external influence causes cancer. Carcinogenesis divided into initiation, in which cells undergo transformation into a premalignant stage and promotion, in which these cells are induces to form a tumour. The agents, which cause cancer, are termed carcinogens. Tumrogenesis is a multistep process that evolves because of the accumulation of a number of genetic mutations. The gene, which are known to play a vital role in this process are divided into two major categories, oncogenes and tumour suppressor genes. An oncogene is a normal regularity gene whose protein product usually promotes cell growth and proliferation. Because of genetic alteration, the activity of an oncogae is increased, and this is often referred to as ‘gain of function’. In contrast to oncogenes, tumour suppressor genes are inactivated to produce a tumorigenic effect or are said to undergo ‘loss of function’. (Bailey and Love, 2004)

As in normal tissue, the commonest form of all death in tumours in apoptosis. All death is a very important aspect of tumour kinetics, and
resistance of cells to apoptosis appears to be central in the development of fanatic instability and subsequent malignancy. In addition, apoptosis appears to be an important form of cell death in response to radiotherapy and chemotherapy, and resistance of tumour cells to apoptosis may confer radio and chemo resistance on the tumour.

**Epidemiology of selected cancers**

1. **Head and Neck Cancers**

   **Oral cancer** is one of the ten most common cancers in the world. Its high frequency in Central and South East Asian countries (eg., India, Bangladesh, Sri Lanka, Thailand, Indonesia, Pakistan) has been well documented. Each year about 5,75,000 new cases and 3,35,000 deaths occur worldwide. (WHO, 1997)

   With estimated incidence of 12-48 cases per 100,000 populations for males and 5-52 per 100,000 populations in females, oral cancer is a major problem in India. The estimated mortality is about 3.48 per 100,000 in males and 1.34 per 100,000 in females (ICMR, 2004).

   Approximately 90 per cent of oral cancers in South East Asia are linked to tobacco chewing and tobacco smoking. Data indicates that oral cancer can also be caused by high concentrations of alcohol, and that alcohol appears to have a synergistic effect in tobacco users. Another type of cancer in the Eastern coastal regions of Andhra Pradesh state in India is the epidermoid carcinoma of the hard palate. It is associated with the habit of reverse smoking of cigar.

   Oral/oropharyngeal cancer is an almost entirely preventable disease, being caused by tobacco use, either with or without alcohol. West, this is mostly cigarette smoking combined with alcohol abuse, the risk of both in
combination being greater than the summation of the risks of each in individually.

Oropharyngeal carcinoma accounts for 40% of malignancy in some countries, e.g. India. Abstinence from pan, tobacco and alcohol would dramatically reduce its incidence. Survival remains at around 55% at five years, despite improvement in treatments. By the time, that oropharyngeal carcinoma is diagnosed; it is often a systemic disease. (Bailey & Love, 2004)

**Oral and Oropharyngeal Cancer**

90% of all and cancers result from the use of tobacco and alcohol. In global terms, oral / oropharyngeal cancer in the sixth most common malignancy. The incidence is increasing particularly in younger people in western world. In Asia, oral / oropharyngeal malignancy is the most common malignant tumour, accounting, in parts of India, for no less than 40 percent of all malignancy. It has been estimated that globally there are nearly 500,000 new cases annually, and that in the year 2000 there were 1.5 million people with oral cancer alive at any one time. The incidence is greater in men than in women. It is predominantly a disease of the elderly.

Oropharyngeal cancer is an almost entirely preventable disease, being caused by tobacco use either with or without alcohol. In Asia, and in the Far East smoking ‘pan’ and reverse smoking are the major aetiopathological agents. Lesions and conditions of the oral mucosa associated with an increased risk of malignancy are leukoplakia, erythroplakia, chronic hyperplastic candidiasis, oral submucous fibrosis, syphilitic glossitis, sideropaenic dysplasia etc.
Oral cancers include cancer of the tongue, cancer of the floor of the mouth, carcinoma of the gingival alveolar ridge, carcinoma of buccial mucosa, hard palate, maxillary alveolar ridge and floor of antrum.

Oral carcinoma presents as indurated ulcers that bleed in floor of mouth, slurring of speech when tongue involved, tooth extraction socket that fails to heal and gingival inflammation with dentures no longer fitting.

Historically, 50% to 60% of patients with locoregionally advanced head and neck cancer treated with radiation therapy (RT), surgery, or both have developed locoregional recurrence in 2 years and 20% to 30% developed distant metastases. They add, for unresectable head and neck cancer, the 5-year survival rate with RT alone is less than 25%.

However, it must be remembered that not all of these deaths are attributable to the primary tumor: independent second malignancies are detected in 3% to 4% of head and neck cancer survivors every year, and the comorbidities associated with the use of alcohol and tobacco (that likely promoted the original tumor) account for deaths as well.

2. Breast Cancer:

Breast cancer is one of the commonest causes of death in many developed countries in middle-aged women. Breast cancer causes 5,19,000 deaths a year worldwide. Mortality rates from Breast cancer have increased during the past 60 years in every country. (Logan, 1975)

The established risk factors of breast cancer include age, family history, parity; age at menarche and menopause, hormonal factors, diet etc., Breast cancer is unknown below age of 35 years and the incidence increasing rapidly. Between the age of 35 and 50. The risk is high in those with a positive family history of breast cancer, especially if a mother or sister
developed breast cancer when premenopausal. The risk of breast cancer is directly related to the age at which women bear the first child. (Macmahon et.al.) Unmarried women tend to have more breast tumours than married single women, and nulliparous women had the same risk.

Breast cancer is the most common cause of death in middle-aged women in western countries. In 1998, approximately one million new cases were diagnosed worldwide. Carcinoma of the breast is extremely rare before the age of 20 years. Less than 0.5 % of patients with breast cancer are males. Breast cancer is common in nulliparous women, and breast-feeding in particular appears to be protective. In addition, protective is having a first child at an early age especially is associated with late menarche and early menopause. It is known that in postmenopausal women, breast cancer is more in the obese.

Most breast cancers occurs will present as a hard lump, which may be associated with in drawing of the nipple.

Treatment of early breast cancer with usually involve surgery with or without radio therapy systemic therapy such as chemotherapy or hormone therapy is added if there are adverse prognostic factors.

3. **Cancers of the Alimentary System** includes Cancer of the Oesophagus, Cancer of the stomach and Colorectal carcinoma.

a. **Carcinoma of the Oesophagus.**

   Cancer of the oesophagus is the ninth most common cancer in the world. In general, it is a disease of mid to late adulthood, with a poor survival rate, squamouscell usually affects upper two thirds, adenocarcinoma usually affects lower one third. Common aetiological factors are tobacco, alcohol and GERD. Dysphagia is the most common presenting symptom.
Adenocarcinoma now accounts for 60-75% of all oesophageal cancers in several countries. There has been an increase in the incidence of carcinoma of the cardia of the stomach. The poor prognosis of oesophageal cancer is proof of its ability to spread.

b. **Carcinoma of the Stomach (Gastric Cancer)**

Stomach cancer is the world’s second most common cancer, with over one million new cases per year. Nearly two thirds occur in developing countries. Incidence in men is nearly twice that in women. Most gastric cancers are adenocarcinomas. The constant decline in stomach cancer in industrialized countries is linked to improved food preservation practices; better nutrition more rich in vitamins from fresh vegetables and fruits; and less consumption of preserved, cured and salted foods. Infection with bacterium Helicobacter pylori contributes to the risk, probably by interacting with other factors. Stomach cancer cases have a generally poor survival prognosis, averaging no more than 20% survival after five years.

Carcinoma of the stomach is a major cause of cancer mortality worldwide. Gastric cancer is an eminently curable disease provided, that it is detected at an appropriate stage and treated adequately. The only treatment modality able to cure the disease is resectional surgery. Gastric cancer is one of the most common causes of cancer death in the world. The outlook is generally poor, owing to the advanced stage of tumour presentation. The aetiology of gastric cancer is multifactorial. Early gastric cancer is with high cure rates. Gastric cancer can be classified into intestinal and diffuse types. Treatment of curable cases is by radical surgery and removal of the second tier of nodes.
c. **Colorectal Carcinoma**

Colorectal carcinoma is the fourth most common variety of malignant tumour found in women, and its frequency in men is surpassed only by carcinoma of the bronchus.

Carcinoma of the rectum can occur early in life. However, the adult age of presentation is usually above 55 years. Bleeding is the earliest and most common symptom. Patient has a sense of incomplete defecation. The patients’ bowel open but there is a sensation that there are more faeces to be passed. (Tenesmus, a painful straining to empty the bowels without resultant evacuation). This is a very important early symptom and is almost invariably present in tumour of the lower half of the rectum. The patient may endeavour to empty the rectum several times a day often with the passage of flatus and a little blood stained mucus (bloody slime). Alteration in bowel habit is the next most frequent symptom. A patient who has to get up before the accustomed hour in order to defecate or one who person blood and mucus in addition to faeces (early morning bloody diarrhea), is usually found to be suffering from carcinoma of the rectum. Pain is the late symptom. Surgery is the mainstay of curative therapy. Adjuvant pre operative radiotherapy can reduce local recurrence. Adjuvant chemotherapy can improve survival in node positive cases.

According to Lawrence et al. (2009), the treatment of resectable colorectal cancer metastases to the liver has undergone changes with the addition of active chemotherapeutic agents, innovations and definition in the surgical procedures, understanding of the benefits and toxicities of the surgical and chemotherapeutic (cytotoxic and biologic) interventions, and use of the team approach. Patients are initially evaluated for the overall risk
of their disease, which includes the standard parameters for disease recurrence and blends in disease and patient comorbidities and likelihood of surgical success. Advanced imaging techniques are mandatory in the initial evaluation. Rather than approaching the patient with sequential, independent therapies and handoff from specialist to specialist, a continuous interaction is required. This article outlines the initial consultation, required team components, surgical decision-making, and use of cytotoxic and biologic agents. The implication is that the best outcomes can only be achieved with the use of all modalities.

The combined-modality care of the patient with colon or rectal cancer metastatic to the liver demands a team approach. It is little wonder that there is much confusion about this topic, given the number of unique treatment options that are delivered in a sequential and reiterative process. The concept of multidisciplinary approaches to complex cancer challenges has been adopted for a variety of tumor types and situations.

Questions of therapy sequencing, therapy-associated morbidity, and disease-related morbidity that limit the use of multiple interventions have necessitated an approach that is data-driven and response-modulated. For patients with colon or rectal cancer metastatic to the liver, both oncologic and functional outcomes are important. The interaction of the modalities must be considered as well as the relative benefits of any single one.

The components of the multidisciplinary team include those with expertise in:

Diagnostic Radiology, Medical Oncology and Surgical Oncology.
4. **Primary Lung Cancer**

Lung cancer is one of the most common cancer throughout the world. From diagnosis, 80% of patients are dead within one year and only 5% survive for five years.

About 95% of cases are believed to be directly related to cigarette smoking. So it is clear that by far the biggest factor in rising and falling incidences of lung cancer is tobacco smoking. The risk is related to the lifetime quantity of cigarettes smoked, which is commonly quoted as ‘pack-years’.

The main symptoms of lung cancer are haemoptysis, cough, pain, dysmpoca, hoarseness and myopathies.

Carcinoma of the bronchus generally has a low survival rate after diagnosis.

Lung cancer has been known in industrial workers from the late 19th century. Globally 85% of cases in men and 46 percent is women are due to smoking. Tobacco smoking was first suggested as a cause of lung cancer in the 1920’s. Subsequent studies proved the causal relationship between cigarette smoking and lung cancer. Besides cigarette smoking there are other factors like air pollution, radioactivity, and occupational exposure to asbestos, arsenic and its compounds. The total burden of lung cancer in any country is directly related to the amount and duration of cigarette smoking (WHO, 1975).

Locally advanced non-small-cell lung cancer is a heterogeneous group of diseases encompassing both stage IIIA and IIIB disease. (Ani et. al., 2010) The treatment options vary, including surgery, chemotherapy, neoadjuvant concurrent chemoradiation, definitive chemoradiation, radiation, and various
combinations of the above. Optimal therapy for each patient group is controversial; however, previous trials have shown efficacy of various treatments for different stages. Surgery as initial therapy is beneficial for patients with stage T3, N1 or T3-4, N0-1 disease due to satellite lesions within the same lung. Chemotherapy should be used for diseases minimally involving the mediastinal lymph nodes, whereas concurrent induction chemoradiation is a good option for bulky nodal disease prior to planning a resection. Concurrent definitive chemoradiation or definitive radiation should be reserved for patients who are not candidates for a surgical resection. Most importantly, the treatment strategy for stage IIIA/IIIB disease should involve a multimodality approach individualized to the patient’s disease stage, age, underlying medical conditions, and performance status.

Psychosocial factors and cancer

Hardly any disease is more feared than cancer. The precise trigger for the disease is not well understood. Certain cells in the body become altered and multiply rapidly in an uncontrolled fashion. As these cells grow they form tumours, if left unchecked, suck nutrients from healthy cells and body tissue, ultimately destroying the body’s ability to function properly.

Although the processes involved in the spread of cancer are basically physiological in natures, accumulating evidence suggests that the emotional responses of cancer patients to their disease may save a critical effect on its course.

Stress

Stress is the response to events that are threatening or challenging. Life is full of circumstances and events, known as stressors, which produce threats to our well-being. Even pleasant events can produce stress, although
negative events result in greater detrimental consequences than positive ones (Sarason, Johnson & Siegel, 1978; Brown & McGill, 1989)

All of us face stress in our lives some health psychologists believe that daily life actually involves a series of repeated sequences of perceiving a threat, considering ways to cope with it, and ultimately adapting to the threat, with greater or lesser success (Baum, 1983). Although adaptation is often minor and occurs without our being aware of it, in those case in which the stress is more severe or longer-lasting, adaptation requires major effort and may produce physiological and psychological responses that result in health problems.

Stress can take its toll in many ways, producing both biological and psychological consequences. Often the immediate reaction to stress is a biological one. Exposure to stressors induces a rise in certain hormones secreted by the adrenal glands, an increase in heart rate and blood pressure, and changes in who well the skin conducts electrical impulses (Mason, 1975; Selye, 1976). On a short-term basis, these responses maybe adaptive because they produce an “emergency reaction,” in which the body prepared to defend itself through activation of the sympathetic nervous system. These responses may allow more effective coping with stressful situation.

However, continued exposure to stress in a decline in the body’s overall level of biological functioning due to the constant secretion of the stress-related hormones. Over time, stressful reactions can promote deterioration of body tissues such as blood vessels and the heart. Ultimately, we become more susceptible to disease as our ability to fight off germs is lowered (Kiecolt-Glaser & Glaser, 1986; Schneiderman, 1983; Cohen, Tyrrell, & Smith, 1991).
In addition to major health difficulties, many of the minor aches and pains we experience may be caused or worsened by stress. These include headaches, backaches, skin rashes, indigestion, fatigue, and constipation. Stress has even been linked to the common cold (Brown, 1984; Cohen, Tyrrell & Smith 1993).

Furthermore, a whole class of medical problems, known as psychosomatic disorders, often result from stress. These medical problems are caused by an interaction of psychological, emotional, and physical difficulties. Among the most common psychosomatic disorders are ulcers, asthma, arthritis, high blood pressure, and eczema (Shorter, 1991). In fact, the likelihood of the onset of any major illness seems to be related to the number and type of stressful events a person experiences.

On a psychological level, high levels of stress prevent people from coping with life adequately. Their view of the environment can become clouded. Moreover, at the greatest levels of stress, emotional responses may be so extreme that people are unable to act at all. People under a lot of stress also become less able to deal with new stressors. The ability to contend with future stress, then, declines because of past stress (Eckenrode, 1984; Glaser & Kiecolt-Glaser, 1944; Avison & Gotlib, 1994).

General Adaptation syndrome (GAS) is theory developed by Selye which suggests that a person’s response to stress consists of three stages: alarm and mobilization, resistance, and exhaustion (Selye, 1976). The effects of stress are best illustrated by a model developed by Hans Selye (Pronounced “sell-yea”). A major stress theorist (Selye, 1976). This model, the general adaptation syndrome (GAS), suggests that the same set of
physiological reactions to stress occurs regardless of the particular cause of stress.

The model has three phases. The first stage, the alarm and mobilization stage, occurs when people become aware of the presence of a stressor. Suppose, for instance, you learned at the end of the first term of college that you were on academic probation because of your low grades. You would be likely to respond first with alarm, feeling concerned and upset. Subsequently, though, you would probably begin to mobilize your efforts, making plans and promises to yourself to study harder for the rest of the school year.

On a physiological level, the sympathetic nervous system is energized during the alarm and mobilization phase. Prolonged activation of this system may lead to problems of the blood circulatory system or stomach ulcers, and the body may become vulnerable to a host of diseases.

If the stressor persists, people move into the next stage of the model. In the resistance stage, people prepare themselves to fight the stressor. During resistance, people use various means to cope with stressor – sometimes successfully-but at a cost some degree of physical or psychological general well-being. For instance, in the case of your placed on academic probation, resistance might take the form of devoting long hours to studying. Your may ultimately be successful in rising your grades, but achievement may come at the expense of a loss of sleep and hours of worry.

If resistance is not adequate, the last stage of the model, the exhaustion is reached. During the exhaustion stage, a persons stability to adapt the stress to declines to the point where negative consequences of stress appear: physical illness, psychological symptoms in the form of an
inability to concentrate, heightened irritability, or, in severe instances, disorientation and a loss of touch with reality. In a sense, people wear out. For instance, if one becomes overwhelmed by pressure to perform well in your courses, he may get sick or find it impossible to study altogether.

Of course, not everyone reaches the exhaustion stage, if people can resist a stressor in the second stage, their physical resources are not drained and they can bounce back, thereby avoiding exhaustion.

The GAS model has had a substantial impact on our understanding of stress. By suggesting that the exhaustion of resources in the third stage of the model produces physiological damage, it has provided a specific explanation of how stress can lead to illness. Furthermore, the model can be applied to both people and nonhuman species.

A number of factors have to be considered in the study of stress, for example, the multidimensionality of the nature of workplace stress, the definition of stress, the direct relationship between stress and behavior, coping with stress and the increasing negative effects of stress on work. The multidimensionality of stress, according to Hogan and Joyce (1982), is evidenced by the fact that it takes different forms and is the concern of different fields, for example, Clinical and Applied Psychology, Anthropology, Sociology, Psychosomatic Medicine, Industrial Relations and Epidemiology.

Stressors can derive from any component of the quality of life, whether economic, physical, emotional, social, intellectual or spiritual, as discussed by Girdano et al (1993). Stress can influence individual behavior either negatively or positively. Many researchers, such as Spielberger (1979), believe that workplace stress is one of the most important factors affecting
productivity because of the direct relationship between individual behavior and the stress experienced.

Some researchers have understood stress as person-environment fit (Bhagat et al, 1995; Mass, 1981; ILO, 1984). The study by Bhagat et al, (1995) defined stress as “a problematic level of environmental demand that interacts with the individual to change his/her psychological or physiological condition such that the person (mind or/and body) is forced to deviate from normal functioning”. Arroba and James (1987), however, define stress as a result of pressure. It is first necessary to understand the person and environmental circumstances before the cause of stress is understood (Lazarus, 1995). Spielberger and Sarason (1986) find that the environment must be dealt with first, which means that multiple variables have first to be tackled.

According to Matteson and Ivancivich (1987), is “an adaptive response, moderated by individual differences, that is a consequence of any action, situation, or event that places special demands upon a person.” Similarly, Barhem et al (2004) define stress as an extraordinary state affecting individual human functions as an outcome of internal and external factors which differ qualitatively (having different types of stressors) and quantitatively (having different numbers of stressors) from individual performance, due to individual differences. Alternatively, Hendrix et al (1995) define stress as “an uncomfortable cognitive state resulting from exposure to a stressor that can result in psychological and physiological strain.” Fontana (1989), for his part, defines stress in relation to personal capabilities ‘a demand made on the adaptive capacities of the mind and body’.
Hormones of the Stress Response

The autonomic nervous system controls bodily functions, which we are largely unaware of and do not consciously control. The part of the autonomic nervous system that is activated during emergencies is the sympathetic nervous system, which speeds up systems needed for survival. The other part of the autonomic nervous system, the parasympathetic nervous system, plays an opposing role. It mediates passive activities and promotes growth and energy storage. Parts of this system are also called into play during stress to slow down systems not required for survival.

When something stressful happens or you think a stressful thought, many hormones are released by the brain, nervous system, and other organs:

1) The base of the brain, the hypothalamus, secretes an array of hormones into the blood, mainly corticotropin releasing factor, which triggers the pituitary to release the hormone corticotropin (ACTH). ACTH in the bloodstream triggers the release of glucocorticoids by the adrenal gland.

2) The sympathetic nervous system releases epinephrine (adrenaline), and norepinephrine (noradrenaline) into the bloodstream.

3) The pancreas releases a hormone called glucagon, which raises the circulating levels of glucose in the blood.

4) The pituitary releases prolactin, suppressing reproductive systems and vasopressin, the anti-diuretic hormone.

5) Both the brain and the pituitary release morphine-like substances called endorphins and enkephalins, which limit pain perception.
Epinephrine and glucocorticoids appear to act in similar ways; however, epinephrine acts within seconds, while glucocorticoids are slower-acting, backing up the epinephrine for minutes or hours. Together, epinephrine, norepinephrine, and the glucocorticoids account for a large portion of what happens in the body during stress.

At the same time, the secretions of the reproductive hormones (estrogen, progesterone, and testosterone) and the growth hormones are inhibited during stress to conserve energy for the imminent fight or flight. The secretion of insulin is also inhibited, which normally tells the body to store energy.

**Anxiety**

Anxiety is a feeling of apprehension or tension, in reaction to stressful situations. There is nothing wrong with such anxiety; everyone feels it some degree, and usually its is reaction to stress that helps rather than hinders, our dialing functioning. But some people experience anxiety in situations in which there is no external reason or cause. When anxiety occurs without external justification and beings to impede people’s daily functioning, it is considered a psychological problem known as an anxiety disorder. There are four main types of anxiety disorders: generalized anxiety disorder, panic disorder, phobic disorder, and obsessive–compulsive disorder.

The psychological meaning of each anxiety component is described here briefly. However, we must indicate here that tension and guilt proneness play a dominant role in the anxiety pattern. Next in order of importance are dimensions of maturity, suspiciousness, and lack of itself control.
Psychological Description of The Anxiety Dimensions

Dimension Tn (Tension)

The person who scores high on Tn tends to be very tense, excitable, frustrated, driven, restless, fretful and impatient. He is often fatigued, but unable to remain inactive. In groups he takes a poor view of the degree of unity, orderliness and leadership. His frustration represents an excess of stimulated by undercharged drive.

The person who scores low on Tn tends to be sedate, relaxed, tranquil, composed and satisfied (not frustrated at all). In some situations, however, his over-satisfaction can lead to laziness and result in low performance, in the sense that low motivation produces little trail and error behaviour. Conversely, high-tension level may disrupt school and work performance. Occupationally, news media persons, journalists, and persons in job which may give less opportunity for self-expression, but which releases an onslaught of environmental demands score high on Tn. Whereas, pilots, airhostesses, nurses and surgeons etc., score low on Tn.

Dimension Gp (Guilt Proneness)

The person who scores high on dimension Gp tends to be depressed, apprehensive, troubled, moody, a worrier, full of foreboding and brooding. He has a childlike tendency to anxiety in difficulties. He does not feel accepted or free to participate in groups. High Gp score is common in clinical groups of all types. They are considered ineffective speakers. Remain rigidly task oriented in their remarks have few peers as friends.

The person who scores low on dimension Gp tends to be self assures, confident, screen, placid, with unshakable nerve. He has a mature, unanxious confidence in himself and his capacity to deal with things. He is resilient and
secure but to the point of being insensitive of when a group is not going along with him, so that he may evoke antipathies and distrust. High scores generally belong to religions groups, artists, farmers, etc., However, Gp is low in electricians, professional athletes and sales personnel.

**Dimension Ma (Maturity)**

The person who scores high on dimension Ma is easily affected by feelings and tends to be low frustration tolerance, changeable and plastic. He evades necessary reality demands, and is neurotically fatigues. He tends to be fretful, easily emotional and annoyed; active in dissatisfaction having neurotic symptoms like phobias, sleep disturbances psychosomatic complaints etc., Low Ma score is common of almost all forms of neurotic and some psychotic disorders.

The person who scores low on Ma is emotionally stable, faces reality, and clam. He tends to be emotionally mature, stable, realistic about life, unruffled, possessing ego strength, better able to maintain slid group morale. Sometimes ge may be person marking resigned adjustment of unsolved emotional problems. Occupational data suggests in which the individuals belong to these occupations in which the individual can set his own pace and does not require sudden adjustments, such as clerks, writers, postmen etc.,

**Dimension Su (Suspiciousness)**

The person who scores high on Su tends to be suspicious, mistrusting doubtful and hard to fool. He is often involved in his own ego, is self, opinionated, and interested in internal, mental life. He is usually deliberate in his actions, unconcerned about other people, a poor team member.

The person who scores low on dimension Su tends to be trusting, free of jealous tendencies, adaptable, cheerful, uncompetitive, concerned about
other people, a good team worker and easy to get on with. High scores usually belong to scientific or engineering professions. Even accountants tend to score above average on this dimension.

**Dimension Sc (Self Control)**

The person who scores high on dimension Sc will not be bothered with will control and regard for social demands. He is careless of protocol and follows own urges. He is not overly considerable, careful, show affective adjustments (but not like a paranoid).

The person who scores low on dimension Sc tends to strong control of his emotions and general behaviour. He is inclined to be socially aware and careful and gives evidence of what commonly termed “self-respect” and regard to social reputation. He tends to be socially very precise and follows self-image.

As a general personality dimension, Sc appears to represent the level of development of the conscious, behaviour integrating self-sentiment (i.e., the extent to which the person has crystallized for himself a clear, consistent, admired pattern of socially approved behaviour to which he makes definite efforts to conform). In terms of anxiety, one can briefly capsulize its meaning as a lowered sense of personal worth or self-esteem.

Low scoring individuals generally belong to the occupational group of administrators, electricians and technicians: in all of whom objectivity, balance and decisiveness are essential.

In clinical practice or research, whether the diagnosis is for therapeutic purposes, or for detecting psychological origins of physical disorders, or for analyzing stress reactions to internal disturbance, it is increasingly necessary to have a standard and dependable measures of
Further, there are also many situations in educational and social psychology where accurate assessment of anxiety level is of prime importance.

Often, especially in clinical practice, anxiety has been measured by observation and interview. Unfortunately, there are many reasons like lack of frankness, differences in use of words lack of a standardized situation, which make an accurate interview estimate very difficult and rare. Evidence shows that even skilled diagnosticians working with the same definition of anxiety may disagree on diagnosed anxiety level. There agreement on diagnosed anxiety level may reach to the extent of reliability coefficient .20 or .30 only.

The reason for disagreement among skilled clinicians is at least partly due to disparity in definitions of anxiety and anxiety manifestations from clinician to clinician. Some explain anxiety as an unpleasant emotional state in which a present or continuing strong desire or drive seems likely to miss this goal, few others describe it as a fusion of fear with the anticipation of future evil or a feeling of threat especially a fearsome threat, without the individual being able to say what he thinks threaten him. Further, the relative weight assigned to tension level or general emotionality and the perceived importance of internal dynamics versus manifest symptomology can easily lead to great disparity between two highly trained psychologies or psychiatrists.

The State Trait Anxiety Test (STAT) is based upon the MAP Series which measures 20 personality dimensions. However, none of the 20 primary personality dimensions by itself could clearly be interpreted as anxiety. Five of them contain immediate manifest content suggesting psychiatric symptoms of anxiety. That is, these five dimensions involve questions which
“look like” anxiety. They ask, for example, whether the examine has difficulty in sleeping, cries easily, feels guilty, etc., Moreover, these primary source dimensions which seemed to share a common anxiety content in fact showed a pattern of correlations which provided empirical evidence that single, unifying influence was at work.

The State-Trait Anxiety Inventory (STAI). The authors of the Polish version of the inventory are Spielberger, Stelau, Tysarczyk, Wrzesniewski and Sosnowski. It is an adaptation of the American version of the test developed by Spielberger, Gorsuch and Lushemne. This instrument enables one to differentiate and to measure independently to different types of anxiety, namely, anxiety understood as the current state of an individual (“state anxiety”) and anxiety understood as a relatively stable trait of this individual’s personality (“trait anxiety”). Both scales contain 20 short statements assessing the patient’s subjective feelings. The received results are compared with suitable centile norms. Results under 30 centile show the low level of anxiety, between 30 and 60 centile indicate the high level of anxiety and more than 60 centile indicate the high level of anxiety. This inventory is an instrument that lives up to the requirements of modern psychometry. It has high reliability and accuracy index, respectively (Wrzesbiewski .K et. al.2002).

In case of cancer, patients’ anxiety is enhanced by the fact that cancer, in common opinion, is a lethal disease, and in most cases, medicine is not able to offer the patient a radical treatment. Consequently, accompanying symptoms connected with cancer progression cause enormous suffering.
Depression

Depression is a common mental disorder that presents with depressed mood and/or loss of interest. It is mainly due to adverse life events, disease or medications. It affects important mental and social functions, which depending on the severity might substantially impair a patient’s abilities to carry out simple daily activities. Episodes might last for 1 year, be recurrent or become chronic. Fifteen per cent of patient will commit suicide if not treated.

Depression accounted for 4.5% of the global and 7.6% of the European burden of disease in the year 2002. Depression affects 3–15% of the general population; 0.4–5% of cases are severe. It affects mainly adults, women, and low-income groups. In young people, the prevalence of depression is 0.3% in preschool children; 2% in schoolchildren; and 4–8% in adolescents. Children of both sexes are equally affected, but in adolescents, females are affected twice as often as males. The symptoms may include behavioural problems, social isolation and difficulties at school; thus, depression is frequently misdiagnosed as “growing pains”. Depression in adolescents is risk factor for depression and bipolar disorder during adulthood; drug or alcohol abuse; and suicide. Suicide is one of the major causes of adolescent mortality.

The percentage of the elderly affected by depression ranges from 2.5% to 53% depending on the setting. Concurrence of other chronic diseases, polymedication, and behavioural symptoms, might mask the psychological symptoms of depression (“depression without sadness”). The suicide rate in the elderly is greater than that for any other segment of the population.
Depressed patients incur higher medical costs, perform worse at work and have a higher level of absenteeism than those who are not depressed. In the general population, depression is often undiagnosed or misdiagnosed and even more frequently untreated. In general, fewer than 40% of cases are diagnosed at the primary care level; fewer than 40% of these are treated; and around 40% of treated patients take their medicines as indicated. Assuming 100% treatment efficacy, the effectiveness of health systems in managing depression at the population level is less than 6.4%.

There are three main forms of treatment for depression:

1. Counselling and/or psychotherapy;
2. Electroconvulsive therapy (ECT); and
3. Antidepressant medications

The biology of depression and its treatments are poorly understood, especially in adolescents and in the elderly who have been systematically excluded from studies. Antidepressants have been reported as highly efficacious, but recently, their risks and benefits have been publicly discussed. Withholding of safety data by the pharmaceutical industry may have distorted the real assessment of these drugs. Lack of efficacy data and a growing number of drug-related suicides preclude their use in young people. There is no first-line drug for treatment of the elderly, but due to their side-effect profile, selective serotonin re-uptake inhibitors (SSRIs) are the preferred choice of many physicians.

In a market worth US$ 16.6 billion, with 7.6% annual growth, the research on antidepressants is intensive, accounting for approximately 16–20% of annual revenues (US$ 5.6–3.2 billion). The current basic research focuses on understanding the relationship between depression and the
circadian rhythms, the hormonal system (hypothalamus regulation), genetics and the characterization of neuronal receptors and circuits, using PET scan and functional MRI. Products in the pipeline mainly target new mechanisms, such as NK, 5HT, and CRF receptors, alone or in combination with known mechanisms, such as selective serotonin, noradrenalin and dopamine reuptake inhibitors.

Recommendations for narrowing the therapeutic gaps are as follows:

1. include adolescents and the elderly in basic research studies and in RCTs of both new and old drugs;
2. improve our understanding of the biology of depression and its treatments, which should be considered together with better clinical diagnostic protocols and robust psychological models; and
3. improve the effectiveness of models of care for mental health.

Despite significant improvements in understanding the biological basis of mental conditions, information on genetics, neuroendocrine and functional imaging has not been found valid enough to be included in the diagnostic criteria listed in international classification reports such as DSM-IV or CIE-10.

Currently, depression is included in the category of mood disorders, which is divided into bipolar depression, unipolar depression and dysthymic disorders. The relationship between psychological stress, adverse life events, and the onset of depressive episodes remains unclear. The distinction between these conditions and anxiety disorders (general anxiety disorder, panic, post-traumatic stress syndrome, and obsessive–compulsive disorder), has no physiopathological support. They usually present together in clinical practice. Certainly, adverse life events can precipitate and contribute to
depression, but depression itself can also be the source of stressful experiences.

New evidence suggests the need for a different classification, based on clusters with significant comorbidities, common neurophysiopathology, and clinical commonalities. Under this classification, the bipolar conditions would include bipolar depression, rapid mood cycling, dysphoric mania, cyclothymiacs and others. The obsessive cluster would include obsessive-compulsive disorder, obsessive personality and other neurological syndromes with obsessive movement such as Tourette syndrome. The affective cluster would include the stress-related mental conditions, bringing together major depression, dysthymia, general anxiety, panic, post-traumatic stress, adaptation disorders, and evasion-prone personalities. The less well understood cluster is the non-affective psychosis cluster, which would include several types of schizophrenia, delirium, type A personality disorders (paranoid and schizoid), and some genetic syndromes such as fragile X and Asperger’s syndromes.

“Late-onset depression” has been proposed, but has not yet been widely accepted, as an additional item in the classification of depression, based on common physiopathological findings in the elderly, such as changes in cognitive function, frontal cortical atrophy seen on a CT-scan, and other associated conditions.

The most common clinical classification for mood disorders divides them into three groups:

(1) Depressive disorders;

(2) Bipolar disorders; and
(3) Depression associated with medical illness or alcohol and substance abuse.

Among depressive disorders (unipolar), the most used clinical classifications are major depression, mild/moderate depression and dysthymic disorders.

**Subjective Well-being**

The concept of subjective well-being is empirically derived and has several definitional aspects (Diener, 1984). Being subjective rather than objective, Well-being is assessed from the internal perspective of the individual rather than measured against the objective criteria of normative standards (Campbell, 1976). Well-being is made up of two components, and a cognitive-evaluative component (Andrews & Withey, 1976, Campbell, et al., 1976, Diener & Emmons, 1984). Within the affective component come the relatively independent feelings of happiness and feelings of unhappiness (Bradburn, 1969, Bradburn & Caplovitz; 1965, Zevon & Tellegen, 1982, Diener & Emmons, 1984). It is found that the two effect factors accounted for 47% - 53% of the variance, while the satisfaction factor accounted for 5-7%. Confirming the affect factor variance, but increasing the life satisfaction factor variance. Beiser (1974) reported that positive affect accounts for 18.5% of the variance, negative effect for 19.9%of the variance, and life satisfaction for 20.4%. In addition, demographics account for about 10-15% of the variance (Diener, 1984).

One of the most widespread findings in the Well-being literature is that subjective well-being consists of three primary components; positive affect, negative affect and life satisfaction (Andrews, Withey, 1976, Campbell, Converse, & Rodgers, 1976, Diener, 1984). Positive affect
consists of the pleasant emotions or feelings such as joy and happiness. Whereas negative affect consists of the unpleasant feelings or emotions such as anger or anxiety. Life satisfaction refers to a cognitive, judgmental process, a global assessment of one’s life as a whole (Diener, 1984). A number of investigators have now demonstrated that average levels of positive and negative affects are relatively independent of each other in people’s lives (e.g. Bradburn, 1969; Diener & Emmons, 1984). Life satisfaction is only moderately related to positive and negative affect (Emmons & Diener, 1985). More recently, Diener, Larsen, Levine and Emmons (1985) have proposed that two dimensions underlay the positive and negative affect: Intensity and frequency (average hedonic level). These two dimensions account for the independence of average levels of affect. Which are a combination of how frequently and intensity each affect if felt with. The frequency of the two types of affects varies inversely, whereas the intensity of positive and negative affect convey positively. Thus, means levels of positive and negative affect do not correlate when long periods are considered because the additive affects of intensity and frequency tend to negate each other. Diener et al. (1999) explained that Subjective well-being is a board category of phenomena that includes peoples’ emotional response, domain satisfactions and global judgments of life satisfaction. Each of the specific constructs needs to be understood in their own right Table 2.1 represents the major divisions and subdivision of the field.
Table 2.1

*Components of Subjective Well-being*

<table>
<thead>
<tr>
<th>Pleasant Affect</th>
<th>Unpleasant Affect</th>
<th>Life Satisfaction</th>
<th>Domain Satisfaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Joy</td>
<td>Guilt and Shame</td>
<td>Desire to change life</td>
<td>Work</td>
</tr>
<tr>
<td>Elation</td>
<td>Sadness</td>
<td>Satisfaction with current life</td>
<td>Family</td>
</tr>
<tr>
<td>Contentment, Pride</td>
<td>Anxiety and worry, Anger</td>
<td>Satisfaction with past</td>
<td>Leisure Health</td>
</tr>
<tr>
<td>Affection</td>
<td>Stress</td>
<td>Satisfaction with Future</td>
<td>Finances</td>
</tr>
<tr>
<td>Happiness</td>
<td>Depression</td>
<td>Significant other’s view of one’s life’s</td>
<td>Self</td>
</tr>
<tr>
<td>Ecstasy</td>
<td>Envy</td>
<td>-</td>
<td>One’s Group</td>
</tr>
</tbody>
</table>

*Source:* Diener et al. (1999)

Several factors are found to influence Subjective well-being. Factors like, subjective satisfaction, high Self-esteem, satisfaction with standard of living, with family, work and health, all are contributing to general Subjective well-being.

Demographic variables like, Age, gender, race, employment, education, religion etc, are also important factors contributing to Subjective well-being.

In addition, satisfaction in married life and family life is considered to be of a strong predictor in Subjective well-being.

Relationship with friends and other social contacts have definitely a bearing on Subjective well-being.
Life event, have shown a consistent, but modest relationship to Subjective well-being (e.g. Kammann, 1982, Miller, 1980).

Pelechano et al. (1994) studied the relationship among stressful life events, personality factors, health, and subjective feelings of self-being. Ss were 429 high school and university students (aged 14-29 yrs), 1,040 normal adults (ages 20 yrs and older), and 511 adults (aged 20 yrs and older) suffering chronic from diseases. Information on socio-demographic factors, personality traits, life events, and health status was obtained questionnaire. The results were evaluated based on age, sex, marital statues, family structure, educational level, occupation, life events, and health status. En Extraversion & Neuroticism and Dogmatism Questionnaire; Motivation super Anxiety Questionnaire Locus of Control Questionnaire; a Hostility Inventory; and personality, intelligence, biographical, and life events inventories were used. The Spanish texts of the instruments are included.

Few people have ever doubted that happiness is very important. In fact, starting at least with the Ancient Greeks, the concept has been subject of unremitting debate. Surely this would not have been the case if people generally felt it did not matter.(King and Napa, 1998) Since happiness has captured, and continues to capture, the interest of so many people, it should not come as a surprise that philosophers and many others debating the concept have long yearned for a way to measure it. The breakthrough came in the 1950s. Psychologists – until then mainly interested in negative emotional states such as depression and anxiety – became interested in positive emotions and feelings of well-being. Within the discipline a consensus grew that self-reports on how well life is going, can convey important information on underlying emotional states, and so the field pushed ahead with measuring what is best referred to as subjective well-being (commonly abbreviated as SWB). SWB, we should
immediately note, is not the same as happiness although the terms are often used synonymously. SWB, in fact, is ‘a broad category of phenomena that includes people’s emotional responses, domain satisfactions, and global judgements of life satisfaction’ (Diener et al., 1999: p. 277). Specifically, reported SWB consists of two distinctive components (cf. Diener, 1994: p. 106): an affective part, which refers to both the presence of positive affect (PA) and the absence of negative affect (NA), and a cognitive part. The affective part is a hedonic evaluation guided by emotions and feelings, while the cognitive part is an information-based appraisal of one’s life for which people judge the extent to which their life so far measures up to their expectations and resembles their envisioned ‘ideal’ life. Since the emergence of the field over five decades ago, the SWB literature has progressed rapidly. First, as recent surveys show, psychologists and other social scientists have taken huge steps in their understanding of the factors influencing people’s SWB. In addition, the methods by which empirical content is given to the concept of SWB have drastically improved and are expected to continue to do so as increasing use will be made of advances in information- and communication technology (ICT). As such, SWB research solicits increasing attention of politicians, government officials and the public alike. This paper must be seen in light of the increasing attention for SWB and aims to provide a short introduction to the field. It starts with a discussion of the measurement of SWB in Section 2. In Section 3 we examine some factors underlying observed differences in SWB, both within and between nations. Section 4 explores some policy uses of SWB, notably in cost-benefit analyses and in the form of national SWB statistics. We conclude with some summarizing remarks in Section 5.

King and Napa (1998) actually investigate how much value people attach to happiness by examining its contribution to the desirability of a
certain hypothetical life and compare it with the contribution wealth and the presence of meaning make to the desirability of a given life. Their results confirm the folk wisdom developed over the ages: happiness and meaning make for the good life, and their effect on the desirability of a certain life is some five (happiness) to six (meaning) times higher than that of wealth. Relatedly, Diener and Oishi (2004) asked a sample of college students from different countries to rate the importance of happiness and other values on a scale from 1 to 9. Happiness came out first with a score of 8.0, slightly above health and love & affection (7.9), but well above wealth (6.8), amongst others. SWB further matters in that it fosters good outcomes in many domains of life, e.g. in work life, relationships and health (Lyubomirsky et al., 2005). Low SWB is also associated with general health risk and higher rates of suicide (Koivumaa-Honkanen et al., 2000 and 2001).

**Physical Symptoms**

The Physical symptoms in cancer patients can be general and organs specific. Almost all malignant diseases will close lose of body weight, general weakness and cachexia. Depending on the organs, affected physical symptoms vary. Certain symptoms are caused by the side effects of chemotherapy and radiotherapy.

The clinical features of cancers can be local, metastatic and non-metastatic manifestatios. For the cancers of stomach, colon, bronchus, Kidney etc., there can be haemorrhage. In breast cancer, it can present as lump. In primary and secondary cancers of bone, there can be pain. Pain, cough, and recurrent infections can occur in cancer of bronchus. Odynophagia, dysphagia, vomiting etc can occur in case of gastro intanstainal cancers. Altered bowel habits and abdominal distension can occur in cancer rectum.
Non-metastasis manifestation can be; weight loss and anorexia in gastro intestinal tumours. Fatigue can be a feature in all types of cancers. Hormonal effects, neuropathies and myopathies can occur in small cell lung cancer. In this study, the main symptoms considered are due to the disease as well as side effects of chemotherapy and radiotherapy.

Early diagnosis of oral cancer should lead to better treatment results. Oral lesions give rise to early symptoms. The majority of the tongue cancers occur on the middle third of the lateral margins; extending to the ventral aspect and the floor of the mouth. Early tongue cancer may manifest in a variety of ways. It may occur as an ulcer or an area of superficial ulceration with unsuspected infiltration into the underlying muscle. A minority of the tongue cancers may be asymptomatic. The malignant ulcer is hard in consistency with heaped up and often averted edges. The floor is granular and indurated and bleeds readily. Often, there are areas of necrosis, the growth infiltration of tongue progressively causing increasing pain and difficulty with speech and swallowing. Pain is often severe and constant, radiating to the neck and ears.

Late edema of the arm is a troublesome complication of breast cancer treatment. The neoplastic infiltration is often painful due to the brachial plexus nerve involvement.

Patients with gastric cancer may preset with dyspepsia. In advanced cancer bloating, distraction and vomiting may occur. The tumour frequently bleeds leading to iron deficiency anemia. Obstruction leads to dysphagia, epigastric fullness or vomiting.

In carcinoma of oesophagus dysphagia is the usual presenting feature and in generally a sign of advanced disease. Weight loss is a sign of
advanced disease. Patients with early disease may present with nonspecific dyspeptic symptoms.

Carcinoma of the rectum can occur early in life. Early symptoms of rectal cancer are bleeding per rectum, tenesmus and early morning diarrhea. Bleeding is the earliest and most common symptoms. Most often the bleeding in every respect simulates that of internal haemorrhoids. Sense of incomplete defecation is an important early symptom. Alteration in bowel habits is the next most frequent symptom. A patient who has to get up before the accustomed hour in order to defecate or one who passes blood and mucus in addition to feces i.e, early morning bloody diarrhea, is usually found to be suffering from carcinoma of the rectum. Often it is the patients with an annular carcinoma at the pelvi rectal junction, who suffers from increasing constipation and one with growth in the ampulla of rectum with early morning diarrhea. Pain is the late symptom and is of colicky character. Weight loss is suggestive of neoplastic metastases.

The clinical features of lung carcinoma depend up on the site of the lesion invasion of neighboring structures and extend of metastases. Common symptoms include a persistent cough, weight loss, dyspnoea and non-specific chest pain. Other symptoms of lung cancer include haemoptysis, cough, pain, dyspnoea, hoarseness of voice etc.,

There is wide range of possible complications and can cause several symptoms. Nausea, vomiting and mucositis are common. Alopecia occurs frequently with some drugs such as doxorubicin. Leucopenia and thrombocytopenia are common.

Complications of radiotherapy arise due to the inevitable damage with results from which results from radiation of normal tissue adjacent to
the tumour. The most sensitive tissues are the bone marrow, the gonads, the eyes and the mucosa of the gastrointestinal tract. Other important tissues, which are frequently damaged, include the wall of the gastrointestinal tract, skin, nervous tissue, lung tissue, kidney, liver, and bone.

Physical Symptoms studied were weakness, sleep, need for pills for sleep, pain, body pain, nausea, vomiting, appetite, sore mouth, dysphagia, vertigo, alopecia, headache, palpitation and reduction of salivation.

**Intervention Programmes**

**Health Education**

Health education is a term, commonly used and referred to by health professionals.

**Definitions**

Health education is indispensable in achieving individual and community health. It can help to increase knowledge and to reinforce desired behaviour patterns. However, there is no single acceptable definition of health education. A variety of definitions exists. Concepts of health education as a process or an activity for inducing behavioral changes are emphasized in the following definitions:

1. Health education is the translation of what is known about health into desirable individual and community behaviour patterns by means of an educational (NIHAE).

2. The definition adopted by John M Last is “the process by which individuals and groups of people learn to behave in a manner conducive to the promotion, maintenance or restoration of health”. (Last J M Dictionary)
3. Any combination of learning opportunities and teaching activities designed to facilitate voluntary adaptations of behaviour that are conducive to health (Green, 1977).

4. The definition adopted by the National Conference on Preventive Medicine in USA is “Health education is a process that informs motivates and helps people to adopt and maintain healthy practices and lifestyle, advocates environmental changes as needed to facilitate this goal and conducts professional training and research to the same end (Somers et al. 1977).

5. Health education is the part of healthcare that is concerned with promoting healthy behaviour (WHO, 1988).

**Alma Ata Declaration**

The Declaration of Alma – Ata (1978) by emphasizing the need for “individual and community participation” gave a new meaning and direction to the practice of health education. The dynamic definition of health education is now as follows:

“a process aimed at encouraging people to want to be healthy, to know how to stay healthy, to do what they can individually and collectively to maintain health, and to seek help when needed” (TRS, 1983)

The Alma – Ata Declaration has revolutionized the concepts and aims of health education:

The modern concept of health education emphasizes on health behaviour and related actions of people.
Health Education and behaviour

The behaviours to be adopted or modified may be that of individuals, groups (such as families, health professionals, organizations or institutions) or entire community.

Strategies designed to influence the behaviour of individuals or groups will vary greatly depending upon the specific disease (or health problem) concerned and its distribution in the population as well as upon the characteristics and acceptability of available methods preventing or controlling that disease (or health problem).

Health education can help to increase knowledge and to reinforce desired behaviour patterns.

It is clear that education is necessary, but education alone is insufficient to achieve optimum health. The target population must have access to proven preventive measures or procedures.

Changing concepts

Historically health education has been committed to disseminating information and changing human behaviour. Following the Alma – Ata Declaration adopted in 1978, the emphasis has shifted from (TRS, 1983).

- Prevention of disease to promotion of healthy lifestyles;
- The modification if individual behaviour to modification of “social environment” in which the individual lives;
- Community participation to community involvement; and
- Promotion of individual and community “self – reliance”.

Aims and objectives

The definition adopted by WHO in 1969 (TRS, 1969) and the Alma–Ata Declaration adopted in 1978 provide a useful basis for formulating the aims and objectives of health education, which may be below:

1. to encourage people to adopt and sustain health promoting lifestyle and practices.
2. to promote the proper use of health services available to them.
3. to arouse interest, provide new knowledge, improve skills and change attitudes in making national decisions to solve their own problems and
4. to stimulate individual and community self-reliance and participation to achieve health development at very step from identifying problems to solving them.

The education objectives are aimed at the group to be taught in the educational programme. The objectives flow from the health needs which have been discovered. They should be carefully unambiguously defined in terms of knowledge to be acquired, behaviour to be acquired or actions to be mastered. Acquired to be mastered. They must be pertinent if the programme is to be appropriate and successful.

The focus of health education is on people and on action (TRS, 1969). It goal is to make realistic improvements in the basic quality of life. Many health education programmes hope, in some way, to influence behaviour or attitudes. The implication of these new concepts is that health education is an integral part of the national health goals. The fact remains
that effective health education has the potential for saving many more lives than has any one research discovery in the near future.

**Role of health care providers**

It is clear that education is necessary, by education alone in not sufficient to achieve optimum health. The role of health care providers in this regard comprise to (TRS, 1983).

a) Provide opportunities for people to learn how to identify and analyze health and health related problems, and how to set their own targets and priorities;

b) Make health and health – related information easily accessible to the community;

c) Indicate to the people alternative solutions for solving the health and health –related problems they have identified, and

d) people must have access to proven preventive measures.

**Behaviour**

There are 4 well – known approaches to health education:

1. **Regulatory approach (Managed prevention)**

   Regulation in the context of health education may be defined any governmental intervention, direct or indirect, designed to alter human behaviour. Regulations may be promulgated by the State by a variety of administrative agencies. Regulations may take many forms ranging form prohibition to imprisonment.
2. **Service Approach**

This approach was tried by the basic health services in 1960’s. It aimed at providing all the health services needed by the people at their doorstep on the assumption that people would use them to improve their own health.

3. **Health education approach**

There are many problems (e.g., cessation of smoking, use of safe water supply, fertility control) which can be solved only through health education. It is a general belief in western democracies that people will be better off if they have autonomy over their own lives, including health affairs on which an informed person should be able to make decisions to protect his own health.

4. **Primary health care approach**

This is a radically new approach starting from the people with their full participation and active involvement in the planning and delivery of health services based on principles of primary health care, viz community involvement and intersectoral coordination.

**Models of health education**

During the past few decades, a number of health education models have been developed. They include the following:

1. **Medical Model**

Most health education in the past has relied on knowledge transfer to achieve behaviour changes. The medical model is primarily interested in the recognition and treatment of disease (curing) and technological advances to
facilitate the process. It is concerned with disease (as defined by the doctor) or opposed to illness (as defined by the client).

2. **Motivation Model**

When people did not act upon the information they received, health education started emphasizing “motivation” as the main force to translate health information into the desired health action. However, the adoption of new behaviour or idea is not a simple act, it is process consisting of several stages through which an individual is likely to pass before adoption. In this regard, sociologists have described three stages in the process of change in behaviour i.e, awareness, motivation and action.

3. **Social intervention model**

Soon, however, it was realized that the public health problems (acting us today are so complex that the traditional motivation approach is insufficient to achieve behavioural change, as for example reducing smoking, adoption of small family norm, raising the age of marriage, elimination of dowry etc. It is not the individual, who needs to be change but the social environment, which shapes the behaviour of individual and the community.

**Content of Health Education**

1) **Human biology**

Understanding health, demands an understanding of the human biology, i.e, structure and functions of the body; how to keep physically fit – the need for exercise, rest and sleep; the effects of alcohol, smoking and drugs on the body; cultivation of healthy life-styles, etc.
2) Nutrition

The aim of nutrition education is to guide people to choose optimum and balanced diets, remove prejudices and promote good dietary habits – not to teach the familiar jargon of calories and the biochemistry of nutrients.

3) Hygiene

This has two aspects – personal and environmental. The aim of personal hygiene is to promote standards of personal cleanliness within the setting of the condition where people live.

4) Family health

The family is the first defense, as well as the chief reliance for the well-being of its members. Health largely depends on the family’s social on physical environment and its lifestyle and behaviour.

5) Disease prevention and control

Drugs alone will not solve health problems without health education, a person may fall sick again and again from the same disease. The experiences of western countries have shown the role of education in the eradication of cholera, typhoid, malaria and tuberculosis etc.

6) Mental health

Mental health problems occur everywhere. They become more prominent when major killer diseases are brought under control. There is a tendency to an increase in the prevalence of mental diseases when there is a change in the society form and agriculture to an industrial economy, and when people move from the warm intimacy of village community to the isolation found in big cities.
7) **Prevention of accidents**

Accidents are a feature of the complexity of modern life. In the developed countries, they are taking an increasing toll of life and limb.

8) **Use of health services**

Many people, particularly in rural areas, do not know what health services are available in their community, and many more do not know what signs to look for that indicate a visit to the doctor is necessary.

**Principles of Health Education**

These includes

1) Credibility
2) Interest
3) Participation
4) Motivation
5) Comprehension
6) Reinforcement
7) Learning by doing
8) Known to unknown
9) Setting on example
10) Good human relations
11) Feedback
12) Leaders
Practice of Health Education

Educational material should be designed to focus attention to provide new knowledge, to facilitate interpersonal and groups discussion and to reinforce or clarify prior knowledge and behaviour.

1. Audiovisual aids

No health education can be effective without audiovisual aids. They help to simplify unfamiliar concepts; bring about understanding where words fail; reinforce learning by appealing to more than one sense, and provide a dynamic way of avoiding monotony. Modern science has made available an endless array of audiovisual aids which can be classified into three groups like, Auditory Aids, Visual Aids and Combined A – V Aids.

2. Methods in health communication

a) individual approach

b) group approach

c) mass approach

Relaxation Techniques

Relaxation Techniques are often integrated into other healthcare practices. For example, they may be included in programmers of cognitive behavioural therapy in pain clinics or occupational therapy in psychiatric units. Many different complementary therapists, such as osetepaths and massage therapists, may include some relaxation techniques in their work.

Some nurses use relaxation techniques in the acute setting, such as in preparation for surgery. A small number of general practices offer regular classes in relaxation, yoga, or tai chi. The practice of many relaxation
techniques is poorly regulated, and standards of practice and training are variable.

This situation is unsatisfactory, but, given the relatively benign nature of many relaxation techniques, this variation in standards presents usually more of a problem of ensuing effective treatment and good professional conduct rather than one of avoiding adverse effects.

Relaxation, that is Cue-controlled, is an abbreviated tension – relief technique that combines elements of release – only relaxation and deep breathing exercises. It uses a cue, such as a word or mental image, to trigger immediate feelings of muscle relaxation. The cue must first be associated with relaxation in the individual’s mind.

This accomplished by choosing the cue, and then using it in breathing and release – only relaxation exercises repeatedly until the cue starts to automatically trigger feelings of relaxation outside of the treatment sessions. Cues can be as simple as the word “relax”, and are frequently used on relaxation audiotapes.

They can also be a visual cue, such a mental image of a white sand Caribbean beach, a flower – filled meadow, or other relaxing images, guided imagery also such visualization exercises to produce feelings of relaxation.

Relaxation through guided imagery is a two-part process. The first component. Involves reaching a state of deep relaxation through breathing and muscle relaxation techniques. During the relaxation phase, the person closes his eyes and focuses on the slow, in and out of his breathing. Alternatively, he might focus on releasing the feelings of tension from their muscles, starting with the toes and working up to the top if the head.
Relaxation technique tapes often feature soft music or tranquil, natural sounds such as rolling waves and chirping birds in order to promote feelings of relaxation. Once complete relaxation is achieved, the second component of the exercise is the imagery, or visualization, itself. Relaxation imagery involved conjuring up pleasant, relaxing images that rest the mind and body. These may be experiences that have already happened, or new situations.

**Relaxation through Biofeedback**

Biofeedback, or applied psychophysiological feedback, is a patient-guided treatment that teaches an individual to manipulate muscle tension though relaxation, visualization, and other cognitive techniques. The name biofeedback refers to the biological signals that are fed back, or returned, to the patients in order for the patient to develop techniques of controlling them.

During biofeedback, one or more special sensors are placed on the body. These sensors measure muscle tension, brain waves, heart rate, body temperature, and translate the information into a visual and/or audible readout, such as a paper tracing, a light display, or a series of beeps. While the patient views the instantaneous feedback form, the biofeedback monitors, he begins to recognize what thoughts, fears, and mental images influence his physical reactions.

By monitoring this relationship between mind and body, he can then use thoughts and mental images deliberately to manipulate heartbeat, brain wave patterns, body temperature, and other bodily functions, and to reduce feelings to stress. This is achieved through relaxation exercises, mental imagery, and other cognitive therapy based on their own unique interests and lifestyle requirements.
As the biofeedback response takes place, the patient can actually see or hear the results of his efforts instantly through the sensor readout on the biofeedback equipment. Once these techniques are learned and the patient is able to recognize the state of relaxation or visualization necessary to alleviate symptoms, the biofeedback equipment itself is no longer needed. The patient then has a powerful, portable, and self-administered treatment tool to deal with problem symptoms.

The individual may also use mental rehearsal. Mental rehearsal involves imaging a situation or scenario and its ideal outcome. It can be used to reduce anxiety about an upcoming situation, such as childbirth, surgery, or even a critical event such as an important competition or a job interview. Individuals imagine themselves going through each step of the anxiety-producing event and then successfully completing it.

**Preparations**

If an individual is considering relaxation therapy to alleviate physical symptoms such as nausea, headache, high blood pressure, fatigue, or gastrointestinal problems, he or she should consult a doctor first to make sure there is not an underlying disorder or disease causing the symptoms.

A complete physical examination and comprehensive medical history will be performed, and even if an organic cause for the symptoms is found, relaxation exercises may still be recommended as an adjunct, or complementary, treatment to relieve discomfort.

Relaxation therapy should always take place in a quiet, relaxing atmosphere where there is a comfortable place to sit or recline, some people find that quiet background music improves their relaxation sessions. If an instructional audiotapes or videotape is to be used, the appropriate equipment
should be available. Taking the phone off the hook, asking family members for solitude can ensure a more successful, and relaxing session.

**Relaxation Precautions**

Most commonly practiced relaxation techniques are completely safe and free of side effects.

Relaxation technique that involves special exercises or body manipulation such as massage, t’ai chi, and yoga should be taught or performed by a qualified healthcare professional or instructor. These treatments may not be suitable for individuals with certain health conditions such as arthritis or fibromyalgia.

These individuals should consult with their healthcare professional before engaging in these therapies. Biofeedback may be contraindicated (not recommended) in some individuals who use a pacemaker or other implantable electrical devices. These individuals should inform their biofeedback therapist before starting treatments, as certain types of biofeedback sensors have the potential to interfere with their use.

Relaxation therapy may not be suitable for some patients. Patients must be willing to take a very active role in the treatment process, and to practice techniques learned in treatment at home. Some relaxation therapies may also be inappropriate for cognitively impaired individuals (e.g., patients with organic brain disease or a traumatic brain injury) depending on their level of functioning.

Given the wide range or relaxation therapies available, if one type of relaxation treatment is deemed inappropriate for these patients, a suitable alternative can usually be recommended by a qualified healthcare professional.
Relaxation therapy can induce sleepiness, and some individuals may fall asleep during a session. Relaxation therapy should not be performed while operating a motor vehicle or in other situations where full and alert attention is necessary. Other than this, there are no known adverse side effects to relaxation therapy.

**Research & general acceptance**

Relaxation therapies have been successfully used in relieving stress and anxiety for many years, and are generally well accepted by the medical community for this purpose.

Teaching cancer patients how to relax while they undergo a variety of hard-to-tolerate cancer treatments helps them cope with symptoms such as nausea and pain, according to a new analysis of 15 studies. Relaxation technique investigated included techniques such as progressive muscle relaxation, hypnosis and mental imagery.

Relaxation technique can also reduce, tension, depression and anxiety, yet few cancer treatment programs use these techniques on a regular basis.

Relaxation technique learned prior to undergoing cancer treatment proved more effective at reducing anxiety than techniques taught while the patient was undergoing aggressive treatment to eradicate or slow the cancer, says lead study author Karin Luebbert of the University Hospital Hamburg.

Teaching relaxation technique involves very little of a professional’s time – usually less than two hours – making the intervention inexpensive, according to the study published in the February issue of Psycho – Oncology.
Relaxation technique may help patients achieve a physical restfulness that reduces their anxiety and reactivity to unpleasant stimuli. The muscular relaxation that results from these techniques may also ease the physiological cascade that leads to nausea and vomiting, the authors say.

Besides some of the documented emotional benefits of relaxation training, these techniques may also help patients feel more in control of their treatment, especially if they are encouraged to practice on their own, they say. Cancer patients can often feel helpless and hopeless “Relaxation affords an active coping strategy for them”.

Twelve types of side effects commonly associated with cancer treatment were addressed in the review. These included four treatment-related symptoms, namely nausea, pain, blood pressure, and pulse rate; and eight emotional adjustment issues; anxiety, depression hostility, tension, fatigue, confusion, vigor and overall mood. Investigators also evaluated a broad variety of interventions, including type of relaxation training, the time professionals spent teaching the techniques and how often relaxation was done.

Relaxation therapy eased symptoms of anxiety more than it did any other side effect, regardless of the type of cancer treatment given the patient (Monika Hasenbring, 2002).

Part 1 - The Physiology of Relaxation Therapy

The researcher came to realize the value of relaxation during my graduate studies in health education where she specialized in stress management education. She studied and researched the effects of relaxation on the peripheral arteries both in the scientific literature and in clinical applications.
Relaxation provides a decrease in sympathetic nervous system tone allowing the arteries to widen ever so little and allowing an increase of blood flowing through them. That in turn translates to an increase of available oxygen to the body tissues, specifically in the periphery.

The neural pathways of the sympathetic and the parasympathetic system guide the function of the stress response and the relaxation response. Through a training process involving relaxation exercises, the patient may learn to regulate a balance in these pathways, thus affecting the body’s physiology. While the tone of the sympathetic nervous system (which guides our activities) lessens, there is an increase in the parasympathetic nervous system (which guides our recovery or rest) at the same time. The way the body works in this instance is to seek a balance - mind and body working together.

Relaxation works through psycho-physiological means implying that both the mind and the body are involved in the quieting process. Progressive muscle relaxation training focuses on the muscle groups and allows them to relax. With fewer impulses firing from the muscles to the brain, a lower level of stimulation is evident in the body organs (e.g., less tense muscles). It is referred to as somatopsychic relaxation. With this modification of incoming and outgoing neural impulses come the benefits associated with relaxation.

Other relaxation techniques such as Herbert Benson’s Relaxation Response, meditation and hypnosis suggest that relaxation starts in the thought processes, the cognitive process of the mind (e.g., reducing excessive rumination or anxiety). This process is called psychosomatic and has as an end result the relaxation of the body physiology. Many relaxation
techniques defy this simple classification and are often a combination of several modalities.

Visualization, active imagination or imagery, has been used successfully in the treatment of various illnesses. It is specifically valuable to use these practices while the body is in a relaxed state. That is, first you allow your body to relax for a few minutes; then while relaxed, visualize healthy outcomes or desired healing. When the body, is in a relaxed state, the neural transmissions are fewer, and the “language” of the positive visualizations and healing suggestions “can be heard” more easily by body tissues.

Part 2 - Testing Methods—How The Results Were Recorded

The first study was designed to see if people with diabetes would have the same ability to increase peripheral blood flow in response to relaxation training as people without diabetes. First people without diabetes completed a pilot study to evaluate the relaxation technique and their response to it. Then diabetic subjects (N=40), ages 17-73, who were volunteers recruited through the University of Wisconsin-La Crosse, the local ADA Chapter and a medical clinic were signed up. A 'within-subjects' experimental design was used. The subjects served as their own controls, which provided complete control of one of the most important sources of variation in educational experiments, namely inter-subject variations.

During Phase1, all subjects used a self-selected relaxation method and recorded toe temperatures daily. During Phase2, the same subjects were taught a biofeedback assisted relaxation technique designed to elicit sensations of warmth in the lower extremities, thereby increasing blood circulation and temperature. Subjects relaxed at home using a designated
relaxation tape. They measured and recorded toe temperatures before and after each relaxation session. Each phase lasted four weeks.

In this study, subjects showed an improvement in their ability to increase blood volume pulse (BVP) in the great toe after training. In fact, most of the increase of BVP change scores, as indexed by the statistical measure \( \text{Eta}^2 = .71 \), which indicated that 71% of the increase in BVP could be attributed to the biofeedback assisted relaxation training. The toe temperature change scores were not only significantly larger after training, but the average starting toe temperature also was 2.86°F higher at the end of Phase 2 even though this time was farther into the winter and the weather colder.

Later a multi site clinical trial aimed to test this relaxation technique further was conducted. We wanted to see if the training would promote enough additional blood flow to make a difference in the healing of chronic, non-healing foot ulcers that often develop as a complication of diabetes. Therefore medical care for patients with non-healing chronic foot ulcers was combined with a standardized biofeedback-assisted relaxation training program in the experimental group of this prospective randomized study. The intervention was designed to increase peripheral perfusion, thereby promoting healing.

The results: 14 out of 16 ulcers (87.5%) healed in the experimental group, whereas 7 out of 16 ulcers (43.7%) healed in the control group (\( p < .01 \)). Other significant outcomes were that patients reported experiencing less pain. We also measured an increased sensory function of the large myelinated fibers of the peroneal nerve. At the end of this study, patients in the experimental group who had practiced biofeedback-assisted relaxation
were able to perceive the stimulus of an electric current (Current Perception Threshold, CPT levels) at lower intensities than at the start of the study.

The improvement in healing and sensory nerve function was due to better oxygenation of nerve endings through increased micro vascular perfusion, brought about by decreased sympathetic muscle tone and peripheral vasodilatation. Findings have been published in peer reviewed medical journals and presented to national audiences of the American Diabetes Association, American Association of Diabetes Educators, Occupational Therapy Association, etc. The WarmFeet® program received the 1999 Paragon Award from the Society for Public Health Education in Minnesota, for its innovative and local application.

**Part 3 - Professional Feedback- Information from actual use**

Several success stories are reported among clients who have learned and used the biofeedback assisted relaxation training in clinical practice. The therapy now has a name; it is WarmFeet®.

The program, WarmFeet®, is a relaxation therapy, which can be taught, in a single session to patients suffering from various foot complications. Patients learn to relax and warm their feet assisted with thermal biofeedback. It is important that the patient wants to, and is open to this kind of therapy; the resulting increased blood flows provides improved healing, pain relief and with time an increased sensory function.

They felt that the training of allied/medical health professionals is important so that they can include WarmFeet® as an adjunct treatment for their diabetes and PAD populations. We want to work with supportive health professionals, to teach and encourage patients, as this is instrumental for obtaining the best results.
The WarmFeet® Kit includes, (1) an audiotape with instructions on how to relax, (2) the actual relaxation technique on the second side, (3) a hard copy of the instructions and (4) a personal skin thermometer for assisted temperature biofeedback.

Duffy et al (2006) conducted a prospective, randomized controlled trial conducted from 2000 to 2003 at four hospitals including the University of Michigan Medical Center and three Veterans Affairs (VA) hospitals in Ann Arbor, Gainesville, and Dallas, Human subjects’ approval was received from all four sites. The control group received “enhanced” usual care for smoking, alcohol use, and depression. The experimental group received the tailored smoking, alcohol, and depression intervention.

Smoking, alcohol use, and depression are interrelated and highly prevalent in patients with head and neck cancer, adversely affecting quality of life and survival. Smoking, alcohol, and depression share common treatments, such as cognitive behavioral therapy and antidepressants. Consequently, they developed and tested a tailored smoking, alcohol, and depression intervention for patients with head and neck cancer.

Methods: Patients with head and neck cancer with at least one of these disorders were recruited from the University of Michigan and three Veterans Affairs medical centers. Subjects were randomized to usual care or nurseadministered intervention consisting of cognitive behavioral therapy and medications. Data collected included smoking, alcohol use, and depressive symptoms at baseline and at 6 months.

Results: The mean age was 57 years. Most participants were male (84%) and White (90%). About half (52%) were married, 46% had a high school education or less, and 52% were recruited from Veterans Affairs sites.
The sample was evenly distributed across three major head and neck cancer sites and over half (61%) had stage III/IV cancers. Significant differences in 6-month smoking cessation rates were noted with 47% quitting in the intervention compared with 31% in usual care (P < 0.05). Alcohol and depression rates improved in both groups, with no significant differences in 6-month depression and alcohol outcomes.

Conclusion: Treating comorbid smoking, problem drinking, and depression may increase smoking cessation rates above that of usual care and may be more practical than treating these disorders separately. (Cancer Epidemiol Biomarkers Prev 2006)

The intervention increased smoking cessation rates by 50% over and above enhanced usual care. Cessation rates in both groups (47% versus 31%) were lower than in a cessation trial conducted by Gritz et. al. (1993), which found more than two-thirds of patients with head and neck cancer in both arms quit at 6 months. However, smoking cessation rates in both the Gritz et al. trial and our trial were higher than other smoking cessation trials conducted among ill patients, suggesting that despite the high smoking rates in this population, many are motivated to quit. The support offered by treating co-occurring drinking and depression may have increased the smokers’ ability to use smoking cessation skills contributing to the high smoking cessation rates, even if it did not differentially affect rates of recovery from depression. The intervention also seemed to work equally well for relapse prevention as well as for cessation. The low dropout rate (17%) in this critically ill population and informal feedback that our patients gave about the intervention further support its implementation.
SECTION – B : RELATED STUDIES

A. Review of Related Literature

There are many dimensions to psychosocial issues in cancer; two of which are focused here and relate to (i) the question of whether psychological factors play any role in cancer prognosis, and (ii) the quality of triage for serious psychological morbidity. These two may be inter-linked. If seriously depressed patients have a poorer outlook in relation to their length of survival then it is important to know whether depression gets diagnosed and treated. The view that psychological responses, such as depression, may be linked to disease course in cancer has always been controversial and never more so, than at the present time when medicine strives to be evidence based. That psyche or the ‘mind’ can influence somatic disorders such as cancer is perceived sometimes as a step back into the past when ‘healers’ or quacks practiced treatments that called upon the strengths of the ‘mind’ to effect a cure. So, what evidence is there that psychological variables impact upon cancer? What evidence is there that serious depression is accurately diagnosed? What is the best way to treat diagnosed depression in people with cancer? The evidence will be summarily reviewed.

Derogatis, et al (1983) in a study placed the level of psychological morbidity at 47% of patients surveyed. However, this level of distress also varies depending on type of diagnosis, disease stage and gender. Adjustment disorder with anxiety and depression is the most frequently reported psychiatric diagnosis but problems could be wide-ranging including major depression, organic mental syndromes (e.g. dementia), relationship
difficulties, sexual dysfunction, body image disturbance, familial, vocational and occupational disruption, and phobias.

Spijker et al (1997) in a recent meta-analysis indicated that the level of serious psychiatric problems in cancer patients does not differ from the general population with the exception of depression, and this remains higher. In a review by Sellick and Crooks (1999), they conclude that serious depression is found in 6–15% of the cancer patient population as a whole across the various studies reviewed. These prevalence rates for depression will also include those cancer patients who were present with either pre-existing depressive disorders or previously undetected depressive illness not necessarily caused by having cancer.

**Stress and Cancer**

Many studies have been done to demonstrate the correlation between cancer and stress in animals. The problem with animal experimentation is that there are numerous variables that seem to affect cancer in animals. Handling, overcrowding, and being intimidated by other dominant animals seem to facilitate tumor growth. The promotion of tumor growth and stress is also depended upon the “Type, Stress, and Carcinogenesis timing of the Injection of tumor cells and the type of animals used in the studies” (Azar, 1999).

Although there are many theories regarding stress and the development of cancer, they have not been proven. The Type C personality, for example, may not be the cause of cancer but the result of having and upsetting disease.

People diagnosed with cancer experience dramatic emotional changes. It is extremely difficult to link behaviour and psychological stress to physical changes that influence tumor progression because patients
receive treatments that can alter any or all of these factors. For example, the side effects of chemotherapy can lead to immuno suppression.

The stress an individual feels may not necessarily be directly manifested in the development of cancer. It is possible that stress lead to poor lifestyles choices that result in the occurrence of cancer (Goleman & Gurin, 1993). Stress attitude, and beliefs can affect lifestyle choices and health-related behaviour. For example, an individual under stress may smoke cigarettes or drink alcohol. These behaviors have been proven to increase the risk of cancer. Other health-related behaviours have been correlated with cancer. For example, one-third of all cases of cancer can be attributed to poor diet.

The complex relationship between physical and psychological health is not well understood. Scientists know that many types of stress activate the body’s endocrine (hormone) system, which in turn can cause changes in the immune system, the body’s defense against infection and disease (including cancer). However, the immune system is a highly specialized network whose activity is affected not only by stress but also by a number of other factors. It has not been shown that stress-induced changes in the immune system directly cause cancer.

Some studies have indicated an increased incidence of early death, including cancer death, among people who have experienced the recent loss of a spouse or other loved one. However, most cancers have been developing for many years and are diagnosed only after they have been growing in the body for a long time (from 2 to 30 years). This fact argues against an association between the death of a loved one and the triggering of cancer.

The relationship between breast cancer and stress has received particular attention. Some studies of women with breast cancer have shown
significantly higher rates of this disease among those women who experienced traumatic life events and losses within several years before their diagnosis. Although studies have shown that stress factors (such as death of a spouse, social isolation, and medical school examinations) alter the way the immune system functions, they have not provided scientific evidence of a direct cause-and-effect relationship between these.

Specifically, the only type of cancer with a significant link to psychological stress in mothers was smoking-related cancers (relative risk = 1.65), specifically, lung cancer. No additional significant risk was observed for breast cancer, hormone-related cancers, alcohol-related cancers, hematopoietic cancers, and virus/immune related cancers. This suggests, according to the authors, that bereaved mothers "may have more adverse risky behaviors."

The authors conclude, "Our study is in line with most of the previous studies, suggesting that an increased overall risk of cancer attributed to stressful life events is small if it exists at all." They add, "only bereaved mothers as opposed to fathers experienced a slightly increased risk, which does not support a general association" between psychological stress and cancer causation. They suggest that psychological stress leads to behaviors that are associated with higher cancer risk, such as smoking.

There is no conclusive evidence either that stress leads to a greater incidence of cancer or that existing cancers progress more rapidly. Some sources claim a higher risk of cancer with stress, but scientific research with humans has not proven this. There appears to be a link between personality type and increased cancer risk, but lifestyle variables were not ruled out in this research. Conforming, compliant people are somewhat more prone to cancer,
but they may also have a higher incidence of smoking, drinking or fat consumption, which may account for this increase in cancer risk. One study has found that severe life stressors cause a small, but significant increase in breast cancer in women, though medical experts still do not agree whether stress alone contributes to the incidence of cancer development since the issue is generally confounded with other complex lifestyle and genetic variables.

The most harmful theories about cancer are those professing that with enough courage, spirit, and love, cancer can be prevented or cured. In the case of childhood cancer, it is implied that the parents are at fault because they are not providing a sufficiently nurturing environment. Nothing bad in human health is caused by stress and it is negligent to imply that we can cure ourselves of cancer by thinking healthy thoughts.

Various experiments and clinical research have identified links between stressors and psychological, psychosocial, environmental factors and genes, which may provide a basis for treatment and prevention of cancers. This paper considers existing research into cancer predisposing genes and the psychological, psychosocial, and environmental factors, which may be involved.

**Stressors**

The Breast Cancer at the ABC Toowong Queensland: Third Progress Report from the Independent Review and Scientific Investigation Panel, (2006) (Third Progress Report) reported on what has been referred to as a review of a cluster of women with breast cancer in a workplace in Queensland noting “Stress and an individual’s response to it are popularly believed to be important factors in causing cancer.”
The Third Progress Report cautioned, however, that a recent critical review of psychological factors and cancer development by Garrsen (2004) concluded that: “…there is not any psychological factor for which an influence on cancer development has been convincingly demonstrated in a series of studies.”

On the other hand, another review, by Butow et al (2000), also referred to in the Third Progress Report, that focused specifically on breast cancer and commissioned by Australia’s National Breast Cancer Centre, noted that while research had not indicated that psychosocial factors played a major role in the development of breast cancer, “… few studies have been of sufficient quality to state definitively that such a role does not exist.”

Levels of depression tend to be higher among cancer patients than those found in the general population at all points. The prevalence of depression in the general population lies between approximately 3–19% depending on whether it is one year or lifetime prevalence rate which is being reported and the specific diagnostic criteria (e.g. DSM, SCID) being applied. Medical illness has also been associated with a 41% higher prevalence rate of psychological morbidity relative to those with no medical disorder10. Not treating moderate depression has long-term implications as it has been estimated that 80% of those with less severe symptoms of depression (i.e. Dysthymic Disorder) will go on to develop major depression if left untreated 11. Massie and Holland (1990) indicated that depression in cancer patients was persistently under-diagnosed and under-treated. More evidence that is recent confirms this persistent under-diagnosis of depression13. Symptoms of depression not only have an impact on quality of life but also on the patients’ ability to self-care and to tolerate cancer treatments. Untreated psychological morbidity has also been linked with
more frequent outpatient attendance, longer in-patient stays and increased visits to the community doctor, suggesting that effective detection and treatment of psychological problems is likely to be more cost-effective than allowing them to go undetected and untreated. The cost to families is also great not only in terms of the mental health of family members but in terms of the additional stress, both emotional and financial, placed on families who must cope with a depressed relative with cancer.

Review of literature identified 3 studies evaluating the association of desire for death with measures of depression in the palliative care population. Two of these studies satisfied the criteria for grade A level of evidence while the other study (Stewart et al., 1988) was grade B.

Chochinov (1997) looked at desire for death as part of a structured psychiatric interview in 200 patients admitted to the Palliative Care Units of 2 hospitals. A strong association was identified between desire for death and the diagnosis of clinical depression (p=0.09) and depression emerged as the only factor which independently predicted desire for death in the study population.

Brown et al (1986) assessed desire for death as part of a psychiatric interview. Desire for death and suicidal ideas were found exclusively in those who were found to be clinically depressed.

Rosenfeld (2000) developed a brief self-report measure of desire for death for use in medically ill patients called the Schedule of Attitudes toward Hastened Death (SAHD). Desire for death was found to correlate significantly with a depression rating on the HAMD scale (r=0.49, p<0.0001).
In a study by Suthahar Ariaratnam et al.(2008) conducted a study on psychiatric mobility and survival in newly diagnosed treatment-naive cancer patients. This paper was prompted by the necessity to investigate the relationship between psychiatric morbidity and survival of cancer patients.

Eighty newly diagnosed treatment-naive patients with cancer were prospectively studied using self-administered questionnaires. Subsequent follow-ups were carried out at 0.5 year and between 1 to 2 years. The prediction of survival time was determined using Cox model.

Depression (p = 0.001), stage 4 cancer disease (p = 0.016), neurological (p = 0.032), gastrointestinal tract (p = 0.04), head & neck (p = 0.011), gynaecological (p = 0.005) and bone & soft tissue (p = 0.030) malignancies were independent and statistically significant prognostic factor of survival. Depressed patients have almost four-fold greater risk of dying than non-depressed patients. Patients with stage 4 cancer illness have five-fold greater risk of dying than patients with stage 1 disease. Patients with neurological, gynecological, head and neck, bone & soft tissue and gastrointestinal tract malignancies were found to have approximately thirty-six, twenty-five, twenty-two, sixteen and seven fold greater risk of dying, respectively when compared to subjects with genitourinary cancers.

Depression has significant impact on survival of patients with cancer.

After the exclusion criteria, a final cohort of 80 subjects was recruited and later followed-up. Table 1 represents the Cox model. It depicts that stage 4 cancer disease, gas-tro-intestinal tract, head & neck, neurological, gynaeco-logical, bone and soft tissue malignancies as well as expression were independent and statistically significant prognostic factor of survival during the study period.
Based on relative risk (RR) it was revealed that patients with depression have at least 4-fold greater risk of dying than those without it. It was also noted that stage 4 cancer patients have almost 5 times greater risk of dying than stage 1 patients. Furthermore, compared to patients with genitourinary cancers, those with neurological, gynae-cological, head and neck, bone and soft tissue as well as gastrointestinal tract malignancies were found to have about 36, 26, 22, 16 and 7-fold greater risk of fatality, respectively.

Several variables of independent and significant prognostic importance of survival have emerged in the multi-variate model namely depression (p = 0.001), stage 4 cancer disease (p = 0.0016), gastrointestinal tract (p = 0.040), head & neck (p = 0.011), neurological (p = 0.032), gynecological (p = 0.005), bone and soft tissue malignancies (p = 0.030). Even though there were no significant differences seen in the cohort based on univariate analysis at baseline and 0.5 years, later the Cox model seemed to have taken into account multiple covariates concomitantly. There is no doubt that many confounders were operating which were masking associations and hence produced a spurious relationship in the univariate analysis.

Almost consistent with previous researcher (Loberiza, 2002), who also examined prospectively the relationship of depression and survival after haematopoietic stem-cell transplantation in 193 patients between 6 and 12 months after similarly controlling for covariates by the Cox model and found, that depressed individuals had a three-fold greater risk of dying as compared to non-depressed patients based on relative risk (in our study the RR was 4). However, there was no standardized measure of depression in that study although it was defined as being present in any person who
reported being bothered by depression and who had four or more of the following symptoms (anxiety, difficulty concentrating, and feelings of isolation, fatigue or loss of memory).

Similarly, Steel et al (2007) who had examined a homogenous population of 101 hepatobiliary carcinoma subjects, deduced that depression, and reduced survival were found to be associated with diminished natural killer cell numbers. Nonetheless, this study although had used a standardized questionnaire on depression, failed to focus on coping strategies and Quality of life issues which have impact on survival.

Derogatis et al (1979) assessed 35 women with metastatic breast cancer and showed that long-term survivors (subjects who lived for 1 year or more) reported more symptoms such as depression, guilt and anxiety while those who died less than 1 year (short-term survivors) were less symptomatic. The short-term survivors demonstrated significant lower levels of hostility and higher level of positive mood. It should be noted that their seven patients, suffered from predominantly more advanced disease in addition to having a much smaller sample size (n = 35) as opposed to our study (n = 80). In addition, it is recognized, that women are generally at higher risk of developing depression than men (Goodwin.G, 2004). Thus, to begin with their subject selection was already biased since it included only females and hence would spuriously report higher level of depression. Therefore, it is only prudent to interpret this study with caution.

From this study, we intend to suggest that depression significantly impairs the survival rate in cancer patients.

Caroline, et al. (2003), in their study on Relationship between Depression and Pancreatic Cancer in the General Population concluded that
Depression and Pancreatic Cancer are associated in the general population. This was a retrospective cohort study using longitudinal insurance claims data. It was on that man with mental disorders more likely to develop pancreatic cancer than goes without psychiatric claims (odds ratio 2.4, confidence interval 1.15–4.78). Depression more commonly preceded pancreatic cancer than it did other gastrointestinal malignancies (odds ratio 4.6, confidence interval 1.07–19.4) or all other cancers (odds ratio 4.1, confidence interval 1.05–16.0).

Distress is common among recently diagnosed patients and this has been highlighted as a period of special need for emotional support15. However, some of this distress is transient and may remit without any additional intervention. Therefore, it is important to distinguish between transient and normal levels of low mood and abnormal levels of depression or anxiety.

Goldberg et al.17 found high levels of anxiety and depression in approximately 25% of breast cancer patients at 12 months following initial diagnosis. There is evidence that this level can persist for up to two years or more after diagnosis18–19. Levels of depression and anxiety can also be higher in those patients with advanced disease20, with pain being an important contributory factor. Pain and depression are likely to interact and management of one without the other is unlikely to produce satisfactory results. In the palliative care, setting psychological care is now increasingly recognized as a priority and integral to good patient management. The majority of cancers still remain incurable, emphasizing the important role for psychological care that aims to improve quality of life, especially in those who are terminally ill.
Brewin et al. (2007) found approximately 4% of cancer patients screened in their survey met DSM IV diagnostic criteria for major depression and Grassi and Rosti 36, taking both major depression and dysthymia together, found a prevalence rate of 15%. This more serious psychological morbidity requires effective provision, and access to existing liaison mental health services is helpful. Knowing who needs this specialist level of care is an essential aspect of good practice in oncology.

**Stress and Cancer**

Experiments on immune system suppression and psychological stress are not limited to lab rats Kiecolt-Glaser and her colleagues conducted a series of experiments on medical students in 1985. “Glaser and her colleagues documented that commonplace stressful events resulted in immune suppression as detected in students’ blood samples taken during examinations as compared to similar samples taken one month previously” (Dacher, 1991). These findings demonstrated that anxiety (like the anxiety involved with test taking) could affect the immune system.

Bereaved spouses are another example of stress and immune system suppression. “Bereaved spouses, and most particularly widowers, are significantly more vulnerable to diseases than the unbereaved” (Pearsall, 1987). Lymphocyte responsiveness (the effectiveness of the part of the immune system that fight disease by maintaining homeostasis and preventing over production of cells decelerates in a person who has lost a partner. When these lymphocytes were stimulated with mitogens (substance that induces mitosis, or cell reproduction) “they reproduced at a significantly lower rate than those of individuals who had not lost a significant person in their lives” (Pearsall, 1987). Stress and carcinogenesis. It is a known fact that
lymphocytes have minute receptors on their surface intended for the reception of a range of secretions form the brain so that they can operate in response to the brain’s signals. It is possible that the loss of daily interactions and closeness can cause the brain to signal the body cells to develop more rapidly than normal in order to fill that void of activity. This would make the lymphocytes less effective due to the chemical changes, which hinder the response at receptor sites. This causes cell disease to begin. This theory of cell disease is called surveillance theory of cancer (Pearsall, 1987). This theory hold that cancer cells are constantly developing in the body, but that the immune system’s ability to recognize them as abnormal and destroy them are what prevents them from becoming malignant tumors. When the number of cancer cells becomes too large to be destroyed or when the lymphocytes become suppressed is when carcinogenesis occurs.

Cancer patients with a positive attitude were more likely to survive than those with a more negative one accordingly to a study of survival rates of women who head undergone the removal of breast because of cancer. (Pettingale et al 1985). The results suggest that the survival rates were related to the psychological response of the women three months after surgery.

Studies suggest that patients emotional responses may partially determine the course of their diseases. In case of cancer, it is possible that positive emotional response will produce natural ‘killer cells’ that helps to control the size and spread of cancerous tumours. Conversely, negative emotions may suppress the ability of the same kind of cells to fight tumours.(Glaser et al, 1986; Holland & Lewis, 1993; Anderson, Kiecolt & Glaser, 1994)
The notion that a positive mental stage increases longevity is supported by other studies.

Psychologists Sandra Levy and colleagues, found that a factor they labeled ‘joy’ refining to mental resilience and vigor was the strongest predictor of survival times for a group of patients with breast cancer. (Levey et. al; 1988). Similarly, cancer patients, who are characteristically optimistic, report less distress throughout the course of their treatment. (Carver, 1990; Carver et al, 1993)

What is increasingly clear is that certain types of psychological therapy have a potential for extending the lives of cancer patients. According of a careful study done by David Spiegel, Women with breast cancer who received psychological treatment lived at least a year and a half long, and experience less anxiety and pain than women who did not participate in the therapy. (Spiegel, 1993, in press; Lewis et al, 1994).

Spiegel’s (1990) results regarding the benefits psychological therapy are persuasive, it is premature to say definitely that therapy prolongs life. According to a study by the its Government, the question of whether psychological methods influence the onset and progression of cancer is an open one (Office of Technology Assessment, 1990) Still the results are promising one day perhaps, psychological therapy will become a standard part of the treatment for cancer. (Golder, Gersh, & Robbins, 1992; Spiegel, 1993)

Bhagyalaxmi. et al. (2003) in their study on psycho social issues in oral and oropharyngeal cancer found that in cancer-affected cases besides their clinical and physical ill effects the economic and psychosocial dimensions makes their life more difficult. Therefore, understanding and alleviating the emotional and social impact of cancer on patients and their
families needs a broader approach. In order to elucidate these aspects, a case control study was carried out at Gujarat Cancer and Research institute, Ahmedabad. The cases and controls were administered the hospital anxiety and depressions scale. Further, an interview Schedule was completed for assessing various areas of burden experience in the family. The study results revealed that oral and oropharyngeal cases were affected by anxiety (12%) and depression (25%) and another (4%) were having both the psychiatric morbidities. Study into disruption of routine activities in cases (oral and oropharyngeal cancer/ and control (cancer of other parts of body), revealed interesting observation.

The psychosocial factors with which the patient must contend may be more challenging than the physical factors and if left un-addressed can result in decreased adjustment coping.

Oral cancer is a disease principally confined to the older age group. In the present study, 66% of the cases were above the age of 45 years. This correlates well with study by Vaish (1984) where 78.1% of the cases were in the age group of above 45 years. Anxiety and depression are the commonest psychiatric problems encountered in cancer patients. In the present study, 12% and 25% of the cases were having anxiety and depression respectively and 4% of the cases having both anxiety and depression.

43% of the cases were having various subjective burden on the family leisure etc. Financial burden was observed in 36% of cases and 43% of the controls. This burden was mainly due to discontinuation loss of job and expenditure on treatment, medicines, transport and accommodation away from home Janet Parameshwaran found the financial burden (moderate to severe) in 70% of the affected families.
Disruption of routine activities is mainly because of the need of someone looking after the patient’s activity. A greater proportion of controls (54%) had disruption of routine activities as compared to the case (36%). Lower reporting for the oral cancer cases may be due to the relative independence of such cases to carry over personal routine work as compared to the cases of other sites eg: lung, stomach, rectum etc., Majority of cases (25%) and controls (32%) were having both psychological and social burden. This difference is not statistically significant \((Z=1.099, p>0.05)\) 59% of the cases were having psychosocial burden. In depth, study of psychosocial aspect of such patient may provide basis for practical guidelines for psychosocial care and accordingly a revised strategy for the better quality of life after the diagnosis. Special training is required two some members of staff to enable them to diagnose and refer psychosocial problems with greater frequency and counsel the cases and care takers in their families.

Lydia Temoshok, a psychologist, and her graduate student, Andrew Kneier, conducted a study at the University of California. Temoshok and Kneier compared the responses of Stress and Carcinogenesis. Patients with malignant melanoma and patients with cardiovascular disease to receiving mild electrical shocks. “The patients with malignant melanoma had a stronger physical reactions to the test, but tended to downplay how emotionally upset they were about it when they talked to the researchers afterward” (Goleman & Gurin, 1993). Temoshok coined the term Type C personality.

In another study found that, women who had an abnormal pattern of cortisol secretion had a significantly decreased survival time. This abnormal pattern involves a low level of cortisol secretion in the morning, and a higher level of cortisol secretion at night. The total amount of cortisol
secreted did no affect their long-term prognosis. Researchers concluded, “dysregulation of cortisol is associated with more rapid breast cancer progression” (Diurnal, Kraemer, Sapolsky, Sephton, & Speigal 2000).

An abnormal cortisol secretion rhythm implies an out of kilter stress responses associated with “poorer sleep patterns, loss of marital and social support, and increased sensitivity to stressors, all of which may effect survival rates” (Diurnal, et al. 2000). Cortisol also suppresses immune response, reducing lymphocytes activity.

A study conducted using 28 psychiatric patients (non-psychotic and non-medicated) compared with Red Cross blood donors demonstrated that “lymphocytes from the psychiatric patients had impaired repair of damaged DNA after X-ray irradiation” (Aramandola, 2002). The psychiatric patients were Stress and Carcinogenesis divided into two groups” one presenting higher symptoms and one presenting lower distress symptoms. The group displaying higher distress symptoms demonstrated poorer DNA repair. “An addition study, conducted in rats, also suggested that stress may alter DNA repair mechanisms” (Armandola, 2002).

The process of apoptosis (programmed cell death) is essential in the destruction of cancer cells. Cytotoxic T lymphocytes are programmed to destroy such cells. A study on the susceptibility to growth factor deprivation-induced apoptosis and their inhibition by phorbol ester (a tumor promoted) was conducted using medical students before and during exam periods. The inhibition of adoptosis was enhanced during exam periods. Increased resistance to adoptosis could present another method for cancer to escape destruction by the body’s immune system.
While Butow et al (2000) observed, that the strongest psychosocial factors associated with the development of breast cancer are emotional repression (especially repression of anger) and severely threatening life events such as the death of a significant other, results from a more recent prospective cohort study with follow up over nine years, by White et al. (2007) suggested that anger control and negative affect are not connected with breast cancer, melanoma, or total cancer, although they may have a small role in the risk of prostate, colorectal and lung cancer. The conclusions by White et al (2007) noted that although more research is needed to confirm the latter associations, the results suggested that if affective states are associated with cancer development, the association may differ for different cancers and argue against the use of total cancer as an outcome measure for studies in this area.

In the study by Maddock & Pariante (2001), when discussing the concept of stress, the authors noted that stress results when environmental demands exceed a person’s resources to meet those demands (Lazarus, & Folkman, 1984). They noted also that stress has various dimensions (Herbertt, & Cohen, 1993). It may be considered in terms of its duration (acute vs chronic; for example, laboratory stressor vs incurable disease); quantity (discrete events vs cumulative events; for example, bereavement vs daily hassles); and quality (interpersonal event vs non-interpersonal; for example, divorce vs earthquake). The individual’s perception of, and adaptation to, stressors is accompanied by physiological and behavioural changes.

There is evidence to link stress with the onset of major depression and a poorer prognosis in cardiovascular disease and cancer. Chronic stress appears to result in suppression of the immune response, whereas immune activation and suppression have been associated with acute stress.
Inflammatory cytokines, soluble mediators of the immune response, can result in symptoms of depression, Maddock & Pariante (2001).

While the relationship between psychosocial factors and the development of cancer has not been strongly established, research does demonstrate that addressing psychological stress as part of treatment programs for cancer patients does have benefits in facilitating adjustment and in improving survival.

Recently 'Clinical practice guidelines for the psychosocial care of adults with cancer' were approved by the National Health and Medical Research Council and released as a National Breast Cancer and National Cancer Control initiative 2003.

Evidence is accumulating that psychological therapies improve emotional adjustment and social functioning, and reduce both treatment- and disease-related distress in patients with cancer. Meta-analyses of randomised controlled trials demonstrate the efficacy of both supportive and cognitive behavioural therapies in the treatment of depressive disorders in patients with cancer and the efficacy of both individual and group therapies.

In a meta-analysis of 45 randomised controlled trials in patients with cancer, those receiving psychological therapies showed, on average, a significant improvement of 12% in measures of emotional adjustment, 10% in social functioning, 14% in treatment and disease-related symptoms, and 14% in overall improvement in their quality of life, compared with those not receiving psychological therapies.

A meta-analysis of 116 intervention studies found that patients with cancer receiving psycho-educational or psychosocial interventions showed much lower rates of anxiety, depression, mood disorders, nausea, vomiting
and pain, and significantly greater knowledge about disease and treatment, than the control group.

Psycho-educational programs are defined as programs with both psychological (for example, supportive group therapy) and educational (for example, coping skills training, stress management, education about disease and treatment) components (italics added).

Psychosocial intervention programs are defined as treatments that are intended to address psychological, social and some spiritual needs, while psychosocial support is the culturally-sensitive provision of psychological, social and spiritual care. (italics added).

While a number of studies discussed below demonstrated that interventions to reduce psychological stress improve cancer survival, further research is required.

Speigel, Bloom, Kraemer & Gottheil (1989) treated women with metastatic breast cancer by means of weekly group therapy. The intervention focused on encouraging a discussion of how to cope with cancer, and the expression of feelings about illness and its physical consequences. Relationships that developed amongst group members provided increased social support. A randomized study compared one year of the psychosocial treatment versus a control group. Both groups received routine oncology care. After 10 years of follow-up, the survival time of patients in the intervention group was almost double that of the controls; 36.6 months versus 18.9 months starting from the onset of the intervention.

At six months follow-up, the intervention group, compared to a randomly selected control group, exhibited lower levels of psychological distress (Fawzy et al, 1995). Furthermore, after 5-6 years of follow-up the
psychosocial intervention group had a lower rate of death and cancer recurrence than controls (Fawzy et al, 1995.) In a 10 year follow-up review the researchers noted that between the 5-6 year follow-up and the 10 year follow-up, the effects of the intervention had not entirely disappeared (Fawzy et al, 2003).

Although not yet extended to cancer patients, experimental investigations provide the most convincing evidence to date that emotional processing and expression are related causally to positive outcomes (Stanton et al, 2000).

The study by Stanton et al (2000) tested the hypothesis of coping through emotional approach and its impacts on enhancing adjustment and health status for breast cancer patients. The authors noted evidence suggesting that coping through emotional approaches, i.e. coping through actively processing and expressing emotion may enhance adjustment in cancer patients.

In the Stanton et al (2000) study, the authors referred to previous randomized, controlled studies of psychological interventions, in which one intervention component was the facilitation of emotional expression. These studies provided evidence that in groups with cancers such as metastatic breast cancer and malignant melanoma such interventions can enhance psychological adjustment (Fawzy et al, 1990; Spiegel, Bloom, & Yalom, 1981), improve immune function (Fawzy et al, 1990), and perhaps promote longer survival (Fawzy et al, 1993; Spiegel, Bloom, Kraemer, & Gottheil, 1989).

Cancers develop due to alterations (mutations) in genes that when working properly, promote normal, controlled cell growth. Only a small percentage of cancers involve inherited mutations that are passed from
generation to generation (genetic). The majority of cancers can be attributed to acquired mutations. "Acquired" means that the mutations occur only in the tissue that is affected by cancer (for example, colon cancer cells), and are not passed to children. These changes occur at the cellular level after birth, as a result of environmental exposures (such as smoking, working with asbestos), lifestyle behaviours (such as eating poorly or not exercising), or chance alone. Mutations in a person's DNA accumulate over time. If mutations affect genes that control cell growth this may cause a cell to grow out of control, and to ultimately become a cancer cell (All About Cancers, description of genetics, Health Topics, University of Virginia Health System, website).

How does our mind potentially modulate our genes? This question is explored in a book by Rossi (2003), The Psychobiology of Gene Expression: Neuroscience and Neurogenesis in Hypnosis and the Healing Art. Rossi explains that genes can be affected by thoughts and emotions.

‘Gene expression’ is the technical word for a gene that is activated into producing a particular protein. Some of these in turn, generate new neurons and connections in our brain. Since a thought or emotion can cause gene expression, there is now a true psycho-biology awaiting our understanding. We have millions of genes that can toggle ‘on’ or ‘off’ when we find the right switches in our thoughts and feelings (Ewin, 2003).

A Japanese study (Irie et al, 2001) using a sample of healthy adults, not only provided evidence of a stress-cancer linkage, but also suggested possible sex differences in the mechanisms of stress-related cancer initiation. This study noted that gene alterations, which are important in the pathogenesis of cancer, have scarcely been investigated in relation to psychosocial factors. It examined the relationship between psychosocial
factors and cancer-predisposing gene alterations simultaneously in order to assess the stress-cancer linkage, particularly with respect to cancer initiation. Very limited issues, such as poorer repair of DNA damage, an increase of sister chromatid exchange and alterations in apoptosis, have been reported to be linked causatively with stress.

Irie et al, (2001) undertook a study to investigate the relationships between the levels of 8-OH-dG in peripheral blood leukocytes and various psychosocial factors that may be associated with oxidative DNA damage. The study considered such psychosocial factors as emotions, stress-coping behaviours, social support, working conditions, and lifestyle factors in workers during usual stressful conditions. The relationships were examined adjusting for age, body mass index (BMI), cigarette smoking and alcohol drinking habits, because these factors have been reported to have associations with carcinogenicity and the formation of 8-OH-dG.

In an article on current directions in cancer research, Antoni and Lutgendorf (2007) state that psychosocial factors such as stress, personality, and social support relate to differences in disease progression in cancer patients. Neuroendocrine substances associated with psychosocial factors may regulate immune responses to cancer as well as regulate the activity of oncogenic (cancer-causing) viruses, DNA-repair processes, and the expression in tumor cells of genes that may affect the tumor's growth and metastasis. Biobehavioral oncology research seeks to understand how these psychosocial factors, and interventions designed to modify them, become neurohormonal changes that alter cell signaling and tumor growth, viral oncogenesis, and immune responses. Antoni and Lutgendorf (2007) reviewed the empirical basis for psychosocial factors and biobehavioral processes in cancer progression and suggest future research.
Lutgendorf et al, (2005) examined the relationships between distress, social support and natural killer (NK) cell activity in ovarian cancer patients in peripheral-blood mononuclear cells (PBMC), ascetic fluid and tumor-infiltrating lymphocytes (TIL). The researchers found that psychosocial stress was related to impaired immunity in cancer patients. However, the extent to which these relationships exist in immune cells in the tumor microenvironment in humans was not explored. In Lutgendorf et al (2005) research, patients awaiting surgery for a pelvic mass suspected of being ovarian cancer completed psychological questionnaires and gave a pre-surgical sample of peripheral blood. Samples of tumor and ascites were taken during surgery, lymphocytes were then isolated, and NK cytotoxicity and percentage were determined. The final sample, which was confirmed by surgical diagnosis, included 42 patients with epithelial ovarian cancer and 23 patients with benign masses.

The results of the research by Lutgendorf et al (2005) noted that peripheral NK cell activity was significantly lower among ovarian cancer patients than in patients with benign masses. It noted, among ovarian cancer patients, NK cytotoxicity in TIL was significantly lower than in PBMC or ascitic fluid. Social support was related to higher NK cytotoxicity in PBMC and TIL, adjusting for stage. Distress was related to lower NK cytotoxicity in TIL. A multivariate model indicated independent associations of both distress and social support with NK cell activity in TIL. In other words, the research by Lutgendorf et al (2005) concluded that psychosocial factors, such as social support and distress, are associated with changes in the cellular immune response, not only in peripheral blood, but also at the tumour level. These relationships were more robust in TIL. These findings supported the presence of stress influences in the tumour microenvironment.
An earlier study on vascular endothelial growth factor (VEGF) by Lutgendorf et al. (2002) also contributes to our understanding of the biological basis for the link between social support and cancer prognosis. Pre-surgical levels of VEGF, a cytokine that stimulates tumor angiogenesis, were lower in patients with ovarian cancer who had higher levels of social well-being.

Further, in the Stanton et al. (2000) study, the authors referred to other studies of adjustment to cancer that indicated that coping through cognitive and behavioural avoidance is detrimental to adjustment (Carver et al., 1993; Friedman, Nelson, Baer, Lane, & Smith, 1990; Stanton, & Snider, 1993) and perhaps to health status (Epping-Jordan, Compas, & Howell, 1994; Jensen, 1987).

In another link to the capacity of our immune system to have a positive effect on cancer outcomes Koebel et al. (2007) presented their research findings that suggested “when cancer cannot be killed, it may be possible to find ways to use the immune system to contain it”. Co–author Prof Mark Smyth, Head of the Peter MacCallum Cancer Immunology Program in Melbourne, suggested that the next step would be to mobilise the immune system to suppress cancer and prevent it from spreading (Kelly, 2007).

In research of another possible predisposition gene marker, Wu et al. (2003) provided support to their hypothesis that telomere dysfunction impairs chromosomal stability and is associated with an increased risk of various cancers. These results (using two different methods to measure telomere length) demonstrated that telomere length was statistically significantly shorter in lymphocytes from case patients with head and neck cancer, bladder, lung, or renal cell carcinoma than in control subjects. It also
provided evidence of an increasing risk for head and neck, lung, and renal cancer associated with progressively shorter telomeres, indicating that telomere dysfunction may be a risk factor for cancer at these sites and possibly for cancer in general.

A Japanese study (Irie et al, 2001) using a sample of healthy adults, not only provided evidence of a stress-cancer linkage, but also suggested possible sex differences in the mechanisms of stress-related cancer initiation. This study noted that gene alterations, which are important in the pathogenesis of cancer, have scarcely been investigated in relation to psychosocial factors. It examined the relationship between psychosocial factors and cancer-predisposing gene alterations simultaneously in order to assess the stress-cancer linkage, particularly with respect to cancer initiation. Very limited issues, such as poorer repair of DNA damage, an increase of sister chromatid exchange and alterations in apoptosis, have been reported to be linked causatively with stress.

Irie et al, (2001) undertook a study to investigate the relationships between the levels of 8-OH-dG in peripheral blood leukocytes and various psychosocial factors that may be associated with oxidative DNA damage. The study considered such psychosocial factors as emotions, stress-coping behaviours, social support, working conditions, and lifestyle factors in workers during usual stressful conditions. The relationships were examined adjusting for age, body mass index (BMI), cigarette smoking and alcohol drinking habits, because these factors have been reported to have associations with carcinogenicity and the formation of 8-OH-dG.

In an article on current directions in cancer research, Antoni and Lutgendorf (2007) state that psychosocial factors such as stress, personality,
and social support relate to differences in disease progression in cancer patients. Neuroendocrine substances associated with psychosocial factors may regulate immune responses to cancer as well as regulate the activity of oncogenic (cancer-causing) viruses, DNA-repair processes, and the expression in tumor cells of genes that may affect the tumor's growth and metastasis. Biobehavioral oncology research seeks to understand how these psychosocial factors, and interventions designed to modify them, become neurohormonal changes that alter cell signaling and tumor growth, viral oncogenesis, and immune responses. Antoni and Lutgendorf (2007) reviewed the empirical basis for psychosocial factors and biobehavioral processes in cancer progression and suggest future research.

Lutgendorf et al, (2005) examined the relationships between distress, social support and natural killer (NK) cell activity in ovarian cancer patients in peripheral-blood mononuclear cells (PBMC), ascetic fluid and tumor-infiltrating lymphocytes (TIL). The researchers found that psychosocial stress was related to impaired immunity in cancer patients. However, the extent to which these relationships exist in immune cells in the tumor microenvironment in humans was not explored.

The research by Lutgendorf et al (2005) concluded that psychosocial factors, such as social support and distress, are associated with changes in the cellular immune response, not only in peripheral blood, but also at the tumor level. These relationships were more robust in TIL. These findings supported the presence of stress influences in the tumor microenvironment.

The evidence presented demonstrates some relationships across psychological, psychosocial, environmental and gene pathways and cancer.
While not determinative, the evidence provides opportunities for further high quality research in what is a psycho-genomic structure.

**Complex/dual role of oxidative stress in carcinogenesis**

Many recent studies have proved the role of oxidative stress in carcinogenesis (Wiseman et al, 1996, & Monya et al, 2001). The role of vitamin antioxidants in reducing the risk of various cancers by suppressing the state of oxidative stress have been documented recently (Fleischauer et. al, 2002 & Schuurman et. al 2002). The present review suggests that oxidative stress is not always detrimental, as it can be beneficial in cancers sometimes. Hence, oxidative stress can act as a double way sword in malignant states.

Oxidative stress sometimes can be utilized therapeutically. Potential anticancer drugs acting by this mechanism may prove novel in future. However, there is a concern for selective production of oxidative stress in cancer cells only, without exhibiting significant cytotoxicity in the normal cells.

**Psychiatric research builds link between sleep, stress, cancer progression**

Spiegel et al (2003), suggest that a person’s sleep/wake cycle might be the connection. Their work appears in the October issue of *Brain, Behavior, and Immunity*.

Spiegel suggested two possible ways in which the circadian rhythm may influence cancer progression. The first involves a hormone called melatonin, which the brain churns out during sleep. Melatonin belongs to a class of compounds called anti-oxidants that mop up damaging free-radical compounds. With a disrupted circadian rhythm, the body produces less
melatonin and the cell’s DNA may be more prone to cancer-causing mutations.

Cortisol is one of many hormones that help regulate immune system activity, including the activity of a group of immune cells called natural-killer cells that help the body battle cancer.

Stephen et al. in a Study “Stress and long-term survivors of brain cancer” using the Perceived Stress Scale and the National Comprehensive Cancer Network’s Distress Thermometer, levels of stress and cancer-related items of concern were assessed in adult long-term survivors of brain cancer. Results Sixty-one percent of the sample population experienced elevated levels of stress. Scores were not significantly associated with age, gender, treatment status, or tumor grade. Long-term survivors were just as likely to report being stressed ($c^2=0.032$, NS), while reporting fewer numbers of items of concern (5.02, SD=3.509), compared to brain tumor patients diagnosed <18 months (M=6.82, SD=3.737, $t=2.467$, $p<0.05$).

Discussion/conclusion: Despite their long-term survival status, long-term survivors of brain cancer continue to experience elevated levels of stress. Predictors of stress in this population are related to familial, emotional, and practical concerns. While the scientific community continues to examine the specific impact of stress on both the physical and mental outcomes of cancer patients, understanding the sources of stress within cancer populations is key in designing targeted interventions to help patients manage the stress associated with this disease.

Receiving a diagnosis of cancer and its subsequent treatment has been cited as being psychologically taxing; however, little is known about the long-term psychological effects on cancer survivors. This study
documents, that long-term survivors of brain cancer (those surviving 18 months or more) are just as likely to report themselves as stressed as other patients with brain tumors. Although these long-term survivors report fewer numbers of concerns than other brain cancer patients, significant predictors for stress for these groups remain the same. Unlike other cancer populations, time since diagnosis and treatment did not mitigate the stress effects of cancer. Despite their long-term status, elevated levels of stress continue across the disease trajectory for patients with brain tumors.

Jennifer et al (2003) studied the link between psychological stress and carcinogenesis. They examined the correlation between psychological stress and carcinogenesis. A number of studies have indicated that there is a positive correlation between stress and cancer development as well as progression. Results indicated that an extensive longitudinal study is needed in order to definitively conclude that stress has a direct effect on cancer development in humans.

Researchers have determined that when an individual is experiencing stress, physical changes occur within the body. During a stressful situation, “the hypothalamus activates the pituitary gland, which in turn activates the adrenal glands to produce hormones that cause chemical changes in various cells and tissues” (Benson & Stuart, 1992). This process is called the fight-flight response. During this fight-flight response, the immune system can become suppressed. The suppression of the immune system leads to susceptibility to diseases, including cancer. Conversely, it has been demonstrated that positive messages from the brain can enhance the ability of the immune system to stave off disease. This mind body connection is referred to as psychoneuroimmunology (PNI).
PNI research began in the 1960s. Today’s researchers have become progressively more sophisticated. PNI Researchers examine how psychosocial factors such as optimism and social support moderate stress responses. “They are mapping the biological and cellular mechanisms by which stress affects the immune system, and they are testing new theories, such as the idea that the immune system acts as a "sixth sense" that gives the brain valuable information about a person’s health status” (De Angelis, 2002)

One of the newest theories of PNI is called the bidirectional model. It states that there is a link from the immune system to the brain and not the other way around. According to this theory, the immune system is a messenger that signals the brain to infection or injury by releasing proteins called proinflammatory cytokines. These cytokines travel to the central nervous system and brain to communicate information about the body’s distress. Next, “the brain releases its own cytokines that signal the central nervous system to initiate a surge of responses such as fever and listlessness that, theorists believe, help the body adapt by reducing energy output” (De Angelis, 2002). PNI researchers are interested in cytokines because they epitomize an immune response gone wrong.

Stress increases hormones, which slow the delivery of cytokines to the site of injury or infection. Robert Ader, an experimental psychologist, was interested in the psychosomatic characteristics of disease. On the 45th day of Ader’s taste-aversion experiment, a few of the rats he used had died. A few more rats died in the next few days. Ader had conditioned the rats to have an aversion to the taste of saccharin. Ader used a chemical called cyclophosphamide, which causes nausea in rats. Ader gave the rats an injection of this chemical, and immediately afterwards, he would give them a saccharin-flavored drink. After 50 days, the taste-aversion was extinguished
and the experiment ended. Ader wanted to know why the rats had died. When he researched the properties of cyclophosphamide, he discovered that it suppressed certain reactions of the immune system.

Ader had unintentionally produced a situation in which the rats were conditioned to weaken their own immune systems (Dacher, 1991). According to Ader’s theory, the rats had associated the saccharin with both the nausea inducing effects and immune suppressing effects of cyclophosphamide. Due to this psychological pairing, every time a rat took a drink of the saccharin alone, it thought it was cyclophosphamide, nausea, and immune suppression followed. Ader learned that the rats that died were the ones that drank the most saccharin-flavored liquid. Ader inadvertently taught the rats to do on their own, what the cyclophosphamide did. This experiment demonstrated that the immune system could be influenced by what an organism believed and what went on in its brain.

In the past decade, psychobiologist Shamgar Ben-Eliyahu has been working on the link between stress and tumor development. Ben-Eliyahu and his colleagues discovered that stress such as “forced swim, surgery, and social confrontation decreases lymphocyte activity in rats for as little as one hour and as long as a day or two” (Azar, 1999). These types of stresses also cause a two-to-five-fold increase in certain types of tumors. These stresses also advance tumor growth. Emory University psychologist Jay Weiss found evidence that b-lymphocytes (the type of white blood cell that responds to an antigen by producing antibodies) are involved in combating tumor cells in the lungs of rats. According to Weiss, b-lymphocytes are the immune cells that are most influenced by stress. Another study investigated the possibility that stress could weaken one part of the DNA repair process. Forty-five rats were given dimethylnitrosamine (a carcinogen), and half were assigned to a
stress condition. The methyltransferase, a DNA repair enzyme generated in reaction to carcinogen damage, was drastically reduced in stressed animals’ splenic lymphocytes, as compared with splenic lymphocytes obtained from the control rats (Kielcot-Glaser & Glaser, 1999).

Experiments on immune system suppression and psychological stress are not limited to lab rats. Janice K. Kiecolt-Glaser and her colleagues conducted a series of experiments on medical students in 1985. “Glaser and her colleagues documented that commonplace stressful events resulted in immune suppression as detected in students’ blood samples taken during examinations as compared to similar samples taken one month previously” (Dacher, 1991, p. 22). These findings demonstrate that anxiety (like the anxiety involved with test taking) could affect the immune system.

Bereaved spouses are another example of stress and immune system suppression. “Bereaved spouses and most particularly widowers are significantly more vulnerable to disease than the unbereaved” (Pearsall, 1987, p. 104). Lymphocyte responsiveness (the effectiveness of the part of the immune system that fights disease by maintaining homeostasis and preventing over production of cells) decelerates in a person who has lost a partner. When these lymphocytes were stimulated with mitogens, (a substance that induces mitosis or cell reproduction) “they reproduced at a significantly lower rate than those of individuals who had not lost a significant person in their lives” (Pearsall, 1987).

It is a known fact that lymphocytes have minute receptors on their surface intended for the reception of a range of secretions from the brain so that they can operate in response to the brain’s signals. It is possible that the loss of daily interactions and closeness can cause the brain to signal the body
cells to develop more rapidly than normal in order to fill that void of activity. This would make the lymphocytes less effective due to the chemical changes, which hinder the response at receptor sites. This causes cell disease to begin. This theory of cell disease is called surveillance theory of cancer (Pearsall, 1987). This theory holds that cancer cells are constantly developing in the body, but that the immune system’s ability to recognize them as abnormal and destroy them are what prevents them from becoming malignant tumors. When the number of cancer cells becomes too large to be destroyed or when the lymphocytes become suppressed is when carcinogenesis occurs.

Temoshok, a psychologist and Kneier, conducted a study at the University of California. Temoshok and Kneier compared the responses of patients with malignant melanoma and patients with cardiovascular disease to receiving mild electrical shocks. “The patients with malignant melanoma had a stronger physical reaction to the test, but tended to downplay how emotionally upset they were about it when they talked to the researchers afterward” (Goleman & Gurin, 1993). Temoshok coined the term Type C personality. The Type C personality characteristics consist of:

1. The suppression of strong emotions
2. Compliance with the wishes of others and a lack of assertiveness
3. Avoidance of conflict or behavior that might offend others
4. A calm, outwardly rational and unemotional approach to life
5. Obeying conventional norms or behavior and maintaining the appearance of niceness
6. Stoicism and self-sacrifice
7. A tendency towards feelings of helplessness or hopelessness (Martin, 1997).

In a study conducted in the 1960s, women undergoing cervical smear tests were given interviews before the outcome of their tests were known. The results illustrated that women who expressed feelings of hopelessness during the interview had the greatest probability of being diagnosed with cancer.

In the 1960s, Ronald Grossarth-Maticek started a long-term prospective study of 1,353 Yugoslavian villagers. He learned that the villagers who scored highly on measures of antiemotionality and rationality were at the most risk for developing cancer. Hans Eysenck worked with Grossarth-Maticek and discovered that personality variables and psychological stress have an important connection with the risk of dying from cancer years later.

In another study, patients with stage one and two malignant melanoma who received no treatment other than surgery were divided into two groups. One of the groups received psychological support, learned how to use relaxation techniques, received stress management training, and had health education in a six-week period. The second group did not receive such support. The group who received support demonstrated less stress and improved immunologic functioning. Six years later, a follow up study was conducted on the two groups. The group that received support had a nine percent mortality rate compared to the other group, which had a 17 percent mortality rate. The group that received support also had a 21 percent tumor recurrence compared with 38 percent in the group that did not receive support.
According to a study in the Journal of the National Cancer Institute, cortisol secretion has an effect on survival time with breast cancer. Cortisol is a stimulatory stress hormone. During times of stress, the sympathetic nervous system (SNS) releases corticotrophin-releasing hormone (CRH). The SNS activates the adrenal glands, which release epinephrine and norepinephrine. Epinephrine and norepinephrine mobilize the body for the fight-flight response. The CRH activates the pituitary gland to release adrenocortico-tropic hormone (ACTH). ACTH activates the adrenal gland to release cortisol. After the stressful event, cortisol halts the production of epinephrine and norepinephrine. This brings the body back to its homeostatic state.

Women with breast cancer had their saliva tested for cortisol levels four times in a 24-hour period. This allowed researchers to examine the circadian rhythm of cortisol release in the women. Circadian rhythm is the body’s internal set of clocks, which control sleep patterns. Cortisol levels normally are at their highest in the morning in order to produce wakefulness. At night, cortisol levels decrease dramatically, allowing for relaxation to induce sleep. The study found that women who had an abnormal pattern of cortisol secretion had a significantly decreased survival time. This abnormal pattern involves a low level of cortisol secretion in the morning, and a higher level of cortisol secretion at night. The total amount of cortisol secreted did not affect their long-term prognosis. Researchers concluded, “Dysregulation of cortisol is associated with more rapid breast cancer progression” (Diurnal, Kraemer, Sapolsky, Sephton, & Speigal 2000).

An abnormal cortisol secretion rhythm implies an out of kilter stress response associated with “poorer sleep patterns, loss of marital and social support, and increased sensitivity to stressors, all of which may affect

A study conducted using 28 psychiatric patients (nonpsychotic and non-medicated) compared with Red Cross blood donors demonstrated that “lymphocytes from the psychiatric patients had impaired repair of damaged DNA after x-ray irradiation” (Armandola, 2002). The psychiatric patients were divided into two groups: one presenting higher distress symptoms and one presenting lower distress symptoms. The group displaying higher distress symptoms demonstrated poorer DNA repair. “An additional study, conducted in rats, also suggested that stress may alter DNA repair mechanisms” (Armandola, 2002).

The process of apoptosis (programmed cell death) is essential in the destruction of cancer cells. Cytoxic T lymphocytes are programmed to destroy such cells. A study on the susceptibility to growth factor deprivation-induced apoptosis and their inhibition by phorbol ester (a tumor promoter) was conducted using medical students before and during exam periods.

The inhibition of adoptosis was enhanced during exam periods. Increased resistance to adoptosis could present another method for cancer to escape destruction by the body’s immune system. Many studies have been done to demonstrate the correlation between cancer and stress in animals. The problem with animal experimentation is that there are numerous variables, which seem to affect cancer in animals. Handling, overcrowding, and being intimidated by other dominant animals seem to facilitate tumor growth. The promotion of tumor growth and stress is also dependent upon the “type and timing of the injection of tumor cells and the type of animals used in the studies” (Azar, 1999).
The stress an individual feels may not necessarily be directly manifested in the development of cancer. It is possible that stress leads to poor lifestyle choices that result in the occurrence of cancer (Goleman & Gurin, 1993). Stress, attitudes, and beliefs can affect lifestyle choices and health-related behavior. For example, an individual under stress may smoke cigarettes or drink alcohol. These behaviors have been proven to increase the risk of cancer. Other health-related behaviors have been correlated with cancer. For example, one-third of all cases of cancer can be attributed to poor diet.

Another current theory about psychological and cognitive states and cancer development suggests that certain negative emotional states (such as depression) may have evolved as part of the sickness response to conserve energy during times of infection.

There is a new theory that is challenging Hans Selye’s General Adaptation Syndrome theory (GAS). Selye believed that everyone goes through the same set of hormonal and immune system changes. This new theory suggests that there are two stress reactions. One reaction is the typical fight-flight response, but the other reaction is of withdrawal. This withdrawal reaction conserves energy. These reactions have been demonstrated using animals.

Another problem with researching stress and tumor growth in humans is that researchers cannot expose humans to tumor cells as they can with animals (Azar, 1999). Researchers often have to interview people with cancer in regards to their stress levels before their diagnosis. The interview style of data collection could lead to inaccurate self-report. A person who is now living with cancer and its treatments may look back at their life before the diagnosis and think, in comparison, that it was much more stress free.
A large longitudinal study is necessary to ultimately establish the correlation between psychological stress and carcinogenesis. A reliable study should include a sufficient number of healthy participants. The study should monitor them for about twenty years. A psychological assessment should be done periodically throughout the twenty-year span. The psychological assessment would determine the stress levels of the individuals throughout the study. This type of longitudinal study will allow researchers to see who develops cancer, who will survive it, and who will not develop cancer over time.

Chronic stress can have a serious impact on our physical as well as psychological health due to sustained high levels of the chemicals released in the ‘fight or flight’ response (Jane, 2007).

Mind and body are inextricably linked and the interaction between them can produce physical changes. Our brain notices a stressor, a physical reaction is triggered, and the reaction can lead to further emotional reactions and mental and physical damage. Some problems such as headaches and muscle tension are often directly caused by the bodily responses that accompany stress. Many other disorders, some say most, are aggravated by stress.

The human body is designed to withstand occasional extreme stress, so can survive quite a lot of pressure. It’s important to remember that most negative symptoms can be corrected if you take action. And there’s a lot of help available. If you are at all worried, do not delay in getting expert advice – your peace of mind is worth the effort. The problem will most likely not go away and the worst thing you can do is ignore it.

If you do develop a stress-related illness, at least you will have become familiar with your individual ‘weak point’, and will be able to keep a close eye on it. If similar symptoms creep back, take them very seriously as a warning.
Take a close look at your current situation and ease off the pressure wherever possible. Most of the problems below aren’t life-threatening, and controlling your stress levels will help keep them at bay (Carlson, 2004).

**Anxiety and Cancer**

Cancer is threatening, and understandably, many patients are anxious in response to that threat. Unfortunately, that anxiety sometimes becomes a clinically important problem in its own right, and cancer care professionals will often be responsible for its initial recognition and management. Anxiety does not feature much in the standard oncology literature. In this article, we therefore review recent research into anxiety complicating cancer and other physical illnesses.

**The nature of abnormal anxiety in cancer**

Anxiety produces a number of typical symptoms and signs. Symptoms of autonomic over-activity include palpitation and sweating. Anxious behaviours such as restlessness and reassurance seeking are a feature. Changes in thinking include apprehension, worry and poor concentration, and physical symptoms such as muscle tension or fatigue may occur. Since anxiety is a frequent response to threat, it is found in all clinical populations. It can be adaptive, but in certain circumstances it becomes maladaptive or morbid. Such pathological anxiety is identified by:

1) Being out of proportion to the level of threat
2) Persistence or deterioration without intervention
3) A level of symptoms which are unacceptable regardless of the level of threat (these include recurring panic attacks, severe physical symptoms, and abnormal beliefs such as thoughts of sudden death)
4) A disruption of usual or desirable functioning:
These characteristics are used to define anxiety disorders in the common diagnostic systems employed in psychiatry: the World Health Organization’s International Classification of Disorders (ICD–10) and the American Psychiatric Association’s Diagnostic and Statistical Manual (DSM-IV). In practice, these criteria may be difficult to apply to cancer patients.

It is difficult to judge when anxiety is disproportionate to the threat of cancer, since the disease is always associated with some real threat. The level of anxiety must be judged against the proximity of threat. For example, it is normal to experience considerable anxiety for a period of 7–10 days after receiving bad news (Holland, 1989), but as the degree of real threat varies throughout the history of the cancer, so therefore do levels of normal anxiety. In certain situations too little anxiety may be as problematic for adaptation as too much, and so while thoughts about recurrence and death will be natural early after diagnosis or relapse, they are not so during a long remission, with the point of transition being difficult to ascertain.

While the duration of symptoms is usually important in distinguishing abnormal anxiety the natural history of anxiety in oncology is uncertain, so this criterion is also difficult to apply. This may be because a range of definitions of abnormal anxiety has been used, and because anxiety is often labile and situational, making the onset of an episode difficult to define. Persistent anxiety may be identified quite early after diagnosis of cancer: anxiety, which persists only 3 weeks after a ‘bad-news consultation’, is highly predictive of anxiety 6 months later (Nordin and Glimelius, 1999). The prevalence of anxiety problems after a cancer diagnosis falls over the following years (Fallowfield et al, 1994), but may not return to population levels even with curative treatment (Loge et al, 1997).
Unacceptable symptoms and disruption in functioning are often at least as useful in defining pathological anxiety in a cancer patient as other criteria. Intrusive and unpleasant anxious thoughts, often involving recurrence of disease, death, or disability, can cause considerable disruption in concentration, decision-making, sleep, and social functioning. Consequent behaviours, such as avoidance, repetitive checking of health, and seeking reassurance for transient somatic symptoms, can be disruptive for the individual and their family.

Death Anxiety

The study of death attitudes has a long past, but a short history. Rooted in religious and philosophical systems that are as old as recorded human thought, the focused psychological study of attitudes toward death only began with the research of Herman Feifel in the 1950’s, gaining considerable momentum over the 60 years since that time. Reflecting the abiding themes of the “death awareness movement,” early research focused on assessing death fear and anxiety in relevant groups such as older adults and physicians, arguing that the discomfort reported by participants stemmed from a blend of individual factors (such as unconscious avoidance of personal mortality) and cultural attitudes (such as the American denial of death). Following the publication of Kübler-Ross’s influential popular book, *On Death and Dying* in 1969, research on death attitudes burgeoned, supported by publication of the first validated scales of death anxiety and related constructs. The result was a literature that became more methodologically sophisticated, more topically diverse, and ultimately more practical in its applications.

Correlates of death anxiety

With the completion of literally thousands of studies of death anxiety in recent decades, some reliable trends have emerged in the findings, as well
as many unanswered questions. Some findings are predictable: professional
groups that involve greater risk of death (such as firefighters or soldiers) tend
to report greater death fear, whereas those that simply confront higher degrees
of death exposure (such as physicians or funeral directors) do not. Likewise,
both physical and mental illness is associated with more anxiety about
personal mortality, and religious belief, though not necessarily religious
behavior (such as attendance at services), often but not inevitably predicts
higher death acceptance. In contrast, some findings are counterintuitive or
largely unexplained. For example, older adults as a group are not more fearful
of death than younger cohorts, despite their greater statistical proximity to
death; if anything, death fears seem generally to peak in mid-life. For
whatever reason, women commonly acknowledge greater discomfort with
death than men, a finding that tends to hold across ethnic and cross-cultural
comparisons, and which does not appear to be explained by a greater female
predisposition for emotional self-disclosure or a masculine concern with the social
desirability of responses. Thus, more remains to be learned about even the
more frequently replicated findings in the published literature.

Experimental studies

Although correlational and group-comparison studies are informative,
they are also limited in the sense that they cannot identify the causes of death
attitudes, nor can they reliably determine their effects. For example,
knowing that psychiatric patients have a higher level of death anxiety than
“normal” controls leaves open the explanation of this finding: perhaps their
fears of death contribute to their more general anxiety, as existential
philosophers might suggest, perhaps their general anxiety simply “spills
over” into worries about death and dying, or perhaps both general and death
specific anxiety are the result of other more basic factors, such as attachment
insecurity or problems in emotion-regulation. To provide more definitive causal explanations for attitudes toward death researchers need to conduct genuinely experimental studies that control some variables while manipulating or changing others, and then carefully measuring the effects. Two major lines of research on death attitudes have followed this strategy with useful, if sometimes disquieting results.

The first is a long line of research by many investigators on death education, a diverse curriculum for grade school, high school and college students as well as professionals, focusing on understanding the dying process, on cultural practices regarding death and bereavement, on demographic trends in dying and on a variety of specialized topics, such as suicide, problems of contemporary institutionalized dying, and stresses and skills in working in end-of-life settings or in grief therapy. In general, participants in such educational programs, relative to comparison groups, have developed a greater knowledge of death and dying, as one would logically expect. At an attitudinal level, however, results have been more mixed, with educational programs featuring primarily lectures and readings often increasing death-related anxieties, whereas those featuring experiential learning more commonly decrease such fears. It therefore seems that if one goal of such education is to allow people to approach death-related discussions and situations with greater equanimity, then many opportunities should be provided for personal processing of the curriculum through subjective values exploration, group exercises, and reflective writing.

The second major experimental program of research concerns terror management, the psychological process by which people unconsciously moderate their fears of death through engaging in behaviors that boost their self-esteem or strengthen their identification with cultural worldviews that provide a
kind of “buffer” against personal mortality. In a typical study participants first would be exposed to either a mortality salience manipulation, such as being asked to complete their own death certificate, watch a film on traffic fatalities or read material that highlights the frailty or vulnerability of the human body, or be assigned a neutral task, such as describing their dormitory room. They would then immediately engage in an unrelated activity to distract them from consciously attending to their resulting feelings or thoughts, such as responding to a series of mathematics problems. Finally, they would be assessed for the predicted attitudes or behaviors theorized to defend against death anxiety, such as more favorably evaluating their performance relative to that of others or adopting more conservative political positions. Results of terror management research have been consistently provocative, demonstrating that confrontation with death can drive a wide range of social attitudes and behaviors, from recommending harsher punishment for drug offenders to xenophobic avoidance of people who are culturally different, which indirectly reinforce mainstream cultural beliefs at the expense of others. Moreover, some of the results are paradoxical: young men whose self-esteem is reinforced by aggressive driving may actually drive more recklessly after exposure to a curriculum on motor vehicle accidents, and college students may be more prone to practice unprotected sex following a presentation on AIDS, as if to flaunt their personal invulnerability. Such findings obviously have practical implications for a wide range of social interventions and contexts, including death education. It also could have relevance for understanding broad societal responses to events like high-profile terrorism, which can precipitate massive shifts toward conservative social and political attitudes and associated behaviors, ranging from increased participation in religion to advocacy of military retribution against parties or nations perceived to be responsible.
The practical yield of death anxiety research

Although some studies of death anxiety seem to have been conducted simply for the benefit of the investigator, contributing little of value to our understanding of the human encounter with death, other research programs have yielded conclusions of clear practical value. One example is research on attitudes toward older adults, which suggests that people—including the staff of nursing homes—who are insecure about their own deaths are especially prone to derogate and devalue the elderly. Furthermore, an ample line of research has examined the predictors of heightened fear of death among older adults themselves, demonstrating that greater anxieties characterize those who live in institutional settings, who are seriously ill, and who struggle unsuccessfully to achieve “ego integrity,” the sense that they have lived well, fully and authentically. Similarly, research on hospice patients suggests that those who enjoy social support, who have recourse to spirituality in their daily lives, and who are troubled by few regrets about their pasts or their foreshortened futures are able to approach death with greater equanimity. Such findings carry implications for psychosocial interventions with such groups, suggesting the usefulness of opportunities for life review and the development of compassionate acceptance of self and others.

Depression and Cancer

Fish (2007) in a study on a Recognizing and Treating Depression states that although the reported incidence of depression in cancer patients varies widely, it is certainly common and often missed, since patients are reluctant to add another “symptom” to their list of medical complaints. It is important to disentangle symptoms of depression from other medical and psychological factors in this population and adequately to treat them.
Bruce, (2007), Professor of Psychology and Human Development at Vanderbilt University and Director of Psycho-Oncology at the Vanderbilt-Ingram Cancer Center, Nashville, noted there are three general levels of depression: depressed mood, symptoms of depression (subthreshold depression), and major depressive disorder or dysthymic disorder, based on Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) criteria.

In Compas’ own studies of breast cancer patients (2004), 27% of subjects reported depression at some point in their lives; about 4% of patients reported current depression, and 8% reported depression within the previous 12 months (Luecken et al. 2004). When generalized anxiety was included in the survey, about 18% of patients reported having either anxiety or depression and 54% reported a lifetime history of one or both of these conditions. “Anxiety disorders and mood disevents naturally can trigger depression in susceptible individuals. The combination of stress and genetic vulnerability most likely leads to depression, he said. “Hearing the three words ‘You have cancer’ triggers ‘kindling,’ and once the initial episode occurs, the patient is more vulnerable to the potential for stress to trigger a recurrence. The embers are there and it does not take much to start a fire,” Compas added.

In cancer patients, data are scarce, but several large reviews suggest that about 20%–25% of patients respond to psychotherapy alone, he said.

In addition to their effects on depressive symptoms, antidepressants may also influence the ability of patients to complete important cancer therapy. In a study Musselman, (2001), it was found that patients with high-risk malignant melanoma taking the antidepressant paroxetine were
significantly more likely to remain on interferon-alpha treatment and to have less depression and better quality of life than those receiving a placebo.

The subjects we studied attended the medical oncology clinic at City Hospital Center at Elmhurst, Queens, New York, and met the following criteria.

We interviewed 50 subjects, mainly Hispanic Catholic women. A stepwise regression analysis of religious variables (RIS: six sets of images of God and VASs: VASs for the importance of religion and attribution of sickness to God) showed only a few statistically significant relationships. Only two of the subscales of the PAIS had a significant predictor from the RIS, which did not appear in the total score. The VASs showed no predictive value.

Drug studies of medically ill-depressed subjects have demonstrated the efficacy of antidepressants for some disorders, but no one has systematically studied patients with cancer and depression. The findings that antidepressants alleviate symptoms of dysthymia suggest that patients with mild forms of depression associated with medical illness might respond to such treatment. Our results show the probable importance of controlling pain.

Tobacco smoking and alcohol use are key risk factors for head and neck cancer. Smoking and problem drinking frequently co-occur and are strongly associated with each other as well as with depression, low quality of life, cancer recurrence, and survival. Smoking and alcohol consumption have a synergistic, multiplicative effect rather than an additive effect on the risk of cancer recurrence (Maier et. al. 1992). Smoking increases during alcohol consumption (Griffiths et. al. 1976) and heavy drinkers are less likely to attempt to quit smoking and are less likely to be successful when they attempt (Whitlock, et. al. 1995, Deleyiannis et. al. 1996 and Bray, et. al.
1991). People with depression are much more likely to use tobacco and alcohol than non-depressed individuals (Romans et al. 1993, Amodei et. al. 1994). Depression in patients with head and neck cancer may be due to pain and disfigurement. Embarrassment from disfigurement may prevent patients with head and neck cancer from participating in traditional substance abuse and mental health group interventions. Furthermore, those attempting to refrain from tobacco and alcohol use may suffer increased depression due to withdrawal from these substances (Breitbart et. al. 1988).

Treating smoking, problem drinking, and depression separately may be inefficient given the similar treatment interventions for these disorders. For example, cognitive behavioral therapy (CBT) techniques are an effective treatment for all three disorders. There are also common pharmacologic interventions (Montvale 1998, Hurt et. al. 1997) that address smoking and depression. Selective serotonin reuptake inhibitors, such as paroxetine, are effective antidepressants and may decrease alcohol consumption, at least temporarily (Angelone et. al. 1998, Tiihonen et. al. 1996). Nicotine replacement therapies can double smoking cessation rates when compared with Counselling alone or no intervention (Silagy et. al. 1994, Hajek et. al. 1996).

Psychological distress, including depression, is an essential element of the QOL of cancer patients and, thus, depression has a great impact on their QOL (Cella 1996, Vissor et al. 1998, Harrison et al. 1998). Depression may be associated with treatment decision making, such as choosing chemotherapeutic agents (Colleoni, 2000), and with the shorter survival of lung cancer patients (Buccheri et al. 1998, Faller et al. 1999). Nevertheless, other studies have revealed that medical staffs are poor at detecting emotionally distressed or depressed cancer patients.
Depression is common in cancer patients and occurs throughout the course of their illness (Derogatis 1983, Massie et al. 1990, Minagawa et al. 1996). Previous reports on depression after a diagnosis of lung cancer have revealed, that 15% to 44% of patients experience some form of depression, including major depression and adjustment disorders with depressive mood, on the basis of Diagnostic and Statistical Manual for Mental Disorders, Revised (DSM-III-R) criteria (American Psychiatric Association 1987), or clinically probable and borderline depression, on the basis of the Hospital Anxiety and Depression Scale (HADS). Because lung cancer and its treatment vary with histologic type and disease stage, previous studies have merely shown that some patients may experience depression after curative resection of NSCLC. We therefore first examined the prevalence of depression using the Structured Clinical Interview for DSM-III-R (SCID) in a large, homogeneous, consecutive, prospectively designed sample of NSCLC patients during the 3 months after curative resection, and found that the 1-month prevalence of depression at 1, 2, and 3 months after surgery was 9.0%, 9.4%, and 5.8%, respectively. (Uchitomi et al. 2000) Although the prevalence of depression was lower than in lung cancer patients as a whole, including patients with advanced and small-cell lung cancer, it was not so low that it was negligible (0.9% to 3.7% in the general populations).

Factors associated with psychological distress, including depression, in various cancers have included physical variables, such as pain, fatigue, other symptom burden, and poor performance status (PS) (Akechi et al. 2001, Kaasa et al. 1993, Dugan et. al. 1998), whereas other studies have indicated socio demographic and psychosocial variables, such as younger age (Wenzel et al. 1999) and social support, including marital status. (Revenson et al. 1983) Because physical variables, such as PS and dyspnea,
would be expected to improve by 6 or 9 months after surgery, psychosocial factors may more strongly predict depression and psychological distress after curative resection in NSCLC patients than physical factors. Previous studies that examined the prevalence of depression and factors associated with depression in lung cancer patients have entailed certain drawbacks, such as small sample size, a heterogeneous subject population that included subjects with all histologic types and all disease stages, measurement of depression by self-report measures with limited accuracy, and design as a cross-sectional or short-term follow-up study. In this study, we chose to use a structured clinical interview, after which clinical intervention for psychiatric disorders had to be recommended by feedback to the attending physician as both a means of clarifying the clinical course of depression by rigorous methods during the year after curative resection of NSCLC and a means of identifying factors predictive of long-term outcome. We also used reliable, valid, self-administered instruments to assess psychological distress during the year after surgery.

Although there have been no long-term studies of depression after surgery for NSCLC, one study examined global QOL according to the Quality of Life Index before and 1, 3, 6, and 9 months after surgery in 117 consecutive subjects who underwent thoracotomy for a certain or presumptive diagnosis of lung cancer. Dales et al observed deterioration of QOL during the first 3 months postoperatively in those with a final diagnosis of cancer (n = 91) and found that although their QOL rebounded to its preoperative level, it did not reach the level of those in whom the final diagnosis was not cancer (n = 26). Our results are similar to their findings in that QOL did not reach the level of those without a final diagnosis of cancer during the 9 months after surgery. Neither depression nor QOL of the
NSCLC patients after curative resection appears to decrease spontaneously. Depression should be assessed repeatedly and should not be under recognized even after curative resection. Because depression at 1 month was a significant predictor, easy self-administered screening tools, such as the HADS, (Hopwood et al. 1991, Kugaya et al. 1998) might be beneficial to patients during the first year after successful surgical treatment of NSCLC.

Another noteworthy finding in this study was that the prevalence of depression did not significantly decrease during the year after surgery, even though only three (18%) of the 17 patients with depression at 1 month after surgery were diagnosed with depression at 12 months. Seven (70%) of the 10 patients with depression at 12 months were diagnosed for the first time. In two studies that prospectively assessed depression before and after treatment for inoperable NSCLC, (Hopwood et al. 2000, Akechi et al. 2001) the clinical course of the depression could be explained in part by a transient reaction to the diagnosis and treatment of cancer, by persistence of the reaction over time, or by worsening of the PS and the development of pain and dyspnea. In contrast, the results of our study showed a significant reduction of PS, pain, and dyspnea during the year after surgical treatment of early NSCLC; these findings are consistent with previous reports. One possible explanation for the finding that in most of the patients diagnosed with depression at 12 months it was diagnosed for the first time, is that junior high school education or less was a significant predictor of depression, although it became a marginal and not significant predictor after subjects with depression at 1 month were excluded ($P = .053, n = 195$). The results of the study indicate that medical professionals should pay careful attention to less educated NSCLC patients after curative resection.
In summary, there is a high prevalence of smoking, alcohol use, and depression among patients with head and neck cancer, and a strong interrelationship among these conditions. The difficulties with service delivery for treating these disorders individually and the similarities in treatment modalities suggest that it may be both more efficient and effective to address these conditions in combination. Hence, developed and tested a tailored intervention for patients with head and neck cancer that included CBT, nicotine replacement therapy, and selective serotonin reuptake inhibitor management for smoking, alcohol use, and depression.

**Subjective Well-being and Cancer**

Few studies have systematically examined the potential long term effects of a cancer experience. Eisenberg and Goldenberg (1966) interviewed 252 women, postmastectomy and again 18 months later and found that while there was considerable improvement in their physical functioning and activity status, there was a worsening sense of attitude concerning the surgery based on the patients expressed unhappiness about the experience. Craig, Comstock, and Geiser (1974) reported a five-year quality of survival study on 134 patients who had had mastectomies and 260 controls and found no correlation between physical disability and psychosocial disability among either subjects or controls.

Psychological problems have been reported in long-term survivors of pediatric cancer by Koocher, O'Malley, and their group. Survivors were on the average 12 years since cancer treatment ended. For purposes of comparison, the patient population was broken up into those rated as having a "Good Adjustment" on a "Combined Adjustment Rating" and those designated as having "Adjustment Problems." Fifty-nine percent had
"adjustment problems" and as a group had significantly more depression, anxiety, and poor self-esteem. Those treated in infancy had less marked and persisting developmental disruptions than those who were in middle childhood or adolescence when treated.

The sense of well-being is a subjective, private experience and its determinants are highly personal. What individuals perceive and report as their well-being is a composite of their experiences and what they recall and consider important for their current functioning. To ask cancer survivors to report their thoughts and feelings on general aspects of their well-being as perceived over the previous month assumes their previous cancer experience had a profound influence on their sense of well-being that has persisted and is measurable.

The Rand Health Insurance Study use of the HIS-GWB had indicated women, those not married, those of lower educational level and of greater age express less psychological well-being than men, those married, those of a higher educational level, and of lower age, respectively. The findings of this study that cancer survivors who are married and have not changed employment had significantly higher well-being scores may be a reflection of this population trend.

Whether the General Well-Being instrument, which measures self, reported mental and general health is adequate to follow cancer patients or to evaluate cancer outcome requires further study. Self-report measures have the advantage of taking less of the investigator's time and eliminate the outsider's bias that may occur in observer ratings. It is our assumption that self and observer ratings tap different aspects of awareness and both are important for studying the details of psychological, physical, and social adjustment.
The current results add to the weight of the evidence that emotional functioning is not an independent predictor of survival in cancer patients. The study had the advantage of a large number of deaths to be explained in a sample with the uniformity of treatment and quality of care that is required in clinical trials. (American Cancer Society, 2007)

The current results provided no support for the hypothesis that negative emotional well-being predict poorer survival among this large sample of patients with head and neck cancer. No effects were observed in either univariate or multivariate analyses or in exploratory analyses that examined interactions between emotional well-being and study protocol, sex, primary cancer site, or staging. Thus, this psychologic variable neither affected progression or death directly nor functioned as a lurking variable (Joiner et al., 1981), and it only emerged when other prognostic factors were controlled. In contrast, a number of demographic and clinical variables significantly predicted survival. These results are entirely consistent with another study of 57 deaths among 208 patients with head and neck cancer patients (deGraeff, deLeeuw, Ros, et al. 2001) that included both a measure of emotional well-being from a QOL instrument and the Center for Epidemiologic Studies-Depression scale (Radloff, 1977). The current study had the advantage of a pair of large, well-described samples with the standardization of treatment available in a controlled clinical trial. The number of deaths to be explained, 646, was larger than the total sample size of most previous studies. It should be noted that the number of events, and not the sample size, determined the ability to detect statistical differences and the ability to avoid spurious results from over fitting the regression models.

In summary, emotional well-being was not a predictor of survival among patients with head and neck cancer who were participating in a pair
of clinical trials. Despite such negative evidence, positive assessments of the evidence for an association between negative emotional well-being and reduced survival persist.

New York (Reuters Health) - Women having radiation treatment for breast cancer experienced lasting improvements in mental and physical health and quality of life after participating in five sessions of art therapy, Swedish researchers report. The findings "strongly support art therapy as a powerful tool in rehabilitation of patients with breast cancer and, presumably, also in the care of patients with other types of cancer," Jack Lindh of Umea University (2009), Umea, Sweden, and colleagues conclude in the European Journal of Cancer Care.

To investigate, they randomly assigned 41 breast cancer patients receiving radiation treatment to five once-a-week, hour-long sessions of art therapy or to a control group who didn't receive art therapy. Study participants completed surveys addressing their quality of life and self-image before beginning radiation, two months after radiation treatment began, and six months after the beginning of treatment. A trained art therapist led each session, in which women were given a wide variety of art materials. Goals of the intervention were to offer time and space for expression and reflection; give support in the process of restoring body image; and reduce stress. By six months, the researchers found, women who had participated in art therapy showed significant improvements in their overall quality of life, general health, physical health, and psychological health, while the control group only showed improvements in psychological health. The art therapy group also showed specific improvements in their body image, perspectives on the future, and radiation therapy side effects. In previous studies, Lindh's team demonstrated improved coping skills and better ability to deal with others’
demands in the breast cancer patients who did art therapy. Art therapy may have improved the women's quality of life by helping them to maintain a positive identity, to deal with pain, and to feel control over their lives, the researchers say.

"The results of studies suggest that the women, through image-making and reflection on their images, were able to give legitimacy to their own interpretations and experiences," as well as to "recognize and question" limits and boundaries imposed by traditional gender roles, they conclude.

In a study by Courneya Kerry, et al. (2000) Personality correlates of patients' subjective well-being after surgery for colorectal cancer: An application of the five-factor model examined the relationship between a general personality framework (the five-factor model) and subjective well-being in patients with colorectal cancer. Participants were 56 post-surgical patients with colorectal cancer who completed a mailed, self-administered questionnaire that assessed demographic characteristics, personality, and subjective well-being (life satisfaction, positive affect, negative affect, and affect balance). Pearson correlations indicated that neuroticism had the highest correlation with life satisfaction (r = -.61), affect balance (r = -.61), and negative affect (r = .48), whereas extroversion had the highest correlation with positive affect (r = .57). Moreover, hierarchical multiple regression analyses indicated that personality explained an additional 20% to 29% of the variance in subjective well-being after important demographic and medical variables were controlled for. The authors concluded that personality, particularly neuroticism, is strongly related to subjective well-being in patients with colorectal cancer and that clinicians should be aware of its implications for patients’ functioning.
In a research, study by Marco Valenti on Physical Exercise and Quality of Life in Breast Cancer Survivors states that an important goal for cancer patients is to improve the quality of life (QOL) by maximizing functions affected by the disease and its therapy. Preliminary research suggests that exercise may be an effective intervention for enhancing QOL in cancer survivors. Research has provided preliminary evidence for the safety, feasibility, and efficacy of exercise training in breast cancer survivors. The aim of this study was to assess the association between physical exercise and quality of life in a population of female breast cancer survivors, followed up from diagnosis to the off-treatment time period, and investigated about their exercise habits in pre-diagnosis.

A total of 212 female breast cancer survivors consecutively registered from January 2002 to December 2006 at a Supportive Care Unit in an Italian Oncology Department were enrolled. Exercise behaviour was assessed by the Leisure Score Index (LSI) of the Godin Leisure-Time Exercise Questionnaire. Patients were asked to report their average weekly exercise for three cancer-related time periods, i.e. pre-diagnosis, during active treatment and off-treatment. Quality of life was assessed by the Italian version of the WHOQOL-BREF standardised instrument.

Statistical analysis indicated significant differences across the cancer-relevant time-periods for all exercise behaviour outcomes: the exercise behaviour was significantly lower during both on- and off- treatment than during prediagnosis; exercise during active treatment was significantly lower than during off-treatment. QOL strongly decreases during active treatment. Significant correlations were found between total exercise on- and off-treatment and all QOL indicators. Strenuous exercise is strongly correlated with QOL. Absent/mild exercise seems to be inversely correlated with a
positive perception of disease severity and with quality of life on all axes. Need clearly results for inclusion of physical activity programs in comprehensive, complementary treatment regimes for breast cancer patients in Italian oncology departments.

Although the weight of evidence gives little support to the hypothesis that emotional factors, such as depression and stress, predispose to cancer, this view has been promulgated in health literature aimed at the lay public (Hesbacher et al. 1980). It is apparently widely accepted, since 36 percent (unadjusted data, unknowns excluded) of respondents to the 1987 National Health Interview Survey believed that "stress" increases a person's chances of getting cancer (personal communication, Larry Kessler, National Cancer Institute). Many people are thus likely to assume that they are at increased risk of cancer if they perceive themselves as depressed and possibly also as worriers.

Nevertheless, these data should provide some assurance to self-perceived depressed and worrying people, since they show no evidence of an increased risk of cancer for over a decade.

Yosuke Uchitomi et al (2003) in their study on Depression and Psychological Distress in Patients During the Year After Curative Resection of Non–Small-Cell Lung Cancer, concluded based on the results suggested the need for psychosocial support even after curative resection of NSCLC and indicate that an approach that includes repetitive perioperative assessment of depression and careful attention to less-educated patients might be of benefit to patients in ameliorating depression and psychological distress during the year after curative resection.
The interpretation of the results in this study is cautious. Fifth, depression may have been overestimated because we elected to use an inclusive diagnostic approach. This approach includes somatic symptoms, regardless of whether the rater judges that the symptom is caused by medical or psychological causes, prevents underdiagnosis of depression, and is reliable because of the high interrater agreement. (Koenig et al. 1995) Because other approaches do not offer a clear significant advantage in measuring depression and the need for treatment, the inclusive approach may be recommended with limitations in the clinical oncology setting. Finally, although the simple four-point verbal pain rating scale is the most widely used in the clinical context, the fact that we did not use a pain rating scale with higher sensitivity to change may have adversely affected the pain and dyspnea assessments in this study. (Caraceni et al. 2002)

This study revealed that the prevalence of depression did not reach a negligible level and did not change after curative resection for NSCLC. It also provided information indicating that preoperative depression and less-educated status were significant predictors of depression at 12 months after surgery. Overall, the study indicates that the psychological status of respectable NSCLC patients needs to be systematically addressed during their overall rehabilitation, including pain and dyspnea management. In addition, this study identified an area that is under studied in the literature regarding cancer survivorship, especially in the context of curative treatment. In the future, a randomized trial of coordinated psychosocial interventions on the basis of patient screening and treatment should be performed with the aim of ameliorating depression and psychological distress during the year after curative resection.
The interpretation of the results in this study is cautious. Fifth, depression may have been overestimated because we elected to use an inclusive diagnostic approach. This approach includes somatic symptoms, regardless of whether the rater judges that the symptom is caused by medical or psychological causes, prevents underdiagnosis of depression, and is reliable because of the high interrater agreement.53 Because other approaches do not offer a clear significant advantage in measuring depression and the need for treatment,54 the inclusive approach may be recommended with limitations in the clinical oncology setting. Finally, although the simple four-point verbal pain rating scale is the most widely used in the clinical context, the fact that we did not use a pain rating scale with higher sensitivity to change may have adversely affected the pain and dyspnea assessments in this study.( Mc Daniel et al. 1995 and Spiegel, 1996)

Tatsuo Akechi et al. (2000) on their study Suicidal Ideation in Cancer patients with Major Depression being first preliminary study that provides information about risk factors for suicidal ideation in depressive cancer patients based on clinical experience. Prior studies showed that depressive disorder is one of the most common psychiatric problems in cancer patients and that approximately 20% of all cancer patients had suicidal ideation. Since the subjects of our study were the patients referred to the psychiatry Division, the sampling bias may be problematic. However, the prevalence rate of suicidal ideation may not be low and the rate we identified is similar to that indicated in previous studies investigating the prevalence of suicidal ideation among depressive patients in a psychiatric setting (Wada et al. 1998). The result of a high prevalence of suicidal ideation in depressive cancer patients may indicate that major depression should not be underestimated and that suicidal ideation should always be taken into
consideration when assessing depressive cancer patients. This result suggests that oncology staff members need to treat cancer patients suffering from major depression carefully to prevent suicide.

The present study provides a clue to understanding why some cancer patients with major depression have suicidal ideation in depressive cancer patients were identified. Univariate analysis indicated that older age, poor performance status, advanced disease stage and severe depression were the possible risk factors, despite the lack of a significant association between suicidal ideation and important demographic factors such as marital status and deleterious physical distress such a pain (Massie et al. 1994, Hirshfeld et al. 1997). A previous study investigating risk factors for suicide in depressed patients in a psychiatric setting indicated that significant suicide-related factors were previous suicide attempt, being unmarried and living along (Roy 1983). That study suggested that social isolation enhanced suicidal tendencies among depressed patients.

**Guided Somato-Psychic Relaxation**

The Guided Somato-Psychic Relaxation (GSPR) is a technique improvised by Krishna Prasad Sreedhar, A Clinical Psychologist and Former Professor of Psychology, University of Kerala, and Trivandram, India. Sreedhar discovered that there was no uniform acceptance among patients and clients with reference to some of the popularly used relaxation techniques. According to him while some accepted ‘Shavasana’ (the yoga technique of relaxation), many felt it superficial because it did not say what to do with mind during its practice. Jacobson’s Progressive Muscular Relaxation (JPMR) was experience as superficial and not so smooth in the beginning phase. Several other techniques also did not fit
into the therapeutic milieu. This made him think of a relaxation technique, which according to him was experienced as natural and smooth. Thus, the Guided Somato-Psychic Relaxation evolved. According to Sreedhar, GSPR is the result of an integration of theories of learning and an amalgamation of the techniques of relaxation that already existed. The classical conditioning of Pavlov, the operant conditioning of Skinner, the techniques of relaxation by Jacobsons and Schultz and the body awareness and mental awareness techniques of the ancient Indian system of yoga influence him in evolving the present technique.

The aims of GSPR

1. Uniform acceptance by a majority of clients.
2. Easy integration of the technique into the psycho therapeutic and Counselling process.
3. Specific effects across clients and conditions.
4. A general beneficial effect to everybody.

The Phases of GSPR

The phase of GSPR consists of:

1. A brief rehearsal regarding physical relaxation relating to the musculo-skeletal system.
2. A narration, which creates a ‘set’ conducive to relation.
3. The instructions for body relaxation.
4. The instructions for mind relaxation.
5. A brief period of silence, and
6. Instructions to bring out the client from the relaxation.
The above phases are covered in approximately 26 minutes. The technique also insists on practice at home twice daily with the help of audio CDs. The GSPR relaxation is totally guided through word cues starting from the ‘soma’ to the ‘psyche’ and beyond. Thus it can be called a body, mind and beyond relaxation.

**Instructions and their importance**

Sreedhar claims that the uniqueness of this relaxation lies in its instruction. After a brief rehearsal, the client is inducted into the main instructions. The client is told that all that is required is to follow the instructions by passively listening, during which time the persons need not show any kind of acknowledgment either verbal or non-verbal. Before relaxing the body, the client is lead into a mental set, which makes the persons accept the relaxation as a natural process. Thus artificiality of the other relaxation techniques is eliminated. The analogies used have also been chosen with care to make the client feel natural. This puts the clients not only at ease but also creates a natural internal readiness to accept the relaxation.

**Procedure**

After taking the case history and arriving at the diagnosis, the client is told about the steps involved in the treatment, the client is further told that one step in the process is a procedure called ‘relaxation training’. In this, the client is requested to lie down on a comfortable cot in a supine position with the head slightly raised with the help of a pillow. The client could instead use a garden deck chair and can assume a relining posture. The client is further informed that the relaxation has both a physical and a mental stage. The person is also told that in the physical stage there are ten steps to be followed. The client is taught these steps by the counselor. At the mental
stage there is visualization of a pond. The visualization in the state of mental relaxation will also be described. The client is given time to clarify doubts, if any. If there are no doubts, the procedure starts. The counselor sits slightly behind the client on one side of the cot so as to have an overall view of the client. Then the instructions are given slowly and softly. The instructions can be given by the counselor himself or using the audio cassette/CD. It is better to give the instructions can be given by the counselor as it will help in enhancing rapport and involvement.

**Dynamics of GSPR**

Human beings experience different shades of consciousness like wakefulness, dreaming deep sleep, hypnagogic, hypnopompic and pure consciousness. Among all these, pure consciousness is probably the most ‘pleasurable and rewarding’. This has been proved by several studies in the area of consciousness. It appears that most of the western relaxation techniques did not given emphasis to this. On the other hand, the eastern techniques of relaxation aimed to achieve this state. However, most of the eastern techniques are found to be high. It is for this reason that GSPR was improvised. More over the popular techniques of relaxation appear to focus more on the relaxation to ‘beyond the body’ experiences. In other words, experts in relaxation therapy often lead the subjects to relaxation of the body, which makes the subjects fall asleep rather than leading them to the state of pure consciousness that follows body relaxation. Sreedhar’s observations have convinced him that if relaxation experience is taken beyond the body awareness it becomes more beneficial. He has evaluated and has shown the relative advantages of GSPR over JPMR, Autogenic training, ‘Shavasana’ Transcendental meditation and Relaxation response (Sreedhar, 1996). It is
claimed that in GSPR, the phase of ‘being calmly awake’ after body and mind relaxation, is highly beneficial.

**Characteristics of GSPR**

1. Among the relaxation techniques used today, this is probably the simples.

2. It is guided till the last moment.

3. The guidance is given step by step and leaves no room for any confusion.

4. The continuous narration in GSPR makes the guidance an uninterrupted process, unlike in JPMR.

5. Only minimal infrastructural facilities (a comfortable garden deck chair or a cot) are required.

6. It induces mental relaxation also, which was not given importance in JPMR.

7. While JMPR, modified by Wolpe (1958) takes nearly one hour, the total duration of GSPR is only approximately thirty minutes (except the first day when the steps are rehearsed, and reduces to fifteen or ten minutes while it is practiced by oneself. In the second and the third stages, the time can be further reduced. However, the end phase (period of silence) can be extended depending on one’s own capacity to keep calmly awake.

8. There are no religious connotations.

9. It can be used by professionals in Psychology, Medicine and Nurses in clinical situations after minimal training.
10. It can be learned and benefited by any body except very young children.

11. The clients tend to practice this at home, as the step are clear and the results immediate and palpable.

12. It can also be used in non-clinical situations for stress reduction and stress coping.

13. As only mechanical repetition is required, even ordinary people for maintenance therapy and follow up can master the administration of the technique. (As increased suggestibility might occur at certain phased of this relaxation, lay people may be forewarned not to suggest anything, which is not within the scope of relaxation of the mind and body.

14. It can be given as a group relaxation technique to groups like the elderly, teachers, college and schoolchildren and corporate employees if already a demonstration (using one of participants) is conducted or can be initiated into the second stage straight away.

15. It may be administered to children above the age of six years with minor modifications (like asking them to keep their eyes open after every third psychical step or allowing them to open their eyes periodically).

16. It can be combined with reasonable levels of pharmacotherapy.

Research studies using GSPR.

a) Sreedhar and Bhagavathi (1989): has found that there was significant decrease in the pulse rate of student volunteers after undergoing the Guided Somato Psychic Relaxation – II Stage.
b) Sreedhar (Personal observation) has observed marked decrease in Generally Anxiety, Phobia, Neurotic Depression, obsessive Ruminations (combined with ‘Thought stopping’), Essential Hypertension, Bronchial Asthma, Tension and Migraine headaches, Abuse of prescribed and on-prescribed drugs, Erectile and ejaculatory importance, and increased control over anger, after employing GSPR.

c) Ramesh (1994) has made some preliminary observations of the E.E.G patterns and the GSR of patients in comparison with progressive muscular relations and found GSPR more efficient in terms of the number of total session taken and the degree of relaxation achieved.

d) Deepa (1994) using GSPR as an intervention techniques in a small N design has found decrease in duration, frequency, and intensity of headache in patients suffering from Migraine.

e) Lakshmidevi (1994) has found GSPR effective in eliminating habituation to an anti-anxiety drug in one case. The Researcher has also observed GSPR to be more effective when compared with ‘Shavasana’ in Anxiety based disorders.

f) Sawitha and Bindu (1994) have concluded, after a content analysis of the subjective Reports of 131 respondents who underwent GSPR that the experiences reported were suggestive of deep relaxation.

g) Geroge (1995) has reported an overall 43.5% and 35% reduction in the degree of Premenstrual Syndrome in the ‘post GSPR’ and ‘follow up’ phases in six patients. In contrast, four control subjects showed only marginal difference in the desirable direction.

h) Thomas (1995) has made some preliminary observations in which the Researcher has found greater reduction in Manifest Anxiety,
Depression, and improvement in purpose of Life with GSPR in contrast to JPMR in Coronary Artery Diseases.

i) Alice (2002) has conducted the study on the effectiveness of stress management programme on cardiac surgical patients. It included GSPR. This stress management programme was found to be effective in preventing complications following cardiac surgery and the patient was ensured with an uneventful recovery following cardiac surgery.

j) Further Researches are in progress, which shows the efficacy of this relaxation technique.

Joy and Sreedhar (1998) in their research ‘to study the effectiveness of Guided Somato-Psychic Relaxation on essential hypertension and its related psychological factors like anxiety and depression,’ 7 female mild essential hypertensives (30-45 years) under medication, all with same drug and dosage were repeatedly assessed for 8 weeks. Four patients forming the intervention group underwent 10 relaxation sessions and the three patients in the Non-intervention group just presented themselves for the various assessments. Results show that there was an average reduction of 24.7 mm Hg in the systolic blood pressure and 10.5 mm Hg in the diastolic blood pressure of the patients in the intervention group who participated in the relaxation sessions. The levels of anxiety and medication alone, showed a slight decrease of 1.3 mmHg in systolic blood pressure, but an average increase of 0.8 mmHg in the diastolic blood pressure. Both anxiety and depression seemed to have slightly increased by 4.8 percent and 5.7 percent respectively. Guided Somato-Psychic Relaxation was found to be effective in the management of essential hypertension and its related psychological factors like anxiety and depression.
The efficacy of behavioral interventions for cancer treatment-related side effects

Mundy et al (2003). The use of increasingly aggressive methods of cancer treatment (e.g., cytotoxic doses of chemotherapy and total body irradiation) has resulted in the need for more effective management of pain, nausea, and other aversive side effects. One of the most promising approaches is nonpharmacologic intervention based on behavioral research and theory. The purpose of this article is to review the efficacy of behavioral intervention methods in controlling aversive side effects of cancer treatments. Sixty-seven published studies were identified for review. Results indicated that: (1) behavioral intervention can effectively control anticipatory nausea and vomiting in adult and pediatric patients undergoing cancer chemotherapy. However, evidence for the efficacy of behavioral intervention to control post-chemotherapy nausea and vomiting is mixed; (2) behavioral intervention integrating several behavioral techniques can decrease levels of anxiety and distress associated with invasive treatments and cancer diagnosis; and (3) although a variety of behavioral methods have been shown to reduce acute treatment-related pain, not all behavioral techniques are equally effective. Hypnotic-like methods involving relaxation, suggestion, and imagery appear to have the greatest impact on cancer-related pain management. The use of behavioral theory and techniques has an important place in the care of patients undergoing invasive cancer treatments.

PSYCHOSOCIAL INTERVENTIONS FOR DEPRESSION, ANXIETY, AND QUALITY OF LIFE IN CANCER SURVIVORS: META-ANALYSES

The abstract of the study Robyn, Osborn et al (2006) states that The purpose of this meta-analysis was to investigate the effects of cognitive behavioral therapy (CBT) and patient education (PE) on commonly reported...
problems (depression, anxiety, pain, physical functioning, and quality of life (QOL)) in adult cancer survivors. Methods: Meta analyses of randomized controlled trials of CBT and PE were conducted. MEDLINE, PSYCHINFO and the Cochrane Database were searched from 1993-2004. The effects of individual versus group interventions and short (<8 months) versus long (>8 months) term follow up are also reported. Results: Fifteen studies met quality criteria. The sample size was 1,492 adult cancer survivors with an age range of 18-84. 790 were randomly assigned to intervention groups and 702 to control groups. CBT varied in duration from 4 weekly one-hour sessions to 55 weekly two-hour sessions. PE ranged from a single 20-minute session to 6 weekly one-hour sessions. Follow up ranged from 1 week to 14 months. CBT was effective for depression (ES = 1.2; 95% CI = 0.22-2.19), anxiety (ES = 1.99; 95% CI = 0.69-3.31), and QOL (ES = 0.91; 95% CI = 0.38-1.44). QOL was improved at both short and (ES = 1.45, 95% CI = .43-2.47) and long term (ES = .26; 95% CI = .06-.46) follow up. PE was not related to improved outcomes. CBT is related to short-term effects on depression and anxiety and both short and long-term effects on QOL. Individual interventions were more effective than group. Various CBT approaches provided in an individual format can assist cancer survivors in reducing emotional distress and improving quality of life.

For all cancers combined, the number of people living at least five years post diagnosis has increased from 50% in 1976 to over 64% in 2001 (Ries et al, 1975-2001). There are an estimated 9.8 million cancer survivors in the United States, and this number is expected to continue to rise as the population ages and cancer detection and treatment improve (Rowland et al, 1971-2001). Despite increased longevity, the effectiveness of various approaches to improving the quality of life in survivors is not well-
understood (Gotay et al, 1998). Quality of life (QOL), including a patient’s sense of well-being and function (NCI) can be affected by depression, anxiety, and pain (Greisinger et al (1997), Ferrell et al (1995)). Approximately 16-25% of newly diagnosed cancer patients experience depression or an adjustment disorder with depressed mood (Sellick et al 1999). Depression has also been associated with functional limitations in cancer survivors (Wang et. al. 2002) and both anxiety and depression can independently contribute to functional and overall health (Dausch et. al. 2004, Simmonds et. al. 2002). Effective long-term management of these problems remains a challenge (Kristeller et. al. 1999).

Cognitive Behavior therapy (CBT) with cancer survivors typically includes stress management and problem solving (Fawzy et. al 1995) although other approaches are considered CBT interventions as long as they are based on the assumptions that cognitions can be monitored and altered, and in turn may facilitate behavior change (Dobson et. al.2001). In contrast, patient education (PE) typically includes information regarding the illness or symptom(s), symptom management, and/or discussion of treatment options (Yates, et. al 2004) and may include the use of booklets, videos or other educational materials (Krouse et. al 2003). While both approaches are used with cancer survivors (Fawzy et. al 1995), the effects on specific outcomes is not well understood and clinical decisions regarding their differential use in practice remains unclear.

Previous meta-analyses on the effects of early attempts to use such interventions in cancer survivors have reported modest results, which may be a function of the outcomes investigated. (Chow, et. al. 2004) reported no effects on mortality, which may be an inappropriate outcome to attribute to these types of interventions.
(Fawzy, et. al 1995) reported a small effect (ES = 0.24) on emotional adjustment. Meyer and Mark (Meyer TJ, et. al. 1995) noted small effect sizes for emotional adjustment (ES = 0.24), functional adjustment (ES = 0.19), treatment and disease related symptoms (ES = 0.26), and a global measure combining the previous outcomes (ES = 0.28), with no differences by type of treatment (behavioral, non-behavioral, educational, or social support). Rehse and Pukrop (Rehse, et. al 2003) concluded a modest effect (ES = 0.31) on QOL, with longer interventions (>12 weeks) being more effective than shorter-term interventions. While these various approaches result in modest improvements in global measures of adjustment, the effects of interventions on specific clinical problems such as depression, anxiety, fatigue, pain, and QOL may provide more precise information (Davidson, et. al 2004). Devine (Devine, et. al. 2003) observed a modest effect of psychoeducational interventions on pain (ES = 0.36) while Sheard and Maguire (Sheard, et. al 1999) concluded that psychological interventions (e.g., individual therapy and relaxation) for anxiety was associated with an effect size of 0.42 and had no impact on depression. These investigators reported larger effect sizes when limiting results to only the highest quality studies (e.g., randomized studies generated a larger effect size than non-randomized; 0.5 vs. 0.19). Further, studies meeting their quality criteria (randomized, >75% quality score, and >40 sample size) generated a much larger effect than those using lower quality designs; 0.63 vs. 0.24 (Sheard, et. al 1999).

The purpose of the present meta analysis was to quantify the specific effects of CBT and PE for treatment of depression, anxiety, pain, physical functioning, and QOL reported in randomized controlled trials in adult cancer survivors. CBT was operationalized as including any specific psychological or psychosocial intervention that was relatively brief, goal
oriented, based on learning principles of behavior change, and was directed at effecting change in a specific clinical outcome (Dobson, et. al. 2001). To address the question of duration of the effects of the various interventions, only studies reporting outcomes at a follow-up time point were selected. The present review defined survivorship as onset at time of diagnosis (ASCO., Mullman, et. al 1985).

**Outcomes: Depression, Anxiety, Pain, Physical Function, and QOL**

The Profile of Mood States (POMS) (McNair et. al. 1971) was commonly used to measure depression and the State-Trait Anxiety Inventory (STAI) (Spielberger, et. al. 1994) was common for anxiety (state form). Pain was typically assessed using a single-item visual analogue scale ranging from 0-10, with 0 being “no pain” and 10 being the “worst pain imaginable” (Oliver et. al. 2001). Physical functioning was assessed using the Functional Living Index for Cancer (FLIC) (Schipper et. al 1984), and QOL using the Functional Assessment of Cancer Treatment (Cella, et. al. 1993). Table 3 displays a summary of the effect sizes and significance levels for each outcome by intervention delivery type (individual or group) and the combined effects for both types.

**Depression**

Five studies measured the effect of CBT on depression at follow up. Four contained one treatment group whereas the Nezu and colleagues (Nezu, et. al 2003) study contained two treatment groups, one in which patients attended meetings alone, and a second where meetings were attended with a “significant other.” The “significant other” group showed larger effects on depression. There was a large effect size for the five studies ($g = 1.21, p < 0.05; 95\% CI 0.22-2.19$). Figure 1 displays the Forest plots that represent the
effect sizes for CBT on depression. In contrast, the two PE studies did not result in significant effects on depression at follow up ($d = -0.06, p = 0.55$; 95% CI $-0.24$-0.13).

A sensitivity analysis revealed that the four studies that used an individual approach resulted in a large clinical effect ($g = 1.44, p < 0.05$; 95% CI $0.29$-2.59). The single study that employed a group format had no effect ($d = 0.09, p = 0.41$; 95% CI $-0.13$-0.32).

**Anxiety**

Four studies used CBT for anxiety and a large effect was observed ($g = 1.99, p < 0.01$; 95% CI $0.69$-3.31). Figure 2 displays the Forest plots representing the effect sizes of CBT on anxiety. Trask et al. (Trask et. al 2003) reported multiple outcome measures of anxiety. As with depression, the single trial using PE resulted in no effect on anxiety at follow-up ($d = -0.02, p = 0.89$; 95% CI $-0.36$-0.31). A sensitivity analysis revealed a large effect size for individual treatment ($g = 2.41, p < 0.01$; 95% CI $1.26$-3.55) and no effect for group interventions ($d = 0.03, p = 0.82$; 95% CI $-0.20$-0.25).

**Pain**

While CBT was used for management of depression and anxiety, PE was more common for pain. The single CBT study revealed no effect on pain ($d = 0.02, p = 0.95$; 95% CI $-0.56$-0.60). There was also no effect for the three PE studies ($d = 0.24, p = 0.06$; 95% CI $-0.01$-0.49). Figure 4 illustrates the Forest plots of effect sizes for PE on pain including both the outcome measures (average and worst pain levels) reported in the Wells et al. study.
Physical Functioning

Three studies evaluated physical functioning. The two CBT studies revealed no effect ($g = -0.65, p = 0.52; 95\% \text{ CI} -2.65-1.35$). Similarly, no effect on physical functioning was found for the study using group PE ($g = 0.14, p = 0.19; 95\% \text{ CI} -0.07-0.36$).

Quality of Life

There were eight studies that used CBT and measured QOL at follow-up. The multiple QOL measures reported in the Allen et al. (Allen, et. al. 2002), Cheung et al. (Cheung, et. al. 2003), and Nezu et al. (Nezu et. al 2003) were included in the analysis. A large effect was found in these studies ($g = 0.91, p < 0.01; 95\% \text{ CI} -0.38-1.44$). The single study using PE did not result in a significant effect on QOL ($d = -0.04, p = 0.80; 95\% \text{ CI} -0.38-0.29$).

A sensitivity analysis revealed that the seven studies using an individual approach resulted in a large effect ($g = 0.95, p < 0.01; 95\% \text{ CI} -0.37-1.54$, whereas the one study that used a group format (Taylor et al. (Taylor, et. al. 2003)) resulted in no effect ($d = 0.37, p = 0.06; 95\% \text{ CI} -0.02-0.75$).

Follow-Up

Sensitivity analyses were preformed on each outcome by length of follow-up (short-term vs. long-term). The median follow-up length was calculated and a median split was performed. Based on the median split, short-term follow-up was less than eight months and long-term was greater than eight months. Neither CBT nor PE produced significant long-term effects on depression. However, CBT had a strong effect in the short-term ($g = 1.81, p < 0.01; 95\% \text{ CI} 0.72-2.89$), whereas PE did not. Similarly, there were no long-term effects of CBT on anxiety despite a strong short-term effect ($d = 2.87, p < 0.01; 95\% \text{ CI} 2.38-3.34$). PE showed no short-term
effects on anxiety. No PE study included a long-term follow-up on anxiety, and therefore this outcome could not be determined. For pain, there was also an absence of long-term follow-up. In the short-term, neither CBT nor PE had an effect on pain.

Analyses indicated significant short and long-term effects of CBT on QOL ($g = 1.45, p < 0.01; 95\%\ CI 0.43-2.47$), ($d = 0.26, p < 0.05; 95\%\ CI 0.06-0.46$), respectively. There were no short-term effects of PE on QOL. Egger’s test was conducted to assess the probability of publication bias for the studies included in the depression, anxiety, and QOL analyses. There was no evidence of such bias for the depression ($p < .37$) and anxiety ($p < .17$) outcomes, however the test revealed a possible publication bias for the QOL studies ($p < .03$). This may be accounted for by the quality criteria for study inclusion, as several studies did not meet these criteria in the present analyses. Many of these studies had inconsistent findings. Further, the heterogeneity of QOL measures used in various studies may contribute to a false positive finding in the Egger’s test (Egger et al., 1997).

The present meta analysis indicates that CBT is effective for the short-term management (<8 months) of depression, anxiety, and QOL in cancer survivors. CBT also has long-term effects (>8 months) on QOL. Individually based interventions were more effective than those delivered in a group format. Pain was not effectively managed by the CBT but PE was effective up to eight months. CBT was not useful for improving physical functioning in cancer survivors, despite its use for this purpose in other chronic illnesses (Kraaimaat et al. 1995). Individual CBT, such as problem solving, appears to be useful for cancer survivors for depression and anxiety. These approaches typically employ weekly, goal-oriented visits. The magnitude of these effects was larger than prior meta analyses. Perhaps when
interventions are targeted at specific clinical problems and only high quality studies are considered, the outcome is more focused and larger effect sizes are observed (Sheard et. al. 1999). This explanation is further supported by the (Nezu et. al 2003) study where a global problem solving intervention resulted in a larger effect size for a global measure of QOL than for the specific problem of depression. The larger effect sizes also may reflect recent refinements in the delivery of such interventions subsequent to the completion of previous meta analyses. The current analyses were completed on studies conducted after earlier metaanalyses were reported. It was the intent of this review to consider more recent studies, as interventions for cancer survivors are continuously being refined (Aziz et. al. 2002).

Since past analyses have indicated positive, yet smaller, effects, including these studies would have attenuated the observed effects, but not eliminated them. While antidepressive and anxiolytic medications are commonly prescribed for cancer survivors, adherence can be a problem. In those cases, non-pharmacological management using CBT represent a viable alternative or adjunct (Holland et. al. 1991). Effective management of depression and anxiety in these cases may impact other outcomes, such as global health, cognitive functioning, and fatigue (Smith, et. al. 2003). While complementary and alternative medicine and exercise-based interventions represent potential options (Goldstein, et. al. 2003), this review only focused on CBT and PE interventions. Increased physical functioning is also a goal for many cancer survivors (Luoma et. al. 2004) yet the approaches studied in the present analyses did not improve physical functioning. Pain is a prevalent symptom in many cancer survivors and insufficient pain control remains a concern in many survivors (Cleeland et. al. 1994). While PE is often used, its
effect on pain revealed only a trend of a small effect. There is a need to develop complimentary approaches for pain management in cancer survivors.

The investigation of short- and longer-term follow-up indicated that individual CBT has short-term effects on both depression and anxiety. Long-term effects were not observed. Andersen (Andersen, et. al. 2002) recently noted that treatment effects in past studies have tended to be transitory. Although long-term cancer survivors do report high levels of QOL, there are studies that indicate the presence of depressive symptoms that are not detected (Cleeland et. al. 1994). At this point in the development of interventions for cancer survivors, periodic follow-up, self-monitoring, and the use of short acting interventions for depression and anxiety may be useful because interventions directed at specific behavior change do improve targeted outcomes. Continued research on patient education interventions is warranted given their widespread use.

**The Benefits of Counselling**

Counselling can greatly benefit a person with cancer; however, it is hard for some people to ask for professional help. A person may worry that seeking help for emotional distress shows a weakness or failure to handle one’s own problems. Some may also discount the importance of seeking support because of a strong sense of needing to be independent and self-sufficient. People living with cancer are often focused on their medical needs, and they may feel they don't have the time, money, energy, or need to care for their emotional needs. Seeking outside, professional help is not a weakness. In fact, it shows the willingness to take care of oneself and find helpful ways to respond to challenging situations. Counselling is designed to help a person develop healthy ways to understand and respond to emotional
needs and concerns. Counselors don't solve problems, but they provide a safe environment where a person with cancer can talk about his or her concerns. Because counselors are removed from the situation, they provide a helpful, outside perspective.

**How counselling helps**

There are many ways professional Counselling helps a person with cancer. Counselling can be a way for someone to better understand and resolve a pressing issue or concern. Counselling can also help explore longstanding problems unrelated to the disease that may have come to the surface during the cancer experience. In addition, Counselling may clarify and prioritize emotional needs that have taken a back seat to other needs and responsibilities.

Here are some ways that Counselling can help people with cancer and those who care about them:

1. Learn ways to help cope with the cancer diagnosis
2. Feel less overwhelmed by the disease and more in control of one's life
3. Explore the meaning of the cancer experience
4. Manage difficult feelings, such as sadness, depression, and anxiety
5. Manage cancer symptoms and treatment side effects, such as pain and fatigue
6. Learn how to communicate effectively with the health care team
7. Address relationship and financial concerns that are causing distress
8. Explore options and get feedback about important decisions
9. Talk about concerns after completing cancer treatment
10. Learn about community cancer resources

11. Learn how to help others understand and adjust to the changes cancer has brought to the family

12. Explore and resolve issues related to body image and sexuality as they relate to cancer

When counselling is needed

Counselling may be recommended to deal with emotional distress. While it's normal for a person to have emotional distress while coping with cancer, it's important to seek professional help when the distress is long lasting and interferes with the ability to carry out daily activities. When searching for a counselor, it is important to ask whether the counselor has worked with people with cancer before. Select a counselor who understands the issues and challenges unique to this situation.

Types of counselling

There are different types of Counselling services available to help a person with cancer cope with and manage distress. The type of Counselling a person chooses may depend on personal preferences and financial resources. Here are some general descriptions of different types of Counselling:

**Individual counselling** is a one-on-one interaction with a counselor to talk about specific feelings, thoughts, and problems that a person is struggling with. The counselor will listen attentively, express caring concerns, ask questions, and offer feedback.

**Family counselling** includes members of the immediate family and is based on the idea that a person is greatly influenced by his or her family's belief system and culture. A family counselor will help the family look at a
situation from a different perspective and try new ways to help and support each other.

**Couples counselling** is between two people, usually spouses or partners. The counselor listens objectively to both participants and helps identify how specific thoughts and behaviors may contribute to conflict between the couple. Couples can learn new ways to help and support one another during times of stress.

**Group counselling** is when a group of individuals with similar concerns meets together with a trained counselor. The counselor leads the group sessions and provides support and guidance.

**Effectiveness of counselling**

**Professional counselling** often helps a person feel gradual relief from emotional distress, develop more self-assurance, have a greater ability to make decisions, and enjoy an increased comfort in relationships with others. If Counselling isn't offering these benefits, it may be helpful to consider whether the topic of discussion, the kind of therapy, or the Counselling relationship is working. Talk about the concerns with the counselor, and if necessary, explore other therapy options that may be a better match.

Based on the extensive reference of several research studies already narrated; there is enough scientific basis to undertake a psychological intervention study which includes health education, counselling and guided somato psychic relaxation in cancer patients. Hence, an intervention programme is designed for this research study for the benefit of cancer patients.