Chapter 1

INTRODUCTION
Introduction:

1.1 Breast cancer disease and incidence:

All kinds of tissues are prone to develop tumours except hair, nails and tooth. But among women the Breast and cervix are the most commonly occurring tumours and in men prostrate and lung cancers are the most common. (Cancer facts and figure 2000). Over years due to a number of compounded effects of sedentary lifestyle, food habits stress and environmental toxicity the incidence of breast cancer has drastically increased world wide at an enormous rate of over 4 % rise in a worldwide survey. Cording to IARC Cancer database, Breast Cancer is increasing in endemic proportions in developed countries. U S A has the highest prevalence and mortality ratio from Breast Cancer followed by China, India, Russia, Germany, France, U K and Italy (WHO, IARC, 2001). It is the most common cancer in women, accounting for 16% of cancer-related deaths and ranking second only to lung cancer as a leading cause of cancer-related mortality (Landis S, Murry T, Bolden S, and Wingo PA, 1998).
1.2 Psychological effects of Breast cancer diagnosis and treatment:-

Breast cancer is a profoundly stressful disease posing both physical and psychological threats to the patient. Moreover, patients with breast cancer normally receive multimodal treatment over a long period of time. Psychological distress and trauma is often associated with the diagnosis of cancer and is common (Derogatis L R et al 1983, Stefanek M et al 1987, Farber JM et al 1983). Anxiety and depression are the commonest psychiatric problems encountered in cancer patients. It has been repeatedly acknowledged that many psychiatric disorders in cancer patients are not detected, diagnosed or treated (Fetting J, 1983). The prevalence of depression in cancer patients ranges from 4.5% to 58% (Lansky S.B, List M.A, & Herman C.A, 1985; Massie MJ & Holland JC, 1990). Patients with breast cancer undergoing radiation treatment also report anxiety and depression before, during and after the treatment (Chaturvedi SK et al., 1996; Wengstrom Y, Haggmark C, Strander H, & Forsberg C, 2000). There is an uncertainty about the prognosis of cancer, and social
isolation along with physical symptoms or functional losses resulting from the disease or its treatment are the most important factors. Due to these various difficulties (Spiegel D et al, 1995, Fox B .H et al 1995) many patients believe that stress, including that which is caused by their cancer experience, may contribute to poor coping as well as recurrence or progression of their disease. The prevalence of anxiety and depression in Indian cancer patients in Bangalore undergoing radiation treatment was 64% and 50% respectively (Chaturvedi SK et al., 1996). There is a very high correlation between anxiety and depression in cancer patients (Cassileth B.R, Lush E.J, Hutter R, Strouse T.B, & Brown L.I, 1984).

1.3. Radiation induced DNA damage and stress in breast cancer:

Radiotherapy has become an indispensable tool in the effective management of most of the cancers. There have been efforts earlier to study the differential radio-sensitivity patterns in patients undergoing radiation treatment to correlate with treatment induced complications such as tissue injury, cell death, and chromosomal
aberration frequencies etc. (Johanson et al 1983). Lately with advent of better machines and innovative technology, individualisation of cancer radiotherapy is gaining greater grounds. There have been number of studies done earlier to prove the radio sensitivity of different individuals undergoing radiotherapy. (Oppitz et al. ). In study by (Parshad R et al 1996) Women with breast cancer and a family history of breast cancer and some with sporadic breast cancer are deficient in the repair of radiation-induced DNA damage compared with normal donors with no family history of breast cancer. DNA repair was measured indirectly by quantifying chromatid breaks in phytohaemagglutinin (PHA)-stimulated blood lymphocytes after either X-irradiation or UV-C exposure, with or without post treatment with the DNA repair inhibitor, 1-beta-D-arabinofuranosylcytosine (ara-C). According to the authors deficient DNA repair appears was found to be a predisposing factor in familial breast cancer and in some sporadic breast cancers. In 14-year-long study (Pinar B et al 2007) makes a novel contribution to the debate on the relationship between the in vitro radio sensitivity of peripheral blood lymphocytes and normal tissue reactions after radiation therapy. They demonstrated a relationship between the sensitivity of in
vitro-irradiated peripheral blood lymphocytes and the risk of developing late toxic effects and opened up a possibility of predicting normal tissue response to radiation in individual patients, at least in high-dose non-conventional radiation therapy regimens.

Radio sensitivity has been extensively studied in breast cancer patients (Speit 1997 Scott 1998). In the study of Scott and colleagues, found that about 9% of healthy controls were radiosensitive. The deficient DNA repair capacity has been proposed to be a predisposing factor in familial breast cancer and in some sporadic breast cancer cases. Genomic instability has also been described for various, Scott 1997, 2004 1999, Hussein 2005, P. Sanchez 1 2004 and H Mozdarani 2005. It has been shown that about 40% of an unselected group of breast cancer cases were found to be radiosensitive (hereditary cancers including breast cancer (R. Parshad and A Bayenes 2002). These findings suggest that radio sensitivity could actually be a potential predisposing condition to breast cancer through mutations in low penetrance genes (Scott et, al 2004) and many genes may be involved in DNA damage processing and repair.

Robert W. Woodruff reviews that there is growing attention to the health benefits of mind/body interventions, particularly relaxation and
meditation. Biomedical research has provided undeniable evidence of the interconnectedness of the mind and body. The field of psychoneuroimmunology has defined the role of stress in reducing effectiveness of the immune system in combating infection and growth of malignant tumours. There are considerable evidences Kiecolt –Glasser et al 2001 et al (reviewed in the next chapter) that Yoga and meditation practices have been successful in managing various stress related effects due to cancer.

Breast cancer is a profoundly stressful disease posing both physical and psychological threats to the patient. Moreover, patients with breast cancer normally receive multimodal treatment over a long period of time. Psychological distress and trauma is often associated with the diagnosis of cancer and is common (Derogatis LR, Farber JM, 1983). There is an uncertainty about the prognosis of cancer, and social isolation along with physical symptoms or functional losses resulting from the disease or its treatment are the most important factors. Due to these various difficulties (Spiegel D., Fox B.H 1995) many patients believe that stress, including that which is caused by their cancer experience, may contribute to poor coping as well as recurrence or progression of their disease. In the last decade there is a growing interest amongst the cancer survivors to use
various complementary therapies adjuvant to the conventional treatment in the anticipation of reducing the burden of stress and better coping to the treatment. (Holmes MD 2006, Cassileth BR 1998) There is a considerable use of these therapies in recent times in approach to cancer treatment; therefore there is a need to understand the links between social, psychological, and physiological determinants of health (Brawley LR, 2002). Yoga is an ancient eastern practice which has been used for therapeutic benefits world wide and is being scientifically studied by many clinicians (Gimbel MA 1991) It has been suggested that ‘gentler’ physical activities, such as yoga or tai chi, may help to promote regular participation, especially in chronic disease populations who face additional barriers to engaging in an active lifestyle (Johnson NA, 1998 Brawley LR, 2002). There have been a number of studies including randomized trials which reported positive therapeutic outcomes following Yoga program including our group Nagendra et al. There was also a wide range of benefits reported earlier such as in asthma(Nagarathna R 1985), increase in immune function(Henderson LE), hypertension (Schneider RH, -Raub JA 2002), improvement in cardiovascular effects(Johnson NA) ,decrease in blood pressure (Wenneberg SR diabetes(Sahay Bk 2002), and serum Cortisol levels(Sadsuang R 1991) The use of CAM as an adjuvant therapy in breast cancer patients have attracted the attention of many
researchers world wide (Homes M.D 2006). Burstein et al., reported that newly diagnosed early-stage breast cancer patients had stressful mental health 3 months after diagnosis in women who began using CAM. Meditation was basically used as a religious or spiritual practices, now it has been accepted world wide as a very effective tool to calm down the mind and harmonize the physiological and psychological parameters to have a balanced effect(Telles S 1998). Meditation based relaxation program have been implemented in a number of randomized and pilot studies particularly by Carlson et al(1999-2002) and they reported to have stress reduction effectively, reduced total mood disturbance and specific symptoms of Anxiety, Depression, Anger, and Confusion. In all these studies mentioned above the main aim was to improve the quality of life of either the breast cancer survivors or those who were undergoing treatment. There have been reports of improvement of quality of life (QOL) in breast cancer patients who under went Yoga based programs or supportive counseling along with relaxation and imageries. (Rosenbaum E, casso D 2004). Inspired by favorable out comes of these interventional studies Carson et al recently reported significant improvement in pain as well as psychological parameters of metastatic breast cancer patients. Recently there is a report where there is no physical improvement of breast cancer survivors over control patients after yoga intervention but
there was a significant improvement in the global quality of life scores and mood disturbance scores (Culos-Reed SN, 2006). In our recently study Raghavendra et al 2006- reported that yoga program has significant improvement in the chemotherapy induced nausea and emesis and the breast cancer survivors had significant improvement in the quality of life. The current study aims to study the effect of an intensive and integrated yoga program which is customized for the breast cancer patients in modulating the psychological and physiological stress. It is known that radiation causes DNA damage to the peripheral blood lymphocytes (PBLs) of the patients undergoing radiotherapy treatment (Scott D 1998). We also reported, banerjee et al, significant radiation induced DNA damage in breast cancer patients undergoing radiotherapy (Banerjee et al 2007). There was also a study in which DNA damage in the form of telomere shortening was linked to increased stress in the population of care givers by Blackburn et al, Our group also reported a significant increased in telomere associated DNA damage in breast cancer patients after radiotherapy. DNA repair capacity is also associated with psychological and physiological stress Therefore the fact that breast cancer patients are under stress and they also undergo considerable radiation induced DNA damage, we set to investigate in the present study the effect of an intensive yoga program on
the Psychological parameters (HADs and PSS) as well as the radiation induced DNA damage in the PBLs derived from the breast cancer patients pre and post radiotherapy in both the intervention and supportive counseling group.

**Why Yoga?**

Any system or process will be accepted by the common man if it can prove its usefulness in his day-to-day aspects of life. In the past we have seen how the society accepted and adopted science as an integral part of its structure as technology solved the problem of providing the basic necessities of life and offering a more comfortable life to an individual. We have also seen, that now society is all set for Yoga as it offers man a conscious process to solve the menacing problems of unhappiness, restlessness, emotional upset, hyperactivity, etc., in the society and helps to evoke the hidden potentialities of man in a systematic and scientific way by which man becomes a fuller individual. All his faculties – physical, mental, intellectual and emotional – develop in a harmonious and integrated fashion to meet the all-round challenge of the modern technological era with its hectic speed.