CHAPTER – II
REVIEW OF LITERATURE

In the hectic age we are living in, we are forced to compromise with situations, mostly external – be it social, economical, political whatsoever but often in vain. What we lack is possibly that we fail to integrate the multidimensional aspects clashing constantly with one another in our internal world. Here comes why we require to enfold Yoga. Especially in the middle-aged males, psychic stability is tossed by multiple tensions, confusions, doubts, fears, phobia et al., that in turn effect and affect their physical health. Yoga helps them cool the psyche, ward off the adversities and brave the storm. It is no dogma today that Yoga is capable of befriending men ranging from 45–55.

In a research study it is customary to collect relevant information and findings of leading researchers. This approach helps the researcher understand the status of his own research and reliability of the findings. For the said purpose the researcher consulted Kalyani University Library, Berhampore U. C. T. C. Library and some more leading libraries located in Kandi. He also took help of electronic media and visited a number of websites to collect related literatures in retrospect. Such literatures are reviewed in the following paragraphs, as far as the researcher could collect.

Fein et al. (1963) studied thirteen male bronchial asthma patients. Their age ranged from 25 to 70 years. The mainstay of treatment was pursed-lip and quiet breathing exercises but some trunk movements and leg raising were also required. Over a year of therapy, there was a substantial improvement of chest expansion and associated psychological relief.

Kocher et al. (1972) examined 43 males and 13 females. A significant reduction in total anxiety scores was observed at the end of 3 weeks of training programme in yogic physical culture.

Moorthy (1978) conducted a study on 22 males and 10 females to observe the effect of training in yogic physical culture on cholesterol level for 3 weeks. Results
showed that it not only brought down higher levels of cholesterol but also helped the individuals to keep the cholesterol level within normal limits.

Karambelkar and Ganguly (1981) observed that the cholesterol level decreased after three weeks training in yogic physical culture in 17 normal females.

Shridharan et al. (1981) examined 10 healthy subjects [male soldiers: mean age 24.9 years] to evaluate the effect of yogic training [prayer, asanas, pranayama, and meditation taught by instructors from Vishwayatan Yogashram in Delhi] on some autonomic responses and biochemical indices. Yogic training was administered daily in the morning hours for one hour under the supervision of qualified yoga experts. Physiological and biochemical responses were assessed before and after three months of training instructors [subjects took one month to learn the program, followed by three months of practice for this study]. A significant decrease in heart rate, blood pressure and elevation of mean skin temperature and alpha index of EEG were recorded, followed by reduction in blood glucose and plasma cholesterol level.

A pilot study on the effect of yogic treatment on various lung functions of asthma patients was made by Bhole (1982) and he concluded that even through four or six weeks of yogic training programme for patients of bronchial asthma showed marginal improvement in various pulmonary functions, it did help to bring about a qualitative improvement in breathing pattern which might be the result of various breathing techniques and cleaning process of yoga system and influence of these practices on the nervous system and the psychological aspect of patients.

Hegde et al. (1983) observed that changes in body flexibility of 40 healthy physically active middle aged (40–48 years) men due to the regular practice of yogic asanas and physical exercises. Subjects were randomly divided into two groups. In group A, selected yoga asanas were administered daily for 1 hour for 6 months, while group B had physical exercise training programme for the same duration. The flexibility measurements were made using Leighton Flexomotor at the level of neck, shoulder, trunk and hip, prior to and after the six month of the course in both the groups. There was improvement in neck rotation in both the groups, while the shoulder flexion-extension and hip flexion-extension values increased only in the yoga
group after training. There was no significant change in trunk flexion-extension in either group.

A study was conducted by Rai et al. (1983) on trained (n = 7) and untrained (n = 7) volunteers to determine the effect of savitri pranayam and shavasan on O2 consumption, heart rate and blood pressure. In trained subject a consistent and significant (p < 0.01) reduction in O2 consumption within a few minutes of starting savitri pranayam was observed. During shavasan, there was significant reduction in O2 consumption (p < 0.05), heart rate (p < 0.001) and diastolic blood pressure (p < 0.05). In untrained subjects, the changes in above mentioned parameters were statistically insignificant.

Selvamurthy et al. (1987) conducted a study among 30 healthy soldiers to assess the effect of selected yogic exercises (asanas) on some physiological responses to cold exposure. They were randomly divided into two groups of 15 each. One group performed regular physical exercises of physical training (P. T.) while the other group practised Yogic exercises. At the end of 6 months of training, both the groups were exposed together to stress at 10° C for 2 hrs., the following parameters were periodically monitored during cold exposure : heart rate (SH), blood pressure (B. P.) were progressive increased. These findings suggest that practice of Yoga exercise may improve cold tolerance.

Gharote (1987) studied the effect of every day and alternate day yoga training on the physical fitness of school boys with mean age of 17 years. When treated with the Fleishman Battery of Basic Physical Fitness Tests, result showed significant improvement with six weeks yoga training given for 6 days-a-week as well as for 3 days-a-week in comparison to the control group.

Bhargava et al. (1988) examined twenty healthy young men to observe the effect of pranayama on selected physiological parameters. Breath was held at different phases of respiration and parameters recorded were Breath holding time, heart rates systolic and diastolic blood pressure and galvanic skin resistance (GSR). After taking initial recordings all the subjects practised Nadi-Shodhana Pranayama for a period of 4 weeks. At the end of 4 weeks same parameters were again recorded and the results compared. Baseline heart rate and blood pressure (systolic and diastolic) showed a
tendency to decrease and both these autonomic parameters were significantly decreased after pranayamic breathing.

Bera et al. (1990) evaluated the effect of one-year yogic training programme on body density and its selected variables. Fat folds were taken from the triceps, sub scapular, post-suprailiac, chin and mid auxiliary sites by a Lange caliper in 20 experimental and 20 control male subjects before and after one year progressive training regimen. Yogic exercise training consisted of 17 practices. ANCOVA revealed significant increments in body density and ideal body weight \( (p < 0.01) \) for the experimental group as compared to the control group. However, significant gains in present body fat and absolute fat weight were observed in control group while compared with the experimental group \( (p < 0.01) \). The results showed that the conventional yogic practices do preferentially reduce the present body fat and absolute fat weight, and significantly increased the ideal body weight and body density.

Sudsuang et al. (1991) conducted a study on serum cortisol and total protein levels, blood pressure, heart rate, lung volume, and reaction time in 52 males of 20–25 years of age practicing Dhammakaya Buddhist meditation, and in 30 males of the same age group not practicing meditation. It was found that after meditation, serum cortisol levels were significantly reduced, serum total protein level significantly increased, and systolic pressure, diastolic pressure and pulse rate significantly reduced. Vital capacity, tidal volume and maximal voluntary ventilation were significantly lower after meditation than before. There were also significant decreases in reaction time after meditation practice. The percentage decrease in reaction time during meditation was 2.2%, while in subjects untrained in meditation, the percentage decrease was only 7%. Results from these studies indicate that practising Dhammakaya Buddhist meditation produces biochemical and physiological changes and reduces the reaction time.

Bera (1993) conducted a study with forty subjects to observe the changes in body composition who participated in a yoga training. Subjects were classified into two groups viz., Yoga group and control group. The duration of the experiment was one year. At the end of the yoga training a significant improvement was found in body
density. It was evident that some of the fat folds like Tricep, Subscapular, Supralliac, Thigh were reduced.

Schell et al. (1994) measured blood pressure and heart rate of the subjects of Yoga and control group during the experimental period. At the end of the Yoga training they observed that the blood pressure and heart rate of the subjects were significantly different from that of the control groups. Yoga improved blood pressure and heart rate.

A study was conducted by Raghuraj et al. (1997) to determine whether breathing through a particular nostril has a lateralized effect on hand grip strength. One hundred thirty right hand dominant, school children between 11 and 18 yrs of age were randomly assigned to 5 groups. Each group had a specific yoga practice in addition to the regular program for a 10 day yoga camp. The practices were: (1) right-, (2) left-, (3) alternate- nostril breathing, (4), breath awareness and (5) practice of mudras. Hand grip strength of both hands was assessed initially and at the end of 10 days for all 5 groups. The right-, left- and alternate-nostril breathing groups had a significant increase in hand grip strength of both hands, ranging from 4.1% to 6.5%, at the end of the camp though without any lateralization effect. The breath awareness and mudra groups showed no change. They concluded that yoga breathing through a particular nostril, or through alternate nostrils increases hand grip strength of both hands without lateralization.

Issac et al. (1997) conducted a study on 45 patients with mild essential hypertension, (Diastolic Blood Pressure (DBP) between 90 and 104 mm / hg). were randomly allocated to three different treatment groups: relaxation, isotonic physical exercise or placebo. Outcome measures included blood pressure readings and heart rate (HR) in the clinic and cardiovascular and responsiveness (mental arithmetic and isotonic exercise). The study schedule consisted of four baselines session, eight weeks of treatment and six months follow-up. Relaxation and physical exercise were superior to the placebo procedure in reducing blood pressure (BP) at post-treatment for Systolic Blood Pressure (SBP) & DBP and at follow-up for SBP. No significant differences were found between experimental procedures. However relaxation was
superior to the exercise programme at follow-up for HR. None of the subjects had their medication changed at post-treatment.

Park et al. (1997) conducted a study to evaluate the effect of a Yoga programme on decreasing blood cholesterol in twenty-four patients, who practiced yoga by three times a week for eight weeks. There were significant reduction in blood cholesterol.

Ganguly et al. (1998) saw the effect of three-years Yogic training programme on Motor Function in School Boys. AAHPERD Health Related Physical Fitness Test was used to assess the health related fitness level of the selected subjects of Gurukul High School, Lonavala. Within the limitations of the study, it was observed that Easy Course of Yoga could, in the first year, helped to improve overall health related physical fitness except cardio-vascular efficiency. Short Course of Yoga training for one year could also improve physical fitness except C-V efficiency. In fact, Short Course was found more effective than the Easy Course in the case of improving all above variables. Full Course of Yoga training proved to be better than Short Course as well as Easy Course in improving health related fitness variables.

Kelley and Kelley (1999) conducted a meta analytic review to examine the effect of aerobic exercise on resting systolic and diastolic blood pressure in women. Twenty one studies representing 1029 subjects (663 exercise, 366 controls) on 54 primary outcomes (28 systolic, 26 diastolic) met the criteria for inclusion. Meta-analysis of included studies suggested that aerobic exercise causes small reduction in resting systolic blood pressure in women.

Vaze et al. (1999) evaluated the effect at 6 month duration of yogic practices on weight, waist-line, hips and chest flexibility of a group of women (age group of 22 to 69 years) who performed yogasanas and Pranayamas regularly. Participants were taught yoga practices (yogasans and Pranayamas) and were supervised by the trained and experienced yoga teacher. In the present study, in the beginning of admission and thereafter every month, the measurements of weight, waistline, hips, maximum value of chest after complete inhalation and minimum value after exhalation were recorded. They were told the importance of balanced diet and were instructed to follow moderation in dietary habits. By statistical analysis, it has been observed that there
was a significant decrease in weight, waistline, hips and significant increase in flexibility.

Das et al. (1999) conducted a study which aimed at assessing the effects of a set of yoga practices on normal adults (n = 37), children (n = 86), and patients with rheumatoid arthritis (n = 20). An equal number of normal adults, children, and patients with rheumatoid arthritis who did not practice yoga were studied under each category, forming respective control groups. Yoga and control group subjects were assessed at baseline and after varying intervals, as follows, adults after 30 days, children after 10 days and patients after 15 days, based on the duration of the yoga program, which they attended, which was already fixed. Hand grip strength of both hands, measured with a grip dynamometer, increased in normal adults and children, and in rheumatoid arthritis patients, following yoga, but not in the corresponding control groups, showing no re-test effect. Adult female volunteers and patients showed a greater percentage improvement than corresponding adult males. This gender-based difference was not observed in children. Hence yoga practice improves hand grip strength in normal persons and in patients with rheumatoid arthritis, though the magnitude of improvement varies with factors such as gender and age.

Damodaran et al. (2001) conducted a study on the effect of Yoga on selected physiological factor in mild to moderate hypertensive twenty patient’s age ranging from thirty five to fifty five years. They underwent yogic practices daily for one hour for three months. Physiological parameter like blood sugar and cholesterol were studied prior and following period of three months of Yoga practices. The results showed decrease in blood sugar and cholesterol.

Ray et al. (2001) examined 54 trainees of 20–25 years age group to observe the effect of yogic practices on selected physiological and psychological parameters. The group was divided randomly in two groups, i.e., yoga and control group. Yoga group (23 males and 5 females) was administered yogic practices for the first five months of the course while control group (21 males and 5 females) did not perform yogic exercises during this period. From the 6th to 10th month of training both the groups performed the yogic practices. Physiological parameters like heart rate, blood pressure, oral temperature, skin temperature in resting condition, responses to
maximal and submaximal exercise, body flexibility were recorded. Psychological parameters like personality, learning, arithmetic and psychomotor ability, mental well being were also recorded. Various parameters were taken before and during the 5th and 10th month of training period. Initially there was relatively higher sympathetic activity in both the groups due to the new work / training environment but gradually it subsided. Later on at the 5th and 10th month, yoga group had relatively lower sympathetic activity than the control group. There was improvement in performance at submaximal level of exercise and in anaerobic threshold in the yoga group. Shoulder, hip, trunk and neck flexibility improved in the yoga group. There was improvement in various psychological parameters like reduction in anxiety and depression and a better mental function after yogic practices.

James et al. (2002) conducted a study and observed that Yoga has become increasingly popular in western culture as a means of exercise and fitness training, however it is still despised as trendy as evidenced by (2001) on “The Power of Yoga”. There is a need to have Yoga better recognised by the health-care community as a complement to conventional medical care. Over the last 10 years, a growing number of research studies have shown that the practices of Hatha Yoga can improve blood pressure, heart-rate, hand grip strength and flexibility of the Yoga subjects.

Bharshankar et al. (2003) examined the effect of yoga on cardio-vascular function in subjects above 40 years of age. Pulse rate, systolic and diastolic blood pressure and valsalva ratio were studied in 50 control subjects (not doing any kind of physical exercise) and 50 study subjects who had been practicing yoga for five years. From the study it was observed that significant reduction in the pulse rate occurs in subjects practicing yoga (p < 0.001). The difference in the mean values of systolic and diastolic blood pressure between study group and control group was also statistically significant. The systolic and diastolic blood pressure showed significant positive correlation with age in (rl systolic = 0.631 and rl diastolic = 0.610) the study group as well in the control group (rl systolic = 0.981 and rl diastolic = 0.864). The significant difference between the correlation coefficient was also tested with the use of Z transformation and the difference was significant (z systolic = 4.041 and z diastolic = 2.901). Valsalva ratio was found to be significantly higher in yoga
practitioners than in controls (p < 0.001). The result indicates that yoga reduces the age related deterioration in cardiovascular functions.

Ganguly et al. (2003) observed that the long-term effect of three different yoga schedules of Swami Kuvalayananda upon health Related Physical Fitness and Academic Achievement of nearby school going boys for three years duration so as to prove the saying of Maharshi Patanjali, “Satu dirgha-kala-nairantarya-saikarasevito drdhbhumih”. It was observed that two variables viz. Flexibility and body balance were significantly improved while third variable body fat% was reduced in the 1st and 2nd year. The result, from 2nd to 3rd year showed significant improvement on cardiovascular endurance and also in balance. No significant improvement was seen in hand grip strength against control group, while, the academic achievement was seen improved year wise.

Madanmohan et al. (2003) undertook a study to observe the effect of yoga training on hand grip strength (HGS), hand grip endurance (HGE), maximum expiratory pressure (MEP), maximum inspiratory pressure (MIP), forced expiratory volume (FEV), forced expiratory volume in first second (FEV1) and peak expiratory flow rate (PEFR). 20 school children in the age group of 12 to 15 years were given yoga training (asans and pranayams) for 6 months. 20 age and gender-matched students formed the control group. Yoga training produced statistically significant (P < 0.05) increase in HGS and HGE. MEP, MIP, FEV, FEV1 and PEFR also increased significantly (P < 0.001) after the yoga training. In contrast, the increase in these parameters in the control group was statistically insignificant. The study shows that yoga training for 6 months improves lung function, strength of inspiratory and expiratory muscles as well as skeletal muscle strength and endurance. It is suggested that yoga be introduced at school level in order to improve physiological functions, overall health and performance of students.

Upadhyay et al. (2003) in their study reported that Pranayama (breathing exercise), one of the yogic techniques can produce different physiological responses in healthy individuals. The responses of Alternate Nostril Breathing (ANB) the Nadisudhi Pranayama on some cardio-respiratory functions were investigated in healthy young adults. The subjects performed ANB exercise (15 minutes everyday in
the morning) for four weeks. Cardio-respiratory parameters were recorded before and after 4-weeks training period. A significant increment in Peak expiratory flow rate (PEFR L/min) and Pulse pressure (PP) was noted. Although Systolic blood pressure (SBP) was decreased insignificantly, the decrease in pulse rate (PR), respiratory rate (RR), diastolic blood pressure (DBP) were significant. Results indicated that regular practice of ANB (Nadisudhi) increases parasympathetic activity.

Woolery et al. (2004) examined the effects of a short-term Iyengar Yoga course on mood in mildly depressed young adults. Young adults pre-screened for mild levels of anxiety were randomly assigned to a Yoga course or wait-list control group. Subjects in the Yoga group attended two 1-hour Iyengar Yoga classes – each week for 5 consecutive weeks. To alleviate anxiety, the classes emphasized Yoga postures particularly backbends, standing-poses, and inversions. Subjects, who participated in the Yoga course demonstrated significant decrease in self-reported symptoms of Trait Anxiety and depression.

Kasiganesan et al. (2004) evaluated the effects of Hatha Yoga and Pranayama on cardiorespiratory performance. Thirty men were randomly divided in two groups of 15 each. 1st group i.e. control group performed exercise and Group-2 subjects practised selected Yogic asanas and pranayama. Yogic practices for 3 months resulted in an improvement of cardiorespiratory performance such as heart rate.

Kirkwood et al. (2005) reviewed the articles that controlled clinical trials on the effectiveness of yoga for the treatment of anxiety and anxiety disorders. The review covered major databases, as well as organizations such as the International Association of Yoga Therapists and the Yoga Biomedical Trust. Only eight controlled clinical trials were identified. The tradition / approach to yoga varied among studies, and studies focusing on meditation only were excluded. Most yoga interventions included asana, breathing, and relaxation. One studied compared Kundalini yoga to mindfulness meditation and relaxation, and found that yoga was more effective in reducing anxiety than mindfulness meditation and relaxation. Several studies compared yoga to anti-anxiety medications, and reported greater improvements from yoga than medication. Despite the positive findings, they concluded that the quality of
research was not adequate to make strong claims about the benefits of yoga for anxiety.

Lavey et al. (2005) examined 113 psychiatric patients at New Hampshire Hospital. Participants completed the profile of mood states (POMS). Prior to and following participation in Yoga class, analysis indicated that participants reported significant improvements.

Malhotra et al. (2005) investigated the benefits of yoga asana for twenty participants between the ages of 30 and 60 with mild to moderate non-insulin dependent diabetes. All participants were on diet and medication for the control of diabetes. The study also compared the yoga group to a control group of 36 adults, also following a diet and medication plan to control diabetes, that practiced standard exercise guidelines for diabetes (such as walking). Participants in the yoga group practiced yoga for 30-40 minutes every morning for 40 days. The asana practice included: surya namaskar, bhastrika pranayama, trikonasana, tadasana, sukhasana, padmasana, pashimottanasana, ardhmatsyendrasana, pawanmuktasana, bhujangasana, vajrasana, dhanurasana, and savasana. Yoga participants showed the following changes after the 40-day program: reduced waist to hip ratio (high weight to hip ratio is considered a risk factor for cardiovascular and metabolic disease) and a decrease in fasting blood glucose. There was also a marginally significant trend for reductions in postprandial (after-meal) blood glucose levels. Among obese participants (but not participants of lower weight), serum levels of insulin decreased. All these changes were considered positive for the management of diabetes. The control group showed no positive changes in any of these measurements.

Manjunath et al. (2005) conducted a study to examine the hypothesis that Yogasana help in the treatment of diabetic mellitus by releasing insulin from the pancreas. Twenty subjects participated in the study. Each subject performed 4 sets of asanas. Blood samples were collected on day 4 and 5 of each set of asanas for measurement of glucose and insulin levels before asanas, within 10 minutes after performing the asanas. The observations suggest that the performance of asanas led to increase sensitivity of the B cells of pancreas to the glucose signal. The increased
sensitivity seems to be a sustained change resulting from a progressive long term effect of asanas.

Michalsen et al. (2005) conducted a study of twenty four self-referred women (mean age 37.9, +/-7.3 years) who identified themselves as having high levels of stress, but did not have a psychiatric diagnosis (i.e., clinical depression or anxiety disorder). Sixteen women participated in the intervention first, while the 8 remaining women served as a wait-list control (and received the intervention later). The yoga intervention consisted of two weekly 90-min Iyengar yoga classes with a certified and experienced Iyengar instructor. The classes focused on poses that are hypothesized, in the Iyengar tradition, to reduce stress. These include backbends, standing poses, forward bends, and inversions. The study did not provide more details on the specific asanas or sequences practiced. Participants were also encouraged to practice at home. Compared to the wait-list control group, the yoga group showed significant reductions in stress, anxiety, fatigue, depression, headaches, and back pain. The yoga group showed significant increases in well-being.

Subhalakshmi et al. (2005) conducted a study to determine whether Nadi-shodana Pranayama practice for 20 minutes has any immediate effect on heart rate, systolic and diastolic blood pressure, peak expiratory flow rate, and simple problem solving ability. Ten normal healthy subjects of first year physiotherapy course volunteered for this study. They were aged between 17–20 years. Among them, five were females and five were males. They did not have any previous training in Pranayama. They were highly motivated to participate in this study program. Study procedures were done separately for each subject at the same time of the day between 4–5 pm. All the selected physiological parameters were measured before and after performing ‘Nadi-shodhana Pranayama’. Two sets of controls were done in the matched subjects by allowing them to relax in a couch (A) or close their eyes with quiet breathing for 20 minutes. Following nadi-shodhana Pranayama of 20 minutes, a significant decline in basal heart rate (P < 0.0001) and systolic blood pressure (P < 0.001) was observed. Peak expiratory flow rate was significantly improved (P < 0.01) and the time taken for simple problem solving was significantly less following Pranayama practice (P < 0.0001). In contrast, both control subjects did not
show any significant change in respiratory and cardiovascular parameters with 20 minutes. They concluded that the ‘Nadi-shodhana Pranayama’ rapidly alters cardiopulmonary responses and improves simple problem solving.

Gupta et al. (2006) in his study found that considerable evidence exists for the place of mind body medicine in the treatment of anxiety disorders. Excessive anxiety is maladaptive. It is often considered to be the major component of unhealthy lifestyle that contributes significantly to the pathogenesis of not only psychiatric but also many other systemic disorders. Among the approaches to reduce the level of anxiety has been the search for healthy lifestyles. The aim of the study was to study the short-term impact of a comprehensive but brief lifestyle intervention, based on yoga, on anxiety levels in normal and diseased subjects. The subjects had history of hypertension, coronary artery disease, diabetes mellitus, obesity, psychiatric disorders (depression, anxiety, 'stress'), gastrointestinal problems (non ulcer dyspepsia, duodenal ulcers, irritable bowel disease, Crohn's disease, chronic constipation) and thyroid disorders (hyperthyroidism and hypothyroidism). The intervention consisted of asanas, pranayama, relaxation techniques, group support, individualized advice, and lectures and films on philosophy of yoga, the place of yoga in daily life, meditation, stress management, nutrition, and knowledge about the illness. The outcome measures were anxiety scores, taken on the first and last day of the course. Anxiety scores, both state and trait anxiety were significantly reduced. Among the diseased subjects significant improvement was seen in the anxiety levels of patients of hypertension, coronary artery disease, obesity, cervical spondylitis and those with psychiatric disorders. The observations suggest that a short educational programme for lifestyle modification and stress management leads to remarkable reduction in the anxiety scores within a period of 10 days.

Jerath et al. (2006) focused on the physiology on the long Pranayamic breathing. They hypothesized that neural respiratory elements may provide a mechanism that explains how slow deep breathing shifts the autonomic nervous system. Pranayamic breathing, defined as a manipulation of breath movement, has been shown to contribute to a physiologic response characterized by the presence of decreased oxygen consumption, decreased heart rate, and decreased blood pressure, as
well as increased theta wave amplitude in EEG recordings, increased parasympathetic activity accompanied by the experience of alertness and reinvigoration.

Prasad et al. (2006) conducted a study to investigate the impact of Pranayama and yoga on lipid profile in normal healthy volunteers. There were 41 men and 23 women, aged 18–30 years, who participated in a three months yoga certificate course at the Vemana Yoga Research Institute in Hyderabad, India. All volunteers were healthy, with no previous yoga experience. For 30 days, the following Pranayama sequence was practiced: Rechaka Puraka, Rechaka Puraka with Kumbhaka, Surybedha Chandrbedha, Surybedha Chandrbedha with Kumbhaka, and Kapalbhati, for 10 min each. Savasana was practiced for another 10 minutes at the end of the Pranayama session. After 30 days, the Pranayama practice was reduced to 20 minutes, and the following asanas were practiced for 40 minutes: Uttanasana, Mandukasana, Ustrasana, Yogamudra, Matsyendrasana, Paschimottanasana, Bhujangasana, Sarvangasana, Halasana, Uddiyana, Ardhamatsyendrasana, Dhanurasana, Shalabhasana, Sarpasana and Chakrasana. This combined Pranayama and asana practice was continued for 60 days. Women and men showed different metabolic responses to the Pranayama and asana practices. However, in general, the responses of both women and men were positive (improvements / reductions in risk factors for metabolic and cardiovascular diseases). Men showed reduced levels of serum triglycerides and VLDL-cholesterol at the end of the first 30 days (Pranayama practice only), and increased levels of HDL-cholesterol (the “good” cholesterol) and free fatty acids at the end of both the first 30 days (Pranayama practice only) and at the end of the 3-month session. There was no change in LDL-cholesterol. Women showed reduced levels of serum free fatty acids at the end of both the first 30 days (Pranayama only) and the 3-month session, and also showed reduced levels of total cholesterol, triglycerides, LDL-cholesterol and VLDL-cholesterol by the end of the 3-month session. There were no changes in HDL-cholesterol.

Preliminary findings support the potential of Yoga as complementary treatment of depressed patients who are taking anti-depressant medications but who are only in partial remission. Shapiro et al. (2006) conducted a study with a purpose to present further data on the intervention, focusing on individual difference in psychological,
emotional and biological processes effecting treatment outcome. 37 subjects were taken and the intervention consisted of 20 classes led by senior Iyenger Yoga teachers in three courses of 20 Yoga classes each. Significant reductions and anxiety were shown after Yoga classes.

Sharma et al. (2006) conducted a study to compare the effects of anti-depressant medication with a combined approach of anti-depressant medication and Sahaj Yoga. Thirty adults (19 men) were randomly assigned to either medication alone or medication and 8 weeks of Sahaj Yoga training. At the end of the 8 weeks, both groups showed improvements in depression symptoms, but participants in the combined medication and yoga group showed greater improvement. Also, a higher percentage of participants in the combined group were in full remission from depression at the end of the 8 weeks.

David (2007) examined that the ancient system of Kundalini Yoga (K. Y.) includes a vast array of meditation techniques. Some were discussed to be specific for treating psychiatric disorders and others are supposedly beneficial for treating cancers. To date, 2 clinical trials have been conducted for treating obsessive-compulsive disorder (OCD). The first was an open uncontrolled trial and the second a single-blinded randomized controlled trial (RCT) comparing a KY protocol against the Relaxation Response and Mindfulness Meditation (RRMM) techniques combined. Both trials showed efficacy on all psychological scales using the KY protocol, however, the RCT showed no efficacy on any scale with the RRMM control group. The KY protocol employed an OCD-specific meditation technique combined with other techniques that are individually, specific for anxiety, low energy, fear, anger, meeting mental challenges, and turning negative thoughts into positive thoughts, in addition to OCD symptoms, other symptoms, including anxiety and depression, were also significantly reduced. Elements of the KY protocol other than the OCD-specific technique also may have applications for psycho-oncology patients and are described here. Two depression-specific KY techniques are described that also help combat mental fatigue and low energy. A 7-part protocol is described that would be used in KY practice to affect the full spectrum of emotions and distress that complicate a cancer diagnosis. In addition, there are KY techniques that practitioners have used in
treat cancer. These techniques have not yet been subjected to formal clinical trials but are described here as potential adjunctive therapies. A case history demonstrating rapid onset of acute relief of intense fear in a terminal breast cancer patient using a KY technique specific for fear is presented. A second case history is reported for a surviving male diagnosed in 1988 with terminal prostate cancer who has used KY therapy long term as part of a self-directed integrative care approach.

Sahay (2007) considered the ancient science of Yoga to have a rich heritage of our culture. He attributed a great role to Yoga in decreasing blood sugar, diabetic susceptibility and body fat%.

Sethi et al. (2007) examined that yoga is rapidly gaining popularity in the West as a form of exercise and mental relaxation. Yoga meaning “union” is an ancient Indian philosophy of life, practiced initially by the Sadhu’s (holymen of India) that encourages the union of the mind, body ad spirit. Recent research has shown that done under proper supervision, it improves muscle strength, hand eye coordination, flexibility, decreases blood pressure, slow the respiratory rate thus improving cardiovascular function. It also reduces stress and anxiety by promoting the release of endorphins, the body’s natural pain-killers. Like any other mode of exercise, complications and injuries can occur if yoga is not practiced under proper supervision. They reported here a case of compressive cervical myelopathy as a result of “Sirsasana” (headstand), a common yoga posture.

Smith et al. (2007) studied on Yoga and relaxation as treatment modalities at 10 and 16 weeks from study baseline to determine if either modality reduced anxiety. A randomized comparative trait was undertaken comparing Yoga with relaxation. One hundred and thirty one subjects with mild to moderate levels of stress were recruited from the community in South Australia. 10 weekly 1-h sessions of relaxation or hatha Yoga brought changes in the State-trait personality. Inventory sub-sole blood pressure, anxiety, General Health Questionnaire. Ten weeks intervention decreased blood pressure and anxiety. Yoga was found to be as effective as relaxation in reducing anxiety: Yoga appears to provide a comparable decrement in blood pressure, anxiety and health status compared to relaxation.
Staller et al. (2007) conducted a study to determine whether concentration and motivation improved, and anxiety decreased over the course of a 10-week participation in a regular yoga class. A sample of 84, predominantly female (93%) college students were enrolled in 4 Hatha yoga classes at a California University. The average age of the students was 23.6 + 9.9 years, and most students had at least 3 months of consistent yoga experience prior to the class. The students were 45% Hispanic, 35% White, 7% African American, 2% Asian American and 7% not reported. The TAIS (Test of Attentional and Interpersonal Style), STAI (State-Trait-Anxiety Inventory), and AMSSE (Achievement Motivation Scale for a Supporting Environment) instruments were administered initially on the 2nd week of class and then again on the 9th week to assess concentration / attention, motivation, and anxiety, respectively. A paired sample 2-tailed t-test was used to determine change in psychological indices over the term. Concentration / attention improved overall (p < 0.001) with yoga students believing themselves better able to focus on appropriate tasks and filter extraneous information. Motivation to achieve success improved (p < 0.001), and motivation to avoid failure decreased (p < 0.001), reflecting a greater likelihood to strive for success in challenging situations. State anxiety did not change between T1 and T2, but trait anxiety decreased (p < 0.001) over the 8 weeks of assessment. For students in 4 college yoga classes showed an improvement in concentration, decreased trait anxiety, and improved motivation for success between a pre and post test assessment.

Wheeler (2007) examined how practicing Yogasana influences perceived stress level and physiological indicators of stress, such as resting heart rate and breathing rate. The sample consisted of 79 moderately stressed students enrolled in Yogasana classes at a university in Southern California. Students participated in Yogasana classes for 10 weeks as part of the General Education (GE) Physical Education curriculum. Participants reported data pre- and post-class on resting heart rate, unregulated breathing rate, and perceived stress level. They hypothesized that the practice of Yogasana would be associated with decreased stress. Yogasana was associated with positive pre- to post-class changes on perceived stress, heart rate, and breathing rate. Participants’ pre-class perceived stress and breathing rate decreased
during the 10-week period. However, participants' pre-class resting heart rate did not change significantly over the course of the study.

Chandrabeya (2008) found that regular practice of Yoga reduces blood pressure.

Sleep disturbance, depression and low perception of health status are commonly seen in elderly population; however, clinicians tend to underestimate or overlook the presence of these symptoms and assume them to be a part of normal aging. Chen et al. (2008) conducted a study to test the effects of 6-months of silver Yoga exercises on promoting the mental health of older adults in senior activity centre, especially their sleep quality, depression perception of health status. Most of the mental health indicators of the participants in the experimental group had significantly improved after the silver Yoga interventions and many of the indicators improved after 30 months of interventions. After 6 months of silver yoga exercises the sleep quality depression and health status of older adults improved.

Madonmohan et al. (2008) found that Yoga training of 6 weeks duration modulates sweating response to dynamic exercise improves respiratory pressures and hand grip strength. Out of 46 subjects, 23 subjects were given yoga training and the remaining 23 subjects served as control group. Muscle strength improved significantly at the end of the Yoga training.

Hypertension was a dangerous disease with no known cure. Megan et al. (2008) reported that Yoga, a type of exercise involving postures and breathing practices aimed at unifying the mind and body was often seen as an effective blood pressure reducer.

Rao et al. (2008), the Director of Vemana of Yoga Research Institute, offer further explanation for the blood pressure benefits of Yoga. They state that 80% of hypertension cases are the result of stress and that Yoga can treat hypertension by helping patients free themselves from stress.

Sathvaprabra et al. (2008) also pleaded that Yoga can improve blood pressure. The Yoga group (n = 18) received supervised training in Yoga and the exercise group (n = 16) practised simple routine exercise. After the training of 10 weeks the Yoga
group showed significant progress in blood pressure whereas there were no changes in
the exercise group.

Singh et al. (2008) examined two diabetic patients. They performed asanas and
pranayams. At the end of the training, their blood glucose was decreased. Yoga
improved blood glucose level.

Yoga, being the process of normalization, is studied for thousands of years.
The daily practice of yoga brings the various unbalanced systems of the body to their
normal state. Sohoni (2008) studied the effect of Yoga training for 6 months of regular
practice of a package of selected yogic practices viz. Asanas, Pranayama. It was
observed that the blood pressure reduced considerably.

Tekur et al. (2008) studied to compare the effect of a short-term intensive
residential Yoga programme with physical exercise (control) on spinal flexibility of
80 subjects who consented were randomly assigned if they satisfied the selection
criteria. After the training, the spinal flexibility measures improved significantly in
both groups but the Yoga group had greater improvement as compared to that of the
control group.

Wheeler et al. (2008) conducted a study to look at how practicing yogasana
influences flexibility. The sample consisted of 83 yogasana students enrolled in
yogasana classes at a University in Southern California. Students participated in
yogaasana classes for 10 weeks as part of the general education (GE) physical
education curriculum. Participants recorded data on pre- and post- class flexibility
using a sit-and-reach test, which tests the flexibility of the hamstring muscles and low
back. The study showed that yogaasana corresponds to positive short-term changes in
pre- to post- class measurement of flexibility.

A study by da Silva et al. (2009) showed that patient use of complementary and
alternative treatments, including yoga, to manage mood and anxiety disorders, has
been well documented. Despite research interest, there are few recent reviews of the
evidence of the benefit of yoga in these conditions. The paucity of reported studies
and several methodological constraints limit data interpretation. In depressive
disorders, yoga may be comparable to medication and the combination superior to
medication alone. There is reasonable evidence for its use as second-line monotherapy
or augmentation to medication in mild to moderate major depression and dysthymia, with early evidence of benefit in more severe depression. In anxiety disorders, yoga may be superior to medication for a subgroup of patients, but its benefits in specific conditions are still largely unknown. Second-line monotherapy is indicated in performance or test anxiety, but only preliminary evidence exists for obsessive-compulsive disorder and post-traumatic stress disorder. Yoga appears to be superior to no treatment and progressive relaxation for both depression and anxiety, and may benefit mood and anxiety symptoms associated with medical illness. It shows good safety and tolerability in short-term treatment. Reasonable evidence supports the benefit of yoga in specific depressive disorders.

Amita et al. (2009) conducted a study on effect of yoganidra on forty one middle aged type-2 diabetic patients, who were on oral hypoglycemic. These patients were divided into two groups (a) twenty patients on oral hypoglycemic with yoga nidra and (b) twenty one were on oral hypoglycemic alone. Result of this study showed that most of the symptoms were subsided (P < 0.004, significant) and full of mean blood glucose level was significantly reduced after three months of Yoga nidra.

Gardens (2009) concluded, after a well controlled study, that Bhashrika, Bhamari and Nadi Shoudhana Pranayama decrease the blood sugar level, thus helps in caring diabetes.

Javnbakht (2009) showed that Yoga has often been perceived as a method of stress management tool that can assist in alleviating depression and anxiety disorders. This study sought to evaluate the influence of yoga in relieving symptoms of depression and anxiety in women who were referred to a yoga clinic. The study involved a convenience sample of women who were referred to a yoga clinic from July 2006 to July 2007. All new cases were evaluated on admission using a personal information questionnaire well as Beck and Spielberger tests. Participants were randomly assigned into an experimental and a control group. The experimental group (n = 34) participated in twice weekly yoga classes of 90 min duration for two months. The control group (n = 31) was assigned to a waiting list and did not receive yoga. Both groups were evaluated again after the two-month study period. The average prevalence of depression in the experimental group pre and post Yoga intervention
was 12.82 ± 7.9 and 10.79 ± 6.04 respectively, a statistically insignificant decrease (p = 0.13). However, when the experimental group was compared to the control group, women who participated in yoga classes showed a significant decrease in state anxiety (p = 0.03) and trait anxiety (p < 0.001). Participation in a two-month yoga class can lead to significant reduction in perceived levels of anxiety in women who suffer from anxiety disorders. This study suggests that yoga can be considered as a complementary therapy or an alternative method for medical therapy in the treatment of anxiety disorders.

Khalsa et al. (2009) conducted an exploratory study for evaluating the potential mental health benefits of yoga in adolescents in a secondary school. Students were randomly assigned by class to twelve weeks of either their regular on-going physical education classes or to yoga practice sessions based upon the yoga training programme. Students completed baseline and end program self-report questionnaires for psychological characteristics including mood, an anxiety perceived stress, and resilience. Yoga participants showed statistically significant reductions relative to control on measures of anger control, fatigue/inertia and resilience. Most of the other outcome measures showed improvements favoring the yoga group. The result suggests that the yoga training program is acceptable and feasible in a secondary school setting and may yield beneficial improvements in mental health.

Pramanick et al. (2009) concluded after thorough study that the vastrika pranayama improved blood pressure and heart rate of the subjects.

Rajak et al. (2009) showed in the study that relaxation provides a number of physical and psychological benefits to cancer survivors, including lessening the impact of detrimental cancer-related symptoms and treatment side-effects (e.g. fatigue, nausea), and improving overall well-being and quality of life. Thirty (n = 30) cancer patients of homogenous disease group were selected randomly as sample from Bharat Sevashram Sangha, Vashi. On the basis of purposive sampling technique, the selected thirty subjects were then assigned into two equal groups, viz., one experimental group (Group A n₁ = 15) and one control group (Group B n₂ = 15). Group A received ‘Medical treatment and Yoga training’ while Group B was treated as control with their regular medical treatment which was given by doctors of Tata
Memorial Hospital, Mumbai. The psychological status of the subjects were assessed through standard questionnaire like Anxiety, Depression and Death Syndrome and Adjustment. Physiological variables recorded were Heart rate, Respiratory rate, Blood pressure and Breathing style. The experimental subjects underwent a Yoga program comprising of selected Asanas and Pranayamas, along with regular medicines, whereas the control group received their regular medicines only. The researchers observed high dropouts because of major operation and death. However, the results of $2 \times 2 \times 4$ Factorial ANOVA and Scheffe’s post hoc test revealed that traditional teaching of Yoga helps to reduce the intensity of death syndrome and improved psychophysiological status of cancer patients.

Sharma and Bera (2009) in a review article evaluated the Psychological responses of yoga during menstruation of low fit college women. Sixty ($n = 60$) low fit female subjects, age from 20–30 years, suffering from irregular menstrual problems for Rajasthan Mahila Teachers Training College, Udaipur, Rajasthan, volunteered in this study as experimental and control groups. Survey result indicates that more than 55% of the selected low-fit college women and higher state of menstruation problems with increased pulse rate, blood pressure and with poor state of pain tolerance. The result of $2 \times 2 \times 5$ Factorial ANOVA followed by Scheffe’s post hoc test revealed that yoga group showed significant superiority over the control group in reducing pulse rate ($CD = 0.45, p < 0.05$), Systolic Blood Pressure ($CD = 0.40, p < 0.05$), and in maintaining Diastolic Blood Pressure ($CD = 0.35, p < 0.05$) to the normal range during menstruation period.

The study of Govindarajulu et al. (2009) was to determine the effect of selected yogasanas and exercises on aged women suffering from geriatric disorders. On a purpose sampling 30 females were selected from the inmates of Hospic Convents i.e. home for aged. The selected subjects (55 to 65 years) were suffering from common as well as specific geriatric disorders of diabetics and hypertension as diagnosed by the medical practitioner. The selected subject were equated into three groups of equal number $n = 09$. Group I was subjected to selected yogasanas and meditation sub-maximal training programme. Group II exercise i.e. simple calisthenics slow and brisk walking administrated at a sub-maximal load (10 to 40 minutes) prior to after the
training programme data was collected on blood pressure, blood sugar and pulse rate. Statistical analysis of ANCOVA results revealed that there was a significant difference in systolic blood pressure, blood sugar and pulse rate in favour of yogasanas and meditation group.

The study of Pramanik et al. (2009) was to evaluate the immediate effect of slow pace bhasrika Pranayama (respiratory rate 6 breaths/minute) for 5 minutes on heart rate and blood pressure and the effect of the same breathing exercise for the same duration of time (5 minutes) following the oral intake of hyoscine-N-butylbromide (Buscopan), a parasympathetic blocker drug. Heart rate and blood pressure of volunteers (n = 39, age 25-40 years) was recorded following a standard procedure. First, subjects had to sit comfortably in an easy and steady posture. The subject was directed to inhale through both nostrils slowly up to the maximum for approximately 4 s and then exhale slowly up to the maximum through both nostrils for approximately 6 s. After 5 minutes of this breathing practice, the blood pressure and heart rate were again recorded. In the other group (n=10) blood pressure and heart rate were recorded following half an hour of oral intake of hyoscine-N-butylbromide 20 mg. The same breathing exercise was then carried out in order to study the effect of parasympathetic blockade on the same Pranayama. After slow bhasrika Pranayamic breathing (respiratory rate 6 breaths/minute) for 5 minutes, both the systolic and diastolic blood pressure decreased significantly with a slight fall in heart rate. No significant alteration in both blood pressure and heart rate was observed in volunteers who performed the same breathing exercise for the same duration following the oral intake of hyoscine-N-butylbromide.

Fillmore (2010) conducted a study on the effects of Yoga interventions on balance, flexibility and strength in adolescent girls 14 to 18 years. A convenience sample of 33 female adolescents participated in Yoga training 2 times per week and a walking programme 3 times per week for 7 weeks. The instructor-led group received instruction from a registered Yoga therapist in person, while the video led group watched a tape of the instructor-led session. Pre- and Post measurements of weight, hamstring flexibility, body fat, strength and balance were collected. Means were computed for all variables. Levene’s tests for equality of variances were run to
determine baseline homogeneity. Histograms with a normal curve, superimposed were drawn to check for normal distribution. Repeated measures general linear model tests were run to test for both within and between-subjects factors, as well as interactions between the two. Data were normally distributed and groups were not significantly different at baseline ($P \geq 0.05$). There was a statistically significant within subject difference (Pretest to Post test) for range of motion right ($P = 0.034$) and range of motion left ($P = 0.036$) as measured by the 90 / 90 hamstring flexibility test. There was no statistically significant differences between the instructor and video led groups for any of the measured.

Yadav (2010) investigated that the effects of inspiratory and expiratory phases of normal quiet breathing, deep breathing and Savitri Pranayama breathing on heart rate and mean ventricular qrs axis was investigated in young healthy untrained subjects. Pranayama breathing produced significant cardio acceleration and an increase in the qrs axis during the inspiratory phase compared to eupnoea. These changes were similar to the changes observed during the corresponding phase of deep breathing or Savitri Pranayama breathing. Right nostril breathing activates the sympathetic nervous system and increase the heart rate. Alternate nostril breathing bring about a balance in the ans. Kapalbhati practice showed an increase in the low frequency band and decrease in the high frequency band of the heart rate variability (hrv) spectrum indicating increased sympathetic activity, nadishohdhana pranayama increased both components of hrv.

Yoshihara et al. (2011) examined the differences in mental states and urinary stress-related biochemical indices between long-term yoga practitioners and non-experienced participants. Previous studies have shown the short-term or intermediate-term practice of yoga to be useful for ameliorating several mental disorders and psychosomatic disorders. However, little is known about the long-term influences of yoga on the mental state or stress-related biochemical indices. If yoga training has a stress-reduction effect and also improves an individual’s mental states for a long time, long-term yoga practitioners may have a better mental state and lower stress-related biochemical indices to comparison to non-experienced participants.
Pal et al. (2011) observed the effect of regular yogic practices and self-discipline in reducing body fat and elevated lipids in CAD patients. There were one hundred seven subjects of both sexes having coronary artery disease were randomly selected from Department of Cardiology. Subjects were divided into two groups randomly in yoga group and in non yoga group, 85 in each group. Out of these (no subjects), one hundred fifty four completed the study protocol. Out of these (no subjects), one hundred fifty four completed the study protocol. The yogic intervention consisted of 85–40 min. / day, five days in a week till six months in the Department of Physiology, CSMMU, UP, Lucknow. Body fat testing and estimation of lipid profile were done of the both groups at zero time and after six months of yogic intervention in yoga group and without yogic intervention in non yoga group. BMI (p < 0.04), fat % (p < 0.0002), fat free mass (p < 0.04), SBP (p < 0.002), DBP (p < 0.009), heart rate (p < 0.0001), total cholesterol (p < 0.0001), triglycerides (p < 0.0001), HDL (p < 0.0001) and low density lipoprotein (p < 0.04) were changed significantly.

The study of Mustian et al. (2011) reveals that cancer treatments disrupt circadian rhythm exacerbating the anxiety and mood disorders experienced by survivors, ultimately, impairing recovery and quality of life. They conducted a nationwide, multi-site, phase III randomized, controlled, clinical trial examining the efficacy of yoga for improving circadian rhythm, anxiety and mood among cancer survivors through the University of Rochester (UR) Cancer Center Community Clinical Oncology Program (CCOP) Research Base. Cancer survivors with non-metastatic disease, between 2-24 months post adjuvant therapy who reported no participation in yoga during the prior 3 months were randomized into 2 arms: 1) standard care, and 2) standard care plus the 4-week (wk) yoga intervention (2 x’s/wk; 75 min./session). The yoga intervention utilized the UR Yoga for Cancer Survivors (YOCAS) program consisting of pranayama (breathing exercises), 18 gentle Hatha and Restorative yoga asanas (postures) and meditation. Circadian rhythm, anxiety and mood were assessed pre- and post-intervention. 410 survivors were accrued (96% female, mean age = 54, 75% breast cancer). Multi-oscillator modeling revealed a 12-hour, ultradian rhythm model fit the circadian rhythm better than a single-oscillator, 24-hour model and demonstrated significant rhythm differences.
between groups post-intervention (p < 0.05) with a more favorable rhythm in the yoga group. ANCOVAs showed a lower 24-hour amplitude and a delayed 12-hour acrophase in the yoga group (all p < 0.05). ANCOVAs with baseline values as covariates revealed significant differences between groups on anxiety and mood (p < 0.05) with yoga participants demonstrating greater improvements in anxiety (CS=-0.80, SE=0.21) and mood (CS=-6.7, SE=1.08) from pre- to post-intervention compared to controls (anxiety CS=-0.20, SE=0.24; mood CS=-1.6, SE=0.96). The brief community-based YOCAS intervention favorably alters circadian rhythm and improves anxiety and mood among survivors. Clinicians should consider prescribing the YOCAS program for survivors reporting anxiety and mood disorders. Funding: NCI U10CA37420 and K07CA120025.