CHAPTER II

REVIEW OF RELATED LITERATURE

The purpose of the study is to know about the effect of yogic exercises and the combination of yogic exercises and autogenic training of climacteric women, the subjects were selected from various colleges in Coimbatore city, Tamilnadu. The investigator was interested to contribute something for the women, for this purpose she hopes that the yogic exercises and the combination of yogic exercise and autogenic training will give positive effect of the women who are suffering from the menopausal problems. Many research studies have been carried out in this area in different fields.

The investigator has collect some of the relevant literature, reports related to the effect of physiological, psychological and biochemical variables of climacteric women and the background of the early studies for this chapter.

STUDIES ON PHYSIOLOGICAL VARIABLE

Cade et al.(2010) conducted a prospective, randomized, controlled study to evaluate whether a yoga lifestyle intervention improves cardio vascular diseases risk factors, virological or immunological status, or quality of life (QOL) in HIV-infected adults relative to standard of care treatment in a matched control group. Sixty HIV-infected adults with mild-moderate cardio vascular diseases
(CVD) risk were assigned to 20 weeks of supervised yoga practice or standard of care treatment. Resting systolic and diastolic blood pressures improved more in the yoga group than in the standard of care group. However, there was no greater reduction in body weight, fat mass or proatherogenic lipids, or improvements in glucose tolerance or overall quality of life after yoga.

**Kiecolt-Glaser et al.(2010)** compared inflammatory and endocrine responses of novice and expert yoga practitioners before, during, and after a restorative hatha yoga session, as well as in two control conditions. Stressors before each of the three conditions provided data on the extent to which yoga speeded an individual's physiological recovery. A total of 50 healthy women (mean age, 41.32 years; range, 30-65 years), 25 novices and 25 experts, were exposed to each of the conditions (yoga, movement control, and passive-video control) during three separate visits. The yoga session boosted participants' positive affect compared with the control conditions, the ability to minimize inflammatory responses to stressful encounters influences the burden that stressors place on an individual.

**Lee et al.(2009)** examined the effectiveness of yoga as a treatment option for menopausal symptoms. Two randomized clinical trials compared the effects of yoga with those of walking or physical exercise. The meta-analysis of these data failed to show specific effects of yoga on menopausal complaints including psychological, somatic, and vasomotor symptoms. Two randomized clinical trials found no
effects of yoga on total menopausal symptoms compared with wait-list control or no treatment. They reported favorable effects of yoga on menopausal symptoms.

Satyapriya et al. (2009) studied the effect of integrated yoga practice and guided yogic relaxation on both perceived stress and measured autonomic response in healthy pregnant women. The 122 healthy women recruited between the 18th and 20th week of pregnancy at prenatal clinics in Bangalore, India, were randomized to practicing yoga and deep relaxation or standard prenatal exercises 1-hour daily. Perceived stress decreased by 31.57% in the yoga group and increased by 6.60% in the control group (P=0.001). During a guided relaxation period in the yoga group, compared with values obtained before a practice session, the high-frequency band of the heart rate variability spectrum (parasympathetic) increased by 64% in the 20th week and by 150% in the 36th week, and both the low-frequency band (sympathetic), and the low-frequency to high-frequency ratio were concomitantly reduced (P<0.001 between the 2 groups). Moreover, the low-frequency band remained decreased after deep relaxation in the 36th week in the yoga group. Yoga reduces perceived stress and improves adaptive autonomic response to stress in healthy pregnant women.

Phoosuwan et al. (2009) investigated the effects of the weight bearing yoga training on both bone resorption marker and the quality of life of the postmenopausal women. The baseline demographic data,
the bone resorption marker (beta-CrossLaps), the bone formation marker (P1NP) and quality of Life (SF-36) data were collected. The experimental group attended the 12-week weight-bearing yoga training 3 days a week, 50 minutes a day while the control group lived their normal lives. After 12 weeks the weight-bearing yoga training had a positive effect on bone by slowing down bone resorption which was a very essential indicator for human health because it reduced the osteoporosis risks in the postmenopausal women. Additionally, yoga training promoted better quality of life.

Miu et.al.(2009) investigated heart rate variability (HRV) in healthy volunteers that were selected for extreme scores of trait anxiety (TA), during two opposite psycho physiological conditions of mental stress, and relaxation induced by autogenic training. R-R intervals, HF and LF powers, and LF/HF ratios were derived from short-term electrocardiograph recordings made during mental stress and relaxation by autogenic training, with respiratory rate and skin conductance being controlled for in all the analyses. The main finding was that high TA was associated with reduced R-R intervals and HF power across conditions. In comparison to mental stress, autogenic training increased HRV and facilitated the vagal control of the heart. There were no significant effects of TA or the psycho physiological conditions on LF power, or LF/HF ratio.

Tarun et.al.(2009) studied the effect of breathing exercises (pranayama) in patients with bronchial asthma of mild to moderate
severity, Fifty cases of bronchial asthma (Forced Expiratory Volume in one second > 70%) were studied for 12 weeks. Patients were allocated to two groups: group A and group B (control group). Patients in group A were treated with breathing exercises (deep breathing, Brahmani, and Omkara, etc.) for 20 minutes twice daily for a period of 12 weeks. Patients were trained to perform Omkara at high pitch (forceful) with prolonged exhalation as compared to normal Omkara. Group B was treated with meditation for 20 minutes twice daily for a period of 12 weeks. Subjective assessment, Forced Expiratory Volume 1, and Peak Expiratory Flow Rate were done in each case initially and after 12 weeks. After 12 weeks, group A subjects had significant improvement in symptoms, Forced Expiratory Volume 1, and Peak Expiratory Flow Rate 1, as compared to group B subjects. Breathing exercises (pranayama) mainly expiratory exercises, improved lung function subjectively and objectively and should be regular part of therapy.

Pomidori et al. (2009) investigated the tolerability and effect of yoga breathing on ventilatory pattern and oxygenation in patients with chronic obstructive pulmonary disease (COPD). Patients with chronic obstructive pulmonary disease COPD (N = 11, 3 women) without previous yoga practice and taking only short-acting beta2-adrenergic blocking drugs were enrolled. Ventilatory pattern and oxygen saturation were monitored by means of inductive plethysmography during 30-minute spontaneous breathing at rest and during a 30-minute yoga lesson. We evaluated oxygen saturation, tidal volume,
minute ventilation, respiratory rate, inspiratory time, total breath
time, fractional inspiratory time, an index of thoracoabdominal
coordination, and an index of rapid shallow breathing. Changes in
dyspnea during the yoga lesson were assessed with the Borg scale. All
the participants reported to be comfortable during the yoga lesson,
with no increase in dyspnea index, which short-term training in yoga
is well tolerated and induces favorable respiratory changes in patients
with chronic obstructive pulmonary disease COPD.

Ring-Dimitriou et al. (2009) assessed the effect of exercise
modalities on determinants of sarcopenia, specifically, lean tissue
mass, maximal voluntary isometric contraction (MVIC), muscle quality
(MQ), and cardiorespiratory fitness (VO2peak) over 12 weeks were
studied in 42 (45-55 years, 60 days of amenorrhea, with <=1 h/week
physical activity) perimenopausal females. Subjects were assigned to
strength training (super-slow, 20 s tension, ST(ss) = 7; hypertrophy, 2-
4 s tension, ST(ht) = 8), endurance training (intermittent, >=48 h
rest, ET(i) = 7; consecutive, 24 h, ET(c) = 9) and autogenic training
group (AT = 11). ST and ET met 60 min day(-1), 3 days week(-1) and
AT 1 day week(-1). Leg extension, incremental cycling with gas
exchange, dual-energy X-ray absorptiometry, and blood analysis were
tested. The MANOVA revealed that ST(ss) improved MVIC (P < 0.01)
and MQ (P <= 0.01). The VO2peak also increased significantly in ET
group by 28% (ET(i): P = 0.02, ET(c): P = 0.01). A modality-specific
effect on strength, MQ, and VO(2)peak in perimenopausal females was duly noted.

*Mourya et al. (2009)* examined the effect of slow- and fast-breathing exercises on autonomic functions in patients with essential hypertension. The subjects comprised 60 male and female patients aged 20-60 years with stage 1 essential hypertension. Patients were randomly and equally divided into the control and other two intervention groups, who were advised to do 3 months of slow-breathing and fast-breathing exercises, respectively. Baseline and post intervention recording of response were done in all subjects. Test showed significant change only in patients practicing the slow-breathing exercise. Both types of breathing exercises benefit patients with hypertension. However, improvement in both the sympathetic and parasympathetic reactivity may be the mechanism that is associated in those practicing the slow-breathing exercise.

*Cohen et al. (2009)* conducted a randomized controlled trial to assess the effects of 12 weeks of Iyengar yoga versus enhanced usual care (EUC) (based on individual dietary adjustment) on 24-h ambulatory BP in yoga-naïve adults with untreated prehypertension or Stage 1 hypertension. In total, 26 and 31 subjects in the Iyengar yoga (IY) and enhanced usual care EUC arms, respectively, completed the study. There were no differences in BP between the groups at 6 and 12 weeks. Twelve weeks of Iyengar yoga IY produces clinically
meaningful improvements in Systolic blood pressure SBP and diastolic blood pressure DBP.

Pramanik et.al. (2009) evaluated the immediate effect of slow pace bhasrika pranayama (respiratory rate 6/min) 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 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 standard procedure). After 5 minutes of this breathing practice, the blood pressure and heart rate again were recorded in the aforesaid manner using the same instrument. The other group (n = 10) took part in another study where their blood pressure and heart rate were recorded following half an hour of oral intake of hyoscine-N-butylbromide 20 mg. It was noted that after slow bhasrika pranayamaic breathing (respiratory rate 6/min) 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 oral intake of hyoscine-N-butylbromide.

Singh et.al. (2009) conducted the study to determine the effects of selected asanas in hatha yoga on agility and flexibility level. The subjects for the study were selected on the basis of random group design. Thirty male students were selected as subjects. The subjects
were subjected to the six week yogasanas training programme that includes Swastikasana, Mayurasana, Matsyendrasana, paschimottanasana and Gomukhasana.

The difference in the mean of each group for selected variable was tested for the significance of difference by “t” test. The level of significance was set at 0.05. The results have shown the significant improvement in flexibility, yogasanas training programme also shown significant improvement in agility.

Haskell et.al.(2009) identified female veterans who used combined estrogen/medroxy progesterone hormone therapy in 2001 using the VA Pharmacy Benefits Management database. We then randomly sorted and selected 4,000 women for a mailed invitation to participate in a hormone therapy survey. Women who agreed to participate were mailed the National Women Veterans Hormone Replacement Survey. In bivariate analysis, taperers were more likely to report higher incomes, less smoking, and more use of alternatives such as vitamin E, other dietary supplements, and exercise or yoga for menopausal symptoms. In multivariate analysis, tapering was significantly associated with younger age, initiating hormone therapy for menopausal symptoms. Separately, tapering hormone therapy was significantly associated with lower menopausal symptom.

Dhungel et.al.(2008) investigated the responses of alternate nostril breathing the nadisudhi pranayama on some cardio-
respiratory functions in healthy young adults. The subjects performed the Alternate Nostril Breathing 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 and pulse pressure was noted. Although Systolic blood pressure was decreased insignificantly, the decrease in pulse rate, respiratory rate, diastolic blood pressure was significant.

Madanmohan et.al.(2008) studied whether yoga training of six weeks duration modulates sweating response to dynamic exercise and improves respiratory pressures, handgrip strength and handgrip endurance. Out of 46 healthy subjects (30 males and 16 females, aged 17-20 yr), 23 motivated subjects (15 male and 8 females) were given yoga training and the remaining 23 subjects served as controls. Weight loss following Harvard step test (an index of sweat loss), maximum inspiratory pressure, maximum expiratory pressure, 40 mm endurance, handgrip strength and handgrip endurance were determined before and after the six week study period. Yoga training produced a marked increase in respiratory pressures and endurance in 40 mm Hg test in both male and female subjects (P < 0.05 for all comparisons). The present study demonstrates attenuation of the sweating response to step test by yoga training. Further, yoga training for a short period of six weeks can produce significant improvements in respiratory muscle strength and endurance.
Raghuraj et.al.(2008) found the effect of right, left, and alternate nostril yoga breathing (i.e., RNYB, LNYB, and ANYB, respectively) were compared with breath awareness (BAW) and normal breathing (CTL). Autonomic and respiratory variables were studied in 21 male volunteers with ages between 18 and 45 years and experience in the yoga breathing practices between 3 and 48 months. Subjects were assessed in five experimental sessions on five separate days. The sessions were in fixed possible sequences and subjects were assigned to a sequence randomly. Each session was for 40 min; 30 min for the breathing practice, preceded and followed by 5 min of quiet sitting. Assessments included heart rate variability, skin conductance, finger plethysmogram amplitude, breath rate, and blood pressure. Following Right nostril yoga breathing there was a significant increase in systolic, diastolic and mean pressure. In contrast, the systolic and diastolic pressure decreased after alternate nostril yoga breathing and the systolic and mean pressure were lower after left nostril yoga breathing. Hence, unilateral nostril yoga breathing practices appear to influence the blood pressure in different ways.

Dvivedi et.al.(2008) conducted a study on 50 clinically healthy women volunteers who were in their reproductive age group and in their premenstrual period. Thirty women having premenstrual syndrome were compared with 20 control women to evaluate 1 week training of 61-points relaxation (61-PR) yogic exercise. In both the group's cold pressor test was performed; and systolic blood pressure
(mmHg), diastolic blood pressure (mmHg) and heart rate (/min) were measured. Basal systolic blood pressure, diastolic blood pressure and heart rate of women with pre-menstrual syndrome were significantly higher than the control subjects with P value.

Cohen et al. (2007) determined the feasibility and acceptability of a restorative yoga intervention for the treatment of hot flushes in postmenopausal women. A pilot trial in 14 postmenopausal women experiencing > or =4 moderate to severe hot flushes per day or > or =30 moderate to severe hot flushes per week. The intervention consisted of eight restorative yoga poses taught in a 3-hour introductory session and 8 weekly 90-min sessions. Feasibility was measured by recruitment rates, subject retention and adherence. This pilot trial demonstrated that it is feasible to teach restorative yoga to middle-aged women without prior yoga experience. The high rates of subject retention and satisfaction suggested that yoga is an acceptable intervention in this population, to explore the efficacy of restorative yoga for treatment of menopausal symptoms would be safe and feasible.

Booth-LaForce et al. (2007) assessed the feasibility and efficacy of a yoga treatment for menopausal symptoms. Both physiologic and self-reported measures of hot flashes were included. A prospective within-group pilot study was conducted. Participants were 12 peri- and post-menopausal women experiencing at least 4 menopausal hot flashes per day, at least 4 days per week. Assessments were
administered before and after completion of a 10-week yoga program. Pre- and post-treatment measures included: Yoga classes included breathing techniques, postures, and relaxation poses designed specifically for menopausal symptoms. Participants were asked to practice at home 15 minutes each day in addition to weekly classes. Significant pre- to post-treatment improvements were found for severity of questionnaire-rated total menopausal symptoms. The yoga treatment and study procedures were feasible for midlife women.

Guenette et al. (2007) compared the mechanics of breathing including the measurement of expiratory flow limitation, end-expiratory lung volume, end-inspiratory lung volume, and the work of breathing in endurance-trained men and women during cycle exercise. Expiratory flow limitation was assessed by applying a negative expiratory pressure at the mouth. End-expiratory lung volume and end-inspiratory lung volume were determined by having subjects perform inspiratory capacity manoeuvres. Findings suggested that women utilize a greater majority of their ventilatory reserve compared to men and this is associated with a higher cost of breathing.

Elavsky et al. (2007) examined the effects of a 4-month randomized controlled exercise trial on mental health outcomes in 164 previously low-active middle-aged women, participants completed body composition and fitness assessment and a battery of psychological measures at the beginning and end of a 4-month randomized controlled exercise trial with three arms: walking, yoga,
control. The results indicated that walking and yoga were effective in enhancing positive affect and menopause-related quality of life and reducing negative affect. Women who experienced decreases in menopausal symptoms across the trial also experienced improvements in all positive mental health and quality of life outcomes and reductions in negative mental health outcomes. Physical activity appears to enhance mood and menopause-related quality of life during menopause, however, other aspects of mental health may be affected only as a result of reduction in menopausal symptoms. Increasing cardio respiratory fitness could be one way to reduce menopausal symptoms.

Elavsky et al. (2007a) examined the effects of walking and yoga on multidimensional self-esteem and roles played by self-efficacy, body composition, and physical activity (PA) in changes in esteem on. Previously, low-active middle-aged women were assessed with a four-month randomized controlled exercise trial with three arms: walking, yoga, and control. Structured and supervised walking program meeting three times per week for 1 hour and supervised yoga program meeting twice per week for 90 minutes. They measured body composition, fitness assessment, and battery of psychologic measures. As a result, the walking and yoga interventions failed to enhance global or physical self-esteem but improved sub-domain esteem relative to physical condition and strength (for walking) and body attractiveness (for both walking and yoga). Over time the effects of
physical activity, self-efficacy, and body fat on changes in physical self-esteem and global esteem were mediated by changes in physical condition and body attractiveness subdomain esteem. Women reporting greater levels of self-efficacy and physical activity with lower body fat also reported greater enhancements in subdomain esteem.

De Godoy et al. (2006) clarified the practicing yoga can modify maximal inspiratory pressure and spirometric indices when compared with the practice of aerobic exercise. A total of 31 healthy volunteers were allocated to practice aerobic exercise (n = 15) or to practice yoga (n = 16). Those in the first group served as controls and engaged in aerobic exercise those in the second group practiced selected yogic techniques. Forced vital capacity, forced expiratory volume in one second and maximal inspiratory pressure were measured before and after the three months of training, there was a significant difference, seen in both genders, between the absolute delta of maximal inspiratory pressure for the group practicing yoga and that obtained for the group engaging in aerobic exercise.

Sarang et al. (2006) cyclic meditation (CM) is a technique which combines "stimulating" and "calming" practices, based on a statement in ancient yoga texts suggested that such a combination may be especially helpful to reach a state of mental equilibrium. The oxygen consumption, breath rate and breath volume of 50 male volunteers were assessed before, during, and after sessions of Cyclic meditation and sessions of supine rest in the corpse posture (shvasana, SH).
The oxygen consumption, breath rate and breath volume increased during the "stimulating" practices of Cyclic meditation, returned to the baseline during the "calming" practices, and the oxygen consumption decreased by 19.3 percent below baseline values after Cyclic meditation.

**Kanji et.al. (2006)** determined the effectiveness of autogenic training in reducing anxiety in nursing students. A randomized controlled trial with three parallel arms was completed in 1998 with 93 nursing students aged 19-49 years. The treatment group received eight weekly sessions of autogenic training, the attention control group received eight weekly sessions of laughter therapy, and the time control group received no intervention. The outcome measures were the State-Trait Anxiety Inventory, the Maslach Burnout Inventory, blood pressure and pulse rate completed at baseline, 2 months (end of treatment), and 5, 8, and 11 months from randomization. There was a statistically significantly greater reduction of State and trait Anxiety in the autogenic training group than in both other groups immediately after treatment. The autogenic training group also showed statistically significantly greater reduction immediately after treatment in systolic (P<0.01) and diastolic (P<0.05) blood pressure, and pulse rate (P<0.002), than the other two groups.

**Jojic et.al.(2005)** checked the influence of autogenic training on the biophysical and biochemical indicators of adjustment disorder in adults. They measured the indicators of adjustment disorder and
their changes in three phases: before the beginning, immediately after the beginning, and six months after the completion, of a practical course in autogenic training. Systolic and diastolic arterial blood pressure, brachial pulse rate as well as the levels of cortisol in plasma, of cholesterol in blood, and of glucose was measured. During that period, autogenic training functioned as the sole therapy. The found that arterial blood pressure, pulse rate, concentration of cholesterol and cortisol, after the application of autogenic training among the subjects suffering from adjustment disorder, were lower in comparison to the initial values. These values remained lower even six months after the completion of the practical course in autogenic training.

Madanmohan et al. (2004) studied the effects of yoga training on cardiovascular response to exercise and the time course of recovery after the exercise. Cardiovascular response to exercise was determined by Harvard step test using a platform of 45 cm height. The subjects were asked to step up and down the platform at a rate of 30/min for a total duration of 5 min or until fatigue, whichever was earlier. Heart rate (HR) and blood pressure response to exercise were measured in supine position before exercise and at 1, 2, 3, 4, 5, 7 and 10 minutes after the exercise. Rate-pressure product and double product which are indices of work done by the heart were also calculated. After two months of yoga training, exercise-induced changes in these parameters were significantly reduced.
Telles et al. (2004) aimed at determining whether novices to yoga would be able to reduce their heart rate voluntarily and whether the magnitude of reduction would be more after 30 days of yoga training. Two groups (yoga and control, n = 12 each) were assessed on Day 1 and on Day 30. During the intervening 30 days, the yoga group received training in yoga techniques while the control group carried on with their routine. At each assessment the baseline heart rate was recorded for one minute, this was followed by a six-minute period during which participants were asked to attempt to voluntarily reduce their heart rate. In contrast, there was no significant change in either the baseline heart rate or the lowest heart rate achieved voluntarily in the control group on Day 30 compared to Day 1. The results suggested that yoga training can enable practitioners to use their own strategies to reduce the heart rate.

Sinha et al. (2004) observed critically the energy cost and different cardio respiratory changes during the practice of Surya Namaskar. Twenty-one male volunteers from the Indian Army practiced selected Yogic exercises for six days in a week for three months duration. The Yogic practice schedule consisted of Hatha Yogic Asanas (28 min), Pranayama (10.5 min) and Meditation (5 min). Oxygen consumption was highest in the eighth posture (1.22+/−0.073 l min (−1)) and lowest in the first posture (0.35+/−0.02 l min (−1)). Total energy cost throughout the practice of Surya Namaskar was 13.91 kcal and at an average of 3.79 kcal/min. During its practice
highest Heart Rate was 101+/−13.5 b.p.m. As an aerobic exercise, Surya Namaskar seemed to be ideal as it involves both static stretching and slow dynamic component of exercise with optimal stress on the cardio respiratory system.

Harinath et al. (2004) evaluated the effects of Hatha yoga and Omkar meditation on cardiorespiratory performance, psychologic profile, and melatonin secretion. Thirty healthy men in the age group of 25-35 years volunteered for the study. They were randomly divided in two groups of 15 each. Group 1 subjects served as controls and performed body flexibility exercises for 40 minutes and slow running for 20 minutes during morning hours and played games for 60 minutes during evening hours daily for 3 months. Group 2 subjects practiced selected yogic asanas (postures) for 45 minutes and pranayama for 15 minutes during the morning, whereas during the evening hours these subjects performed preparatory yogic postures for 15 minutes, pranayama for 15 minutes, and meditation for 30 minutes daily, for 3 months. Yogic practices for 3 months resulted in an improvement in cardiorespiratory performance and psychologic profile. The plasma melatonin also showed an increase after three months of yogic practices. The systolic blood pressure, diastolic blood pressure, mean arterial pressure, and orthostatic tolerance did not show any significant correlation with plasma melatonin. However, the maximum night time melatonin levels in yoga group showed a significant correlation with well-being score.
Khalsa et.al. (2004) investigated the hemodynamics of a yogic breathing technique claimed "to help eliminate and prevent heart attacks due to abnormal electrical events to the heart," and to generally "enhance performance of the central nervous system and to help eliminate the effects of traumatic shock and stress to the central nervous system. Parameters for (4) subjects were recorded during a pre exercise resting period, a 31-minute exercise period, and a post exercise resting period, cardiac index, end diastolic index, peak flow, ejection fraction, thoracic fluid index, index of contractility, ejection ratio, systolic time ratio, acceleration index, and systolic, diastolic, and mean arterial pressures (MAPs). Left stroke work index (LSWI) and Stroke Systemic Vascular Resistance Index (SSVRI) were calculated. This technique induces dramatic shifts in all homodynamic variables during the 1 BPM exercise and can produce unique changes in the post exercise resting period after long-term practice that appears to have a unique effect on the brain stem cardio respiratory center regulating the Mayer wave (0.1-0.01 Hz) patterns of the cardiovascular system.

Ray et.al.(2001) observed the effect of training in Hatha yogic exercises on aerobic capacity and physical exercise after maximal exercise, The subjects were divided into two equal groups. One group practiced Hatha yogic exercises for 1 hour every morning (6 days in a week) for six months. The other group underwent conventional physical exercise training during the same period. Absolute values
VO2Max increased significantly in the yoga group after 6 months of training. The physical exercise scores after maximal exercise decreased significantly in the yoga group after 6 months but the Physical training group showed no change.

Yadav et.al.(2001) assessed the effects of yogic practice on some pulmonary functions. Sixty healthy young female subjects (age group 17-28 yrs.) were selected. They had to do the yogic practices daily for about one hour. The observations were recorded by MEDSPIROR, in the form of FVC, FEV-1 and PEFR on day-1, after 6 weeks and 12 weeks of their yogic practice. There was significant increase in FVC, FEV-1 and PEFR at the end of 12 weeks.

Stachenfeld et.al.(1998) Hypothesized that improvement in peak oxygen consumption (VO2peak) during training in older women is associated with specific central adaptations, such as blood volume expansion and a reduction in cardio pulmonary baroreflex control of vascular tone. Seventeen healthy older women were randomized into training and control groups. The training group exercised three to four times per week for 30 min at 60% peak heart rate for 12 week and then 40-50 min at 75% peak heart rate for 12 week. The control group participated in yoga exercises over the same time period. We measured resting blood volume (Evans blue dye), VO2peak, and the forearm vascular resistance response to unloading low pressure mechanoreceptors during low levels of lower body negative pressure (through -20 mm Hg) before and after aerobic training. The slope of
the increase in forearm vascular resistance (response) per unit decrease in central venous pressure (stimulus) was used to assess cardio pulmonary baroreflex responsiveness. Aerobic training increased VO2peak 14.2% from 24.2%, a smaller improvement than typically seen in younger subjects. Blood volume and cardio pulmonary baroreflex were similar before and after training.

Bera et al. (1998) compared the recovery from induced physiological stress in Shavasana (a yogic relaxation posture) and two other postures (resting in chair and resting supine posture). Twenty one males and 6 females (age 21-30 yrs) were allowed to take rest in one of the above postures immediately after completing the scheduled treadmill running. The recovery was assessed in terms of Heart Rate (HR) and Blood pressure (BP). Heart rate and blood pressure were measured before and every two minutes after the treadmill running till they returned to the initial level. The results revealed that the effects of stress were reversed in significantly (P < 0.01) shorter time in Shavasana, compared to the resting posture in chair and a supine posture.

STUDIES ON PSYCHOLOGICAL VARIABLE

Saeed et al. (2010) analyzed exercise and yoga have demonstrated therapeutic effectiveness superior to no-activity controls and comparable with established depression and anxiety treatments. High-energy and frequent aerobic exercise reduce symptoms of
depression more than less frequent or lower-energy exercise. Mindful meditation and exercise have positive effects as adjunctive treatments for depressive disorders, although some studies show multiple methodological weaknesses. For anxiety disorders, exercise and yoga have also shown positive effects.

Shirley et.al.(2010) assessed the effect of Post traumatic stress symptoms and heart rate variability in Bihar flood survivors. A week of yoga practice was given to the survivors a month after the event; Twenty-two volunteers were randomly assigned to two groups, yoga and a non-yoga wait-list control group. The yoga group practiced yoga for an hour daily while the control group continued with their routine activities. Both groups' heart rate variability, breath rate, and four symptoms of emotional distress using visual analog scales, were assessed on the first and eighth day of the program. There was a significant decrease in sadness in the yoga group, and an increase in anxiety in the control group, a week of yoga can reduce feelings of sadness and possibly prevent an increase in anxiety in flood survivors a month after the calamity.

Chen et.al.(2010) aimed to test the effects of a 6-month yoga exercise program in improving sleep quality and decreasing depression in transitional frail elders living in assisted living facilities. A quasi-experimental pretest-and-posttest design was used. A convenience sample of 69 elderly residents of assisted living facilities was divided randomly into a yoga exercise (n = 38) and control group (n = 31)
based on residence location. After 6 months of performing yoga exercises, participants' overall sleep quality had significantly improved, whereas depression, sleep disturbances, and daytime dysfunction had decreased significantly (p < .05).

Uebelacker et al. (2010) provided the evidence for the efficacy of hatha yoga for depression and possible mechanisms by which yoga may have an impact on depression, and to outline directions for future research. Literature review and synthesis were done. A literature search for clinical trials examining yoga for depression uncovered eight trials: 5 including individuals with clinical depression, and 3 for individuals with elevated depression symptoms. Although results from these trials are encouraging, they should be viewed as very preliminary because the trials, as a group, suffered from substantial methodological limitations. First, current strategies for treating depression are not sufficient for many individuals, and patients have several concerns about existing treatments. Yoga may be an attractive alternative to or a good way to augment current depression treatment strategies. Second, aspects of yoga—including mindfulness promotion and exercise—are thought to be "active ingredients" of other successful treatments for depression. Third, there are plausible biological, psychological, and behavioral mechanisms by which yoga may have an impact on depression.

Posadzki et al. (2010) proposed to explore two alternative medicine therapies—qigong and yoga for balancing the essential duo of
holistic mind-body and consequently offer a solution for stress, uncertainty, anxiety and depression. Qualitative research methods have been used to create a conceptual synthesis of yoga and qigong. It is suggested that an increased sense of control is the interface between these two modalities. This conceptual congruence of qigong and yoga is thought to be a selective, curative method, a prescription for ideal living and a ground of human essence existence. The two alternative therapies can prevent mental health disorders such as anxiety, depression and, minimize mental health disruptions such as stress and poor quality of life.

Brown et al. (2009) provided clinical evidence for the use of yoga breathing in the treatment of depression, anxiety, post-traumatic stress disorder, and for victims of mass disasters. By inducing stress resilience, breath work enables us to rapidly and compassionately relieve many forms of suffering. Yoga breathing (pranayama) can rapidly bring the mind to the present moment and reduce stress, and reviewed data indicating how breath work can affect longevity mechanisms in some ways that overlap with meditation and in other ways that are different from, but that synergistically enhance, the effects of meditation.

Elavsky et al. (2009) examined the contribution of personality factors to the reporting of menopausal symptoms in the context of a 4-month randomized controlled exercise trial. Symptomatic middle-aged women completed measures of menopausal symptoms, personality,
physical activity, fitness and body composition assessment at the beginning and end of a 4-month randomized controlled trial involving walking and yoga. After controlling for baseline values, psychological symptoms at the end of the trial were associated with trait anxiety and changes in fitness vasomotor symptoms with optimism and changes in fitness and sexual symptoms were associated with changes in fitness. Personality characteristics partially explain symptom reports during menopause however improvements in physical parameters such as fitness may reduce reported symptomatology.

Asbury et.al.(2009) explored autogenic training (AT) as a treatment for psychological morbidity, symptomology, and physiological markers of stress among women with chest pain, a positive exercise test for myocardial ischemia, and normal coronary arteries (cardiac syndrome X). Fifty-three women with cardiac syndrome X were randomized to an 8-week autogenic training program or symptom diary control. Symptom severity and frequency, Hospital Anxiety and Depression Scale, Spielberger State-Trait Anxiety Inventory, Cardiac Anxiety Questionnaire (CAQ), and Ferrans and Powers Quality of Life Index (QLi), blood pressure, heart rate, electrocardiogram, and plasma catecholamine were measured before and after intervention and at the 8-week follow-up. Women who underwent AT had improved symptom frequency (compared with control women and reduced symptom severity) and frequency, post-AT compared with baseline within group. Within-group improvements
among women who underwent AT include QLI health functioning, post-AT and QLI health functioning, CAQ fear, CAQ total, Spielberger State-Trait Anxiety Inventory trait anxiety, and QLI quality of life at follow-up.

**Polisseni et al. (2009)** determined the prevalence of depression and anxiety in climacteric women and the probable factors responsible for its occurrence. A transversal study that has selected 93 women attended at a climacteric outpatient clinic women from 40 to 65 years old who agreed with participating in the project; Blatt-Kupperman's Menopausal Index for climacteric syndrome diagnosis; Anxiety subscale of the Hospital Anxiety and Depression scale (HADS-A) for anxiety diagnosis; and Beck's Depression Inventory for the diagnosis of depression. The average depression prevalence among the patients was 36.8%, while that of anxiety was 53.7%. There was no significant difference between the prevalence of depression and anxiety in the three phases of climacterium. There was a significant relationship between the presence of moderate climacteric symptoms and the presence of mood alterations, to conclude the prevalence of depression and anxiety is high in climacterium, being possible to detect risk factors related to their occurrence.

**Javnbakht et al. (2009)** sought to evaluate the influence of yoga in relieving symptoms of depression and anxiety in women who were referred to a yoga clinic. They were evaluated on admission using a personal information questionnaire well as Beck and Spiel Berger
tests. Participants were randomly assigned into an experimental and a control group. The experimental group participated in twice weekly yoga classes of 90 min duration for two months. The control group 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 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 and trait anxiety. Participation in a two-month yoga class can lead to significant reduction in perceived levels of anxiety in women who suffer from anxiety disorders.

Hafner-Holter et.al (2009) described and compared influences from a physical activity program and a yoga program on well-being, mood, stress coping, body-image and social competence in healthy people. 18 persons attending a gym and 21 taking part in a yoga program answered following questionnaires before entering the program and after taking part for 20 units. Statistical analyses show significant improvement in social competence in both training groups; the gym-group report reduced sexual discomfort, whereas people taking part in yoga-group show a reduction in somatization and body-related anxiety as well as an improvement in physical and emotional well-being.
Kang et al. (2009) examined the effect of biofeedback treatment on headache activity, anxiety, and depression in Korean female patients with migraine headache. Patients were randomized into the treatment group (n=17) and monitoring group (n=15). Mood states including anxiety and depression, and physiological variables such as mean skin temperature of the patients were compared with those of the normal controls (n=21). They found greater treatment response rate (defined as \( > \) or \( \geq 50\% \) reduction in headache index) in patients with biofeedback-assisted autogenic training than in monitoring group. The scores on the anxiety and depression scales in the patients receiving biofeedback-assisted autogenic training decreased after the biofeedback treatment.

Yurdakul et al. (2009) aimed an abbreviated form of grounded theory was used to explore retrospectively and in detail the experiences of a small sample of people of the process of change. Forty people were approached and 12 women participated who had completed autogenic training in group form after referral for anxiety. Each was interviewed individually. A preliminary model of change was produced, grounded in the interview data. Factors reported to be salient were learning in a group, the core AT experience (the six standard exercises), difficulties with practice, the importance of regular practice integrated into daily life, and enhanced well-being and coping, which incorporated reduced worrying and clearer thinking.
Kraemer et al. (2009) compared changes in the psychosocial outcomes of mood and state anxiety produced by an acute bout of yoga or walking among older adults and psychosocial correlates of activity. Participants were 51 adults who were 50 years of age or older who walked for exercise or participated in a yoga class. Results revealed that yoga participants had significantly greater levels of depression and perceived barriers to exercise, and lower quality of life than did walkers. With control for these differences, yoga practitioners had improved levels of fatigue pre- to post session, compared with walkers. It is possible that yoga practitioners seek out mindful-based exercise to cope with greater levels of depression and lower levels of quality of life.

Bosch et al. (2009) investigated whether neuroendocrine and physical function in women with rheumatoid arthritis (RA) can be altered through a yoga intervention. Sixteen independently living, postmenopausal women with an RA classification of I, II, or III according to the American College of Rheumatology functional classification system served as either participants or controls. The study group participated in three 75-minute yoga classes a week over a 10-week period. At baseline and on completion of the 10-week intervention, diurnal cortisol patterns and resting heart rate were measured. Balance was measured using the Berg Balance Test. Participants completed the Health Assessment Questionnaire (HIQ), a visual analog pain scale, and the Beck Depression Inventory. Yoga
resulted in a significantly decreased HAQ disability index, decreased perception of pain and depression, and improved balance. Yoga did not result in a significant change in awakening or diurnal cortisol patterns.

Simard et al. (2009) structured yoga intervention on medical students. Fourteen first-year medical students participated in a 16-week yoga intervention pilot study. Students completed questionnaires at baseline, mid-intervention and end of the study. The students reported improvements in overall health, perceived stress and depressive symptoms following the intervention. A yoga intervention may be effective in decreasing stress and improving general well-being in medical students.

Ando et al. (2009) assessed the efficacy of mindfulness-based meditation therapy on anxiety, depression, and spiritual well-being of Japanese patients undergoing anticancer treatment. A secondary goal was to assess the relationships among anxiety, depression, spiritual well-being, growth, appreciation, pain, and symptoms. The subjects were 28 patients who were receiving anticancer treatment. The subjects participated in two sessions of mindfulness-based meditation therapy, including breathing, yoga movement and meditation. Patients completed pre intervention and post intervention questionnaires on anxiety and depression (Hospital Anxiety and Depression Scale [HADS]), spiritual well-being (Functional Assessment of Chronic Illness Therapy-Spiritual [FACIT-Sp]), and appreciation, growth, pain,
and symptoms. Hospital anxiety and depression scale scores significantly decreased after the intervention, and Functional Assessment of Chronic Illness Therapy-Spiritual (FACIT-Sp) was increased, but the change was not significant. There were significant associations between FACIT-Sp and HADS, FACIT-Sp and growth, FACIT-Sp and pain and growth and appreciation.

**Daley et al. (2009)** suggested that aerobic exercise can improve psychological health and quality of life in vasomotor symptomatic women. In addition, several RCTs of middle-aged/menopausal-aged women have found that aerobic exercise can invoke significant improvements in several common menopause-related symptoms (e.g. mood, health-related QoL and insomnia), relative to non-exercise comparison groups. There is some evidence that alternative forms of low intensity exercise such as yoga are beneficial in reducing vasomotor symptoms and improving psychological well-being in menopausal women.

**Kulkarni et al. (2009)** focused the study that relaxation potential of yogic exercises seems to play a vital role in establishing psycho-physical health in reversing the psycho-immunology of emotions under stress based on breath and body awareness. However, mechanism of yogic exercises for restoring health and fitness components operating through psycho-neuro-immunological pathways is unknown. Therefore, a hybrid model of human information processing-psycho-neuroendocrine (HIP-PNE) network has
been proposed to reveal the importance of yogic information processing.

Chattha et.al.(2008) assessed the efficacy of an integrated approach of yoga therapy (IAYT) on cognitive abilities in climacteric syndrome. A randomized control study where in the participants were divided into experimental and control groups. They were experimented. One hundred and eight perimenopausal women between 40 and 55 years with follicle-stimulating hormone level equal to or greater than 15 miu/ml. One hundred and twenty perimenopausal women were randomly allotted into the yoga and the control groups. The yoga group practiced a module comprising breathing practices, sun salutation and cyclic meditation, whereas the control group practiced a set of simple physical exercises, under supervision (1 hour/day, 5 days/week for 8 weeks) tests were made and concluded that integrated approach of yoga therapy can improve hot flushes and night sweats. It also can improve cognitive functions such as remote memory, mental balance, attention and concentration, delayed and immediate recall, verbal retention and recognition tests.

Chattha et.al.(2008) studied the effect of yoga on the climacteric symptoms, perceived stress, and personality in perimenopausal women. One hundred twenty participants (age’s 40-55 year) were randomly divided into two study arms, ie, yoga and control. The yoga group practiced an integrated approach to yoga therapy comprising surya namaskara (sun salutation) with 12
postures, pranayama (breathing practices), and avartan dhyan (cyclic meditation), whereas the control group practiced a set of simple physical exercises under supervision of trained teachers for 8 weeks (1 h daily, 5 days per week). The assessments were made by Greene Climacteric Scale, Perceived Stress Scale, and Eysenck's Personality Inventory before and after the intervention. They concluded thus, eight weeks of an integrated approach to yoga therapy decreases climacteric symptoms, perceived stress, and neuroticism in perimenopausal women better than physical exercise.

Elavsky et al. (2007b) examined structured exercise in the form of walking or yoga to determine the effects on perceived sleep quality during menopausal transition. Participants completed body composition and fitness assessments and a battery of psychological measures, including the Pittsburgh Sleep Quality Index, at the beginning and end of a 4-month randomized, controlled exercise trial with three arms: walking, yoga, and control. A series of mixed-model repeated-measures univariate analyses of covariance did not reveal any statistically significant intervention effects for total sleep quality or any individual sleep-quality domain. In this study, 4-month moderate-intensity walking and low-intensity yoga programs were ineffective in yielding statistically significant improvements in sleep quality.

Kjellgren et al. (2007) investigated whether Sudharsankriya and related practices can lead to increased feeling of wellness in
healthy volunteers. Participants were instructed in a 6-day intensive program of SK&P which they practiced daily for six weeks. The control group was instructed to relax in an armchair each day during the same period. Subjects included a total of 103 adults, 55 in the intervention (SK&P) group and 48 in the control group. Various instruments were administered before and after the intervention, outcome measures appeared to be appropriate for assessing the differences between the groups. The data suggest that participants in the SK&P group, but not the control group, lowered their degree of anxiety, depression and stress, and also increased their degree of optimism. The participants in the yoga group experienced the practices as a positive event that induced beneficial effects.

Ospina et.al. (2007) examined the efficacy and effectiveness of different meditation practices for the three most studied conditions; the role of effect modifiers on outcomes; and the effects of meditation on physiological and neuropsychological outcomes. Five broad categories of meditation practices were identified (Mantra meditation, Mindfulness meditation, Yoga, Tai Chi, and Qi Gong). Characterization of the universal or supplemental components of meditation practices was precluded by the theoretical and terminological heterogeneity among practices. Evidence on the state of research in meditation practices was provided in 813 predominantly poor-quality studies. The three most studied conditions were hypertension, other cardiovascular diseases, and substance abuse. Sixty-five intervention studies
examined the therapeutic effect of meditation practices for these conditions. Meta-analyses based on low-quality studies and small numbers of hypertensive participants showed that TM(R), Qi Gong and Zen Buddhist meditation significantly reduced blood pressure. Yoga helped reduce stress. Yoga was no better than Mindfulness-based Stress Reduction at reducing anxiety in patients with cardiovascular diseases. No results from substance abuse studies could be combined. The physiological and neuropsychological effects of meditation practices have been evaluated in 312 poor-quality studies. Meta-analyses of results from 55 studies indicated that some meditation practices produced significant changes in healthy participants.

**Hudacek (2007)** evaluated the immunological effects of hypnosis in patients with early stage breast cancer (a) an experiment that taught hypnotic guided-imagery therapy to patients and (b) one that provided participants with home visits and autogenic training. Both investigations demonstrated improvement in depression and increased natural killer (NK) cell counts after 2 months of hypnosis treatment.

**Brown (2005)** documented the benefits of programs that combine pranayama (yogic breathing) asanas (yoga postures), and meditation, there is sufficient evidence to consider Sudarshan Kriya Yoga to be a beneficial, low-risk, low-cost adjunct to the treatment of stress, anxiety, post-traumatic stress disorder (PTSD), depression,
stress-related medical illnesses, substance abuse, and rehabilitation of criminal offenders. SKY has been used as a public health intervention to alleviate PTSD in survivors of mass disasters. Yoga techniques enhance well-being, mood, attention, mental focus, and stress tolerance. Proper training by a skilled teacher and a 30-minute practice every day will maximize the benefits. Health care providers play a crucial role in encouraging patients to maintain their yoga practices.

**Travers et. al. (2005)** investigated the prevalence of climacteric symptoms in a representative sample of postmenopausal Australian women. A cohort of 500 pre menopausal, perimenopausal and postmenopausal women aged 40-80 years participated in the Longitudinal Study of Ageing in Women (LAW study) at the Royal Brisbane and Women's Hospital, Brisbane, Australia. In year 1 of the study (2001), all participants completed the Greene Climacteric Scale and information regarding their menopausal status and the use of hormone therapy (HT) was obtained through a clinical interview with a qualified medical practitioner. The 50-59-year age group achieved the highest scores on the vasomotor and the depression scales in comparison to other age groups. Significant differences were also evident on the vasomotor and the depression scales on the basis of menopausal status, especially in perimenopausal women. Vasomotor symptoms, as assessed by the Greene Climacteric Scale, are common
during the menopause transition and remain elevated for some years in a minority of older postmenopausal women.

Ray et al. (2001) observed the effect of yogic practices during training period on the young trainees. 54 trainees of 20-25 years age group were divided randomly in two groups i.e. yoga and control group. Yoga group was administered yogic practices for the first five months of the course while control group did not perform yogic exercises during this period. 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 sub maximal 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.

McAuley et al. (2000) examined the growth and form of multidimensional self-esteem over a 12-month period (6-month exercise intervention and 6-month follow-up) in 174 older adults engaged in either a walking or stretching/toning program. Latent growth curve analyses showed a curvilinear pattern of growth in esteem with significant increases at all levels of self-esteem upon completion of the intervention followed by significant declines at 6 months post intervention in both groups.
Bera (1998) compared the recovery from induced physiological stress in Shavasana (a yogic relaxation posture) and two other postures (resting in chair and resting supine posture). Twenty one males and 6 females (age 21-30 yrs) were allowed to take rest in one of the above postures immediately after completing the scheduled treadmill running. The recovery was assessed in terms of Heart rate (HR) and blood pressure (BP). Heart rate and Blood pressure were measured before and every two minutes after the treadmill running till they returned to the initial level. The results revealed that the effect of stress was reversed in significantly shorter time in Shavasana, compared to the resting posture in chair and a supine posture.

STUDIES ON BIOCHEMICAL VARIABLE

Sayyed et.al. (2010) studied the effect of Sudarshan Kriya Yoga on Lipid Profile, Pulmonary Function and Hemoglobin concentration; they conducted a workshop of 8 days consisting of 150 participants. Out of which 55 were included in the study group. Their results show that after practicing Sudarshan Kriya, there is decrease in Total Cholesterol, LDL-Cholesterol along with significant increase in HDL-Cholesterol. There are significant changes in Pulmonary Function, but statistically non-significant changes in Hematological parameters. From the observation Sudarshan Kriya Yoga may play vital role in reducing Total Cholesterol and significantly increasing HDL-Cholesterol and improvement in all Pulmonary Function.
Telles et al. (2010) assessed the effects of a yoga and diet change program, emphasizing breathing techniques practiced, while seated, in obese persons. A single group of 47 persons were assessed on the first and last day of a yoga and diet change program, with 6 days of the intervention between assessments. The assessments were: body mass index (BMI), waist and hip circumferences, mid-arm circumference, body composition, hand grip strength, postural stability, serum lipid profile and fasting serum leptin levels. Participants practiced yoga for 5 hours every day and had a low fat, high fiber, vegetarian diet. Last and first day data were compared using a t-test for paired data. Following the 6-day residential program, participants showed a decrease in Body Mass Index (1.6 percent), waist and hip circumferences, fat-free mass, total cholesterol (7.7 percent decrease), high density lipoprotein (HDL) cholesterol (8.7 percent decrease), fasting serum leptin levels (44.2 percent decrease) and an increase in postural stability and hand grip strength.

Nahas et al. (2009) evaluated the prevalence of metabolic syndrome (MetS) and its associated risk factors in Brazilian postmenopausal women. In this cross-sectional study, a total of 368 postmenopausal women aged 40-75 years. According to the US National Cholesterol Education Program Adult Treatment Panel III (NCEP ATP III) guidelines, MetS was diagnosed with waist circumference, blood pressure, triglycerides, high density lipoprotein cholesterol and glucose. Data on past medical history, tobacco use,
anthropometric indicators, and values of C-reactive protein (CRP) were collected. Multivariate analysis, using a logistic regression model (odds ratio, OR) was used to evaluate the influence of various simultaneous MetS risk factors, they concluded Metabolic syndrome was highly prevalent among Brazilian postmenopausal women seeking gynecologic health care. Abdominal obesity, diabetes, hypertension and high CRP were strong MetS predictors and hormone therapy appeared to play a protective role for this condition.

Zaros et.al.(2009) investigated the effects of 6 months of dynamic exercise training on blood pressure and plasma nitrate/nitrite concentration in hypertensive postmenopausal women. Eleven volunteers were submitted to the consisting in 3 days a week, each session of 60 minutes during 6 months at moderate intensity. Anthropometric parameters, blood pressure, Nitric Oxide concentration were measured at initial time and after exercise training. A significant reduction in both systolic and diastolic blood pressure values was seen after exercise training which was accompanied by a marked increase of Nitric Oxide levels. Total cholesterol was significantly reduced, whereas triglycerides levels were not modified after exercise training.

Carson et.al.(2009) evaluated the effects of a yoga intervention on menopausal symptoms in a sample of survivors of early-stage breast cancer (stages IA-IIIB). Thirty-seven disease-free women experiencing hot flashes were randomized to the 8-week Yoga of
Awareness program (gentle yoga poses, meditation, and breathing exercises) or to wait-list control. The primary outcome was daily reports of hot flashes collected at baseline, post treatment, and 3 months after treatment via an interactive telephone system. Data were analyzed by intention to treat. At post treatment, women who received the yoga program showed significantly greater improvements relative to the control condition in hot-flash frequency, severity, and total scores and in levels of joint pain, fatigue, sleep disturbance, symptom-related bother, and vigor. This pilot study provides promising support for the beneficial effects of a comprehensive yoga program for hot flashes and other menopausal symptoms in early-stage breast cancer survivors.

Vera et al. (2009) examined the effects of long-term yoga practice on Subjective Sleep Quality (SSQ) and on several hormonal parameters of the hypothalamus-pituitary-adrenal (HPA) axis. Twenty-six subjects (16 experimental and 10 controls) were recruited to be part of the study. Experimental subjects were regular yoga practitioners with a minimum of 3 years of practice. Blood samples were drawn from all subjects. Likewise, the Pittsburgh Sleep Quality Index (PSQI) was employed to assess Subjective Sleep Quality SSQ. The yoga group displayed lower Pittsburgh Sleep Quality Index PSQI scores and higher blood cortisol levels than control subjects. Therefore, it can be concluded that long-term yoga practice is associated with significant psycho-biological differences, including
better sleep quality as well as a modulatory action on the levels of cortisol.

Kosuri et al. (2009) examined the effect of yoga practice on subjects with type 2 diabetes mellitus (T2DM). In a 40-day yoga camp, yogic practices were overseen by trained yoga teachers. Clinical, biochemical, and psychological well-being were studied at baseline and at the end of the camp, there was a reduction of body mass index and anxiety and an improvement in total general well-being of subjects with T2DM. The yoga practice for 40 days resulted in reduced BMI, improved well-being, and reduced anxiety.

Amita et al. (2009) evaluated the effect of Yoga-Nidra on blood glucose level in diabetic patients. This study was conducted on 41, middle aged, type-2 diabetic patients, who were on oral hypoglycaemic. Yoga-nidra practiced for 30 minutes daily up to 90 days, parameters were recorded every 30th day. This study suggested that subjects on Yoga-nidra with drug regimen had better control in their fluctuating blood glucose and symptoms associated with diabetes, compared to those were on oral hypoglycaemics alone.

Yang et al. (2009) assessed the feasibility of implementing a 12-week yoga program among adults at high risk for type 2 diabetes. Twenty-three adults (19 Whites and 4 non-Whites) were randomly assigned to the yoga intervention group or the educational group. The yoga group participated in a 3-month yoga intervention with sessions twice per week and the educational group received general health
educational materials every 2 weeks. All participants completed questionnaires and had blood tests at baseline and at the end of 3 months. Effect sizes were reported to summarize the efficacy of the intervention. Compared with the education group, the yoga group experienced improvements in weight, blood pressure, insulin, triglycerides and exercise self-efficacy indicated by small to large effect sizes.

Saptharishi et al. (2009) measured the efficacy of physical exercise, reduction in salt intake, and yoga, in lowering BP among young (20-25) pre-hypertensives and hypertensives, and to compare their relative efficacies. A total of 113 subjects: 30, 28, 28 and 27 in four groups respectively participated for eight weeks: control (I), physical exercise (II) - brisk walking for 50-60 minutes, four days/week, salt intake reduction (III) - to at least half of their previous intake, and practice of yoga (IV) - for 30-45 minutes/day off at least five days/week. A total of 102 participants (29, 27, 25 and 21 in groups I, II, III and IV) completed the study. All three intervention groups showed a significant reduction in blood pressure. There was no significant change of blood pressure in control group (I). Physical exercise was most effective (considered individually); salt intake reduction and yoga were also effective.

Haskell et al. (2009) compared female veterans who tapered Hormone Therapy to those who stopped abruptly with regard to patient-specific health factors and recurrence of menopausal
symptoms. They identified female veterans who used combined estrogen/medroxyprogesterone hormone therapy in 2001 using the VA Pharmacy Benefits Management database. We then randomly sorted and selected 4,000 women for a mailed invitation to participate in a hormone therapy survey. Women who agreed to participate were mailed the National Women Veterans Hormone Replacement Survey. Of 836 participants who discontinued hormone therapy, 75% stopped cold turkey and 25% tapered. In bivariate analysis, taperers were more likely to report higher incomes, less smoking, and more use of alternatives such as vitamin E, other dietary supplements, and exercise or yoga for menopausal symptoms.

**Khalsa et al. (2009)** examined changes in brain physiology during a chanting meditation practice using cerebral blood flow single-photon emission computed tomography. Single-photon emission computed tomography scans were acquired in 11 healthy individuals during either a resting state or meditation practice randomly performed on two separate days. When the meditation state was compared with the baseline condition, significant cerebral out flow increases were observed in the right temporal lobe and posterior cingulate gyrus, and significant cerebrospinal fluid (CBF) decreases were observed in the left parieto-temporal and occipital gyri.

**Skoro-Kondza et al. (2009)** aimed of this study was to explore the feasibility of researching community based yoga classes in Type 2 diabetes with a view to informing the design of a definitive, multi-
The study design was an exploratory randomised controlled trial with in-depth process evaluation. The setting was two multi-ethnic boroughs in London, UK; one with average and one with low mean socio-economic deprivation score. Classes were held at a sports centre or GP surgery. Participants were 59 people with Type 2 diabetes not taking insulin, recruited from general practice lists or opportunistically by general practice staff. The intervention group was offered 12 weeks of a twice-weekly 90-minute yoga class; the control group was a waiting list for the yoga classes. Both groups received advice and leaflets on healthy lifestyle and were encouraged to exercise. Yoga teachers felt that most participants were unsuitable for 'standard' yoga exercises because of limited flexibility, lack of basic fitness, co-morbidity, and lack of confidence. There was a small fall in HbA1c in the yoga group which was not statistically significant and which was not sustained six months later, and no significant change in other outcome measures. The benefits of yoga in type 2 diabetes suggested in some previous studies were not confirmed.

Gordon et al. (2008) investigated the impact of Hatha yoga and conventional physical training (PT) exercise regimens on biochemical, oxidative stress indicators and oxidant status in patients with type 2 diabetes. This prospective randomized study consisted of 77 type 2 diabetic patients in the Hatha yoga exercise group that were matched with a similar number of type 2 diabetic patients in the conventional Physical training exercise and control groups. Biochemical parameters such as fasting blood glucose (FBG), serum total cholesterol (TC),
triglycerides, low-density lipoprotein (LDL), very low-density lipoproteins (VLDL) and high-density lipoprotein (HDL) were determined at baseline and at two consecutive three monthly intervals. The concentrations of Fasting blood glucose in the Hatha yoga and conventional Physical training exercise groups after six months decreased by 29.48% and 27.43% respectively and there was a significant reduction in serum Total cholesterol in both groups.

**Vy
as et.al. (2008)** assessed the effect of raja yoga meditation of Brahmakumaris on serum lipids in normal Indian women. 49 normal female volunteers were the subjects. They were divided into pre-menopausal (n=23) and post-menopausal (n=26) groups. They were further divided into non-meditators, short-term meditators and long-term meditators. Lipid profile was assessed using their respective reagent sets. The result showed thus, Raja yoga meditation lowered serum cholesterol and low-density lipoprotein-cholesterol in post-menopausal women thus reducing the risk of coronary artery disease in them.

**Danucalov et.al.(2008)** investigated the changes in cardiorespiratory and metabolic intensity brought about by the practice of pranayamas (breathing exercises of yoga) and meditation during the same hatha-yoga session. The technique applied was the one advocated by the hatha-yoga system. Nine yoga instructors-five females and four males, mean age of 44+-11, 6, were subjected to analysis of the gases expired during three distinct periods of 30 min
rest, respiratory exercises and meditative practice. The oxygen uptake (VO₂) and the carbon dioxide output (VCO₂) were statistically different during meditation and pranayama practices when compared with rest. The heart rate also suffered relevant reductions when results at rest were compared with those during meditation. A smaller proportion of lipids were metabolized during meditation practice compared with rest. The results suggest that the meditation used in this study reduces the metabolic rate whereas the specific pranayama technique in this study increases it when compared with the rest state.

Innes et.al.(2008) suggested that traditional mind-body practices such as yoga, tai chi, and qigong may offer safe and cost-effective strategies for reducing insulin resistance syndrome-related risk factors for cardiovascular disease in older populations, including postmenopausal women. Current evidence suggested that these practices may reduce insulin resistance and related physiological risk factors for cardiovascular disease; improve mood, well-being, and sleep; decrease sympathetic activation; and enhance cardiovascular function.

Hemant et.al.(2008) aimed to record the efficacy of yoga on superoxide dismutase, glycosylated hemoglobin (Hb) and fasting blood glucose levels in diabetics. Forty diabetics aged 40-55 years. The experimental subjects underwent a Yoga program comprising of various Asanas (isometric type exercises) and Pranayamas (breathing
exercises) along with regular anti-diabetic therapy whereas the control group received anti-diabetic therapy only. Heparinized blood samples were used to determine erythrocyte superoxide dismutase (SOD) activity and glycosylated Hb levels and fasting blood specimens collected in fluoride Vacutainers were used for assessing blood glucose. The results revealed that Yogic exercise enhanced the levels of Superoxide dismutase and reduced glycosylated Hb and glucose levels in the experimental group as compared to the control group. The findings conclude that Yogic exercises have enhanced the antioxidant defence mechanism in diabetics by reducing oxidative stress.

Chaya et al. (2008) assessed insulin sensitivity and cardiac autonomic function in long term practitioners of yoga. Fifteen healthy, young, male practitioners of yoga were compared with 15 young, healthy males who did not practice yoga matched for body-mass index. Fasting insulin sensitivity was measured in the fasting state by the hyperinsulinaemic-euglycaemic clamp. There were no significant differences between the groups in their anthropometry or body composition. However, the fasting plasma insulin was significantly lower in the yoga group.

Sahay et al. (2007) assessed the role of yogic practices on glycaemic control, insulin kinetics, body composition exercise tolerance and various co-morbidities like hypertension and dyslipidemia of the individual with diabetics. These studies were both
short term and long-term, and confirmed the useful role of yoga in the control of diabetes mellitus. Fasting and postprandial blood glucose levels came down significantly. Good glycaemic status can be maintained for long periods of time. There was a lowering of drug requirement and the incidence of acute complications like infection and ketosis was significantly reduced. There were significant changes in the insulin kinetics and those of counter-regulatory hormones like cortisol. There was a decrease in free fatty acids. There was an increase in lean body mass and decrease in body fat percentage. There was an improvement in insulin sensitivity and decline in insulin resistance.

Ahn et al. (2007) examined the effect of a moderate-intensity, walking exercise program on the body composition, blood lipids and psychosocial outcomes in postmenopausal obese women, with a quasi-experimental pre- and post-test design; a total of 36 postmenopausal obese women was recruited in 2 metropolitan areas by convenience sampling. Sixteen women participated in 1 hour of moderate-intensity walking exercise 5 days per week for 3 months and 20 women did not. Cardiovascular risk factors include body composition and blood lipids. Body composition was measured as body mass index, % body fat, and waist/hip ratio; Blood lipids were measured with total cholesterol, triglyceride, HDL and LDL; psychosocial outcomes were evaluated by self-esteem and depression. Over 3 months, the score of self-esteem increased and depression
decreased in the exercise group relative to the control group. However, there were no significant differences in body composition and blood lipids.

**Yang et al. (2007)** determined the effect of yoga interventions on common risk factors of chronic diseases (overweight, hypertension, high glucose level and high cholesterol). A systematic search yielded 32 articles published between 1980 and April 2007. The studies found that yoga interventions are generally effective in reducing body weight, blood pressure, glucose level and high cholesterol, but only a few studies examined long-term adherence.

**Yurtkuran et al. (2007)** evaluated the effects of a yoga-based exercise program on pain, fatigue, sleep disturbance, and biochemical markers in hemodialysis patients. In 2004 a randomized controlled trial was carried out clinically stable hemodialysis patients were included and followed in two groups: the modified yoga-based exercise group and the control group. Yoga-based exercises were done in groups for 30 min/day twice a week for 3 months. All of the patients in the yoga and control groups were given an active range of motion exercises to do for 10 min at home. After a 12-week intervention, significant improvements were seen in the variables: pain, fatigue, sleep disturbance, grip strength, urea, creatinine, alkaline phosphatase, cholesterol, erythrocyte, and hematocrit count; no side-effects were seen. Improvement of the variables in the yoga-based exercise program was found to be superior to that in the control group.
for all the variables except calcium, phosphorus, HDL-cholesterol and triglyceride levels.

Daley et al. (2006) (1) determined the prevalence of using complementary and alternative medicine CAM and non-pharmacological interventions NPI for menopausal symptoms; (2) described the perceived effectiveness of complementary and alternative medicine and non-pharmacological interventions for menopausal symptoms and for symptom management; and (3) investigated lifestyle and demographic factors associated with complementary and alternative medicine/non-pharmacological interventions use among menopausal women with vasomotor symptoms. Women aged 46-55 years were recruited via six socioeconomically diverse general practices. Participants completed a postal questionnaire that contained items relating to demographics, lifestyle factors, weight, height, exercise behavior, menopausal status, vasomotor symptoms and utilization and perceived effectiveness of a range of complementary and alternative medicine/non-pharmacological interventions for symptom management. Of 1,206 women who responded, 563 (47%) were symptomatic. The most commonly used complementary and alternative medicine/non-pharmacological interventions for symptom management were diet/nutrition, exercise/yoga, relaxation/stress management and homeopathic/naturopathic remedies. Of women who used these interventions, large proportions reported them to be helpful. The
characteristics that were independently associated with use of complementary and alternative medicine and non-pharmacological interventions were White ethnicity, being physically active, and not smoking.

Damodaran et al. (2002) studied the effect of yoga on the physiological, psychological well being, psychomotor parameter and modifying cardiovascular risk factors in mild to moderate hypertensive patients. Twenty patients (16 males, 4 females) in the age group of 35 to 55 years with mild to moderate essential hypertension underwent yogic practices daily for one hour for three months. Biochemical, physiological and psychological parameters were studied prior and following period of three months of yoga practices, biochemical parameters included, blood glucose and lipid profile, Results showed decrease in blood pressure and drug score modifying risk factors, i.e. blood glucose, cholesterol and triglycerides decreased overall improvement in subjective well being and quality of life.

Imthurn et al. (2000) opined the most frequent symptoms of the climacteric syndrome are hot flushes. Although usually they disappear after a few years, hot flushes persist for five or more years in a quarter of the affected women. Apart from oestrogen deficiency other diseases should be evaluated as potential causes of hot flushes such as psychosomatic disorders, hyperthyroidism and a neoplasm. The treatment of the first choice is an oestrogen replacement therapy. By assaying a single serum sample for oestradiol an oestrogen
replacement therapy can be monitored reliably only in the case of transdermal application.

Schmidt et.al.(1997) studied the participants of a comprehensive residential three month yoga and meditation training programme living on a low fat lacto-vegetarian diet changes in cardiovascular risk factors and hormones. Substantial risk factor reduction was found. Body mass index, total serum and LDL cholesterol, fibrinogen, and blood pressure were significantly reduced especially in those with elevated levels. Urinary excretion of adrenaline, noradrenaline, dopamine, aldosterone, as well as serum testosterone and luteinizing hormone levels were reduced, while cortisol excretion increased significantly.

Desai et.al.(1990) investigated that twelve normal healthy male subjects showed decrease in blood urea, increase in creatinine and tyrosine after one minute of Kapalabhati, a fast-breathing technique of Hatha Yoga (120 respiratory strokes min.). From biochemical point of view the practice of Kapalabhati seems to promote decarboxylation and oxidation mechanisms due to which quieting of respiratory centres is achieved.

SUMMARY OF THE LITERATURE

The review of the literature helped the investigator to spot out relevant topics and variables. Further the literature helped the
investigator to frame the suitable hypothesis leading to the problems. The latest literature also helped the investigator to support her findings with regard to the problem. Further the literature collected in the study will also help the research scholar understand the problem completely.

The research studies reviewed from many journals available in the websites such as www.pubmed.gov, eric websites etc., employ physiological, psychological and biochemical variables etc., that too at woman at climacteric stage. The research studies were presented with chronological order.

The purpose of the study was to find out the effect of specific yogic exercises and combination of specific yogic exercises with autogenic training on the selected physiological, psychological and bio-chemical variables of the climacteric women.

It is also observed from the review of literature that there is no research study related to combination of specific yogic exercises with autogenic training in climacteric women. This inference has motivated the researcher to attempt a study on specific yogic exercises with and without autogenic training.