Chapter II
Review of Related Literature
Review of related literature is very important and it plays a vital role to understand the problem thoroughly. In the present chapter the investigator has made an attempt to report the literature based upon this study. Aggarwal quotes that in the words of Walter R. Brog “the literature in any field form the foundation upon which all future work will be built”. A study of relevant literature is an essential step to get a full picture of what has been done with regard to the problem.

The related studies pertaining to this research are presented in the following heads:

1. Studies related to walking and health related physical fitness components, kinanthopometric variable, physiological and biochemical variables

2. Studies related to yogic practices and health related physical fitness components, kinanthopometric variable, physiological and biochemical variables.

**Studies related to walking and physical fitness components, kinanthopometric variable, physiological and bio-chemical variables**

Stephen D. Anton, Glenn E. Duncan (2013) conducted In this study, the participants were assigned to one of four exercise prescriptions using a randomized, factorial design, with two levels of intensity (45–55% vs. 65–75% HRres) crossed with two levels of frequency (3–4 vs. 5–7 days/week), controlling for mode of exercise (walking), daily duration (30 min), and setting (home-based). Data were analyzed during the first 6 months of the main study only for participants assigned to the high frequency (5–7
days/week), high intensity condition (65–75% HRres), as this condition allowed for evaluation of the minimum and optimal physical activity levels recommended in the 2008 Physical Activity Guidelines for Americans. Briefly, eligible participants (N= 74; 41 women) met the following inclusion criteria: 30–69 years of age with no major medical conditions, sedentary (< 1 hr of leisure-time physical activity per week), body mass index (BMI; kg/m²) between 19 and 45, and resting blood pressure below 140 mm Hg systolic and 90 mm Hg diastolic. During a baseline testing session, each participant completed a symptom-limited maximal graded exercise test to determine maximum oxygen consumption (VO₂max; ml/min/kg) and maximum heart rate (HRmax) using the Bruce protocol (Bruce, Kusumi, & Hosmer, 1973). All participants repeated the maximal graded exercise test after 6 months of training. Performance during the treadmill test was the basis for determining a participant’s training heart rate zone (THRZ). The Karvonen formula (Guidelines for exercise testing, 1986) was used to calculate HRres (HRres = HRmax - resting HR). The THRZ for all participants was between 65–75% HRres, which corresponded to “fast paced” walking. To assist participants in walking within their prescribed THRZ, they received an HR monitor (Polar Beat; Polar Electro, Inc., Port Washington, NY) and were instructed to wear the monitor and record their most frequently observed HR during each walking bout. All participants were to walk within their individually tailored THRZ for 30 min per day (either in a continuous bout or in up to three bouts, each of at least 10-min duration) for 5–7 days/week. Walking of 75–149 minutes per week (mean = 124 min/wk) was associated with clinically meaningful improvements in cardio respiratory fitness (mean = 9% increase in VO₂max). The majority of participants (68%) who walked at this level achieved significant fitness improvements. Moreover, among participants who accumulated 150 minutes or more per week of fast-paced walking (M= 165 min/week), 73% achieved improvements of >5% in cardio respiratory
fitness. This finding suggests participants who engage in 150 minutes or more of vigorous versus moderate intensity activity will improve their fitness levels to a degree that would be considered clinically significant (>5%). Although it is difficult to know the clinical significance of this finding, a 5% difference in the number of individuals who achieve significant fitness improvements has the potential to be very meaningful on a population level in terms of disease prevention.

Ming-Lang Tseng, Chien-Chang Ho et.al., (2013) conducted a 12-week, randomized controlled trial. Male volunteers aged 18 to 29 years identified as having a body mass index (BMI) of more than or equal to 27kg/m were recruited from the Chung Hua University in Taiwan. 40 subjects who underwent laboratory screening were randomly assigned to an aerobic training group (n=10), resistance-training=10), a combined-exercise-training group(n=10), or a control group(n=10). The exercise programme were conducted at the Fitness Center of Chung Hua University in Taiwan. Each of the sessions included a 10-minutes warm-up/cool down and stretching period. The aerobic-training group performed walking treadmill exercise 60 minutes/day, 5days/week. Heart-rate monitors (Polar Elektor OY, Finland) were used to adjust workload to achieve the target heart rate. The resistance training group performed 60minutes/day,5days/week at 50-60% of 1-repetition maximum (1RM) for three sets (12-15repetitions) during Weeks 1-4,60-70%of1-RM For three sets (10-12repetitions) during weeks5-8, and 70-80% of 1RM for three sets (8-10repetitions) during weeks 9-12. The combined-exercise-training group was separated into aerobic training (3daysof the odd week, 2days of the seven week) and resistance training (2days of the odd week, 3days of the even week). After 12 weeks, bodyweight, BMI, waist circumference, systolic and diastolic blood pressure, fasting glucose, and triglycerides had significantly decreased, and HDL-C, sit-ups, and sit-and-
reach test had significantly increased in the aerobic, resistance, and combined exercise-training groups.

Mahaprasad Ghosh, Moahammed Kamarul Hassan et.al., (2012) conducted a study of walking, yogasanas and combined walking and yogasanas among school boys for 12 weeks. To facilitate the study 60 school boys from Mahodary High School, Birbhum District, West Bengal were randomly selected as subjects and their age between 14 and 16 years. They were assigned into four groups of which one group served as yogic practices group, second group served as walking group, the third group as combined walking and yogic exercise group and the fourth one served as control group. The experimental groups participated in their respective walking, yogic practices and combined walking and yogic practices for a period of six weeks. The training programme was scheduled at 6.30a.m to 7.30 a.m, on week days excluding Sundays. The results of this study proved that comparing with control group the walking group significantly improved the selected physiological variables, resting pulse rate and blood pressure and the physical fitness variable, the cardio respiratory endurance.

Sung, Kiwol, et.al., (2012) conducted a study to examine the effects of a regular walking exercise programme on biochemical (fasting blood glucose [FBG], glycated hemoglobin [HbA1c], total cholesterol, triglycerides [TG], low-density lipoprotein cholesterol, and high-density lipoprotein cholesterol) aspects of elderly people between the age group of 60 to 70 years .The experimental group was subjected to a 6 month walking exercise programme, involving walking exercise three times per week for 50 minutes, and a 4 week education programme on diet control once per week for 20 minutes. Post-test was conducted after 3 and 6 months to examine short-and long-term biochemical effects. The regular walking exercise programme effectively
decreased FBG, HbA1c, and TG levels (biochemical aspects) in elderly people.

Ali Soroush. Cheryl Der Ananian (2012) conducted a study to assess the effects of a six-month pedometer based workplace intervention on changes in resting blood pressure (BP) and cardio respiratory fitness (CRF). A sample of 355 were randomly selected to have changes in their blood pressure and cardio respiratory fitness monitored during the intervention. Pedometers were used to monitor steps taken with a goal of walking more than 10,000 steps/day. Systolic and diastolic BP were taken using an Omron automated BP cuff. Estimated VO$_2$ max was obtained using the Astrand Rhyming Cycle Ergo Meter Test. There were significant changes in systolic and diastolic BP. Age was positively related to initial starting values for systolic and diastolic blood pressure. There was significant change in the estimated VO$_2$ max. The number of steps taken was significantly related to changes in estimated VO$_2$ max.

Lee PH, Nan H et al. (2012) conducted a study to examine the associations between walking (number of steps and minutes spent) and health indicators, including chronic health conditions, depressive symptoms, and blood pressure, among non exercising people who did not regularly engage in any non-walking moderate-to-vigorous physical activity in Hong Kong. Participants (n=2417) whose only form of physical activity was walking were included in the present analysis. Three indicators of walking (number of steps, minutes spent walking at moderate intensity, and minutes spent walking at light intensity) was measured by accelerometer. Associations between these indicators and health conditions were measured by the difference in z scores for those with, and those without, each health condition, adjusted for age and sex. The number of steps per day was significantly and inversely associated with hypertension (difference in z=-0.22, p<0.01), depressive symptoms
(difference in $z=-0.15$, $p<0.01$), health-related quality-of-life (difference in $z=-0.13$, $p<0.05$), and pulse rate (difference in $z=-0.11$, $p<0.01$). By contrast, time spent walking as measured by accelerometer was associated only with a single health indicator (hypertension, difference in $z=-0.14$, $p<0.05$).

Karstoft K, Winding K, et al., (2012) selected subjects with type 2 diabetes were randomized to a control (n = 8), continuous-walking (n = 12), or interval-walking group (n = 12). Training groups were prescribed five sessions per week (60 min/session) and were controlled with an accelerometer and a heart-rate monitor. Continuous walkers performed all training at moderate intensity, whereas interval walkers alternated 3-minutes repetitions at low and high intensity. Before and after the 4-month intervention, the following variables were measured: VO$_2$max, body composition, and glycemic control (fasting glucose, HbA1C, oral glucose tolerance test, and continuous glucose monitoring [CGM]). VO$_2$max increased 16.1 ± 3.7% in the interval-walking group ($P < 0.05$), whereas no changes were observed in the continuous-walking or control group. Body mass and adiposity (fat mass and visceral fat) decreased in the interval-walking group only ($P < 0.05$). Glycemic control (elevated mean CGM glucose levels and increased fasting insulin) worsened in the control group ($P < 0.05$), whereas mean ($P = 0.05$) and maximum ($P < 0.05$) CGM glucose levels decreased in the interval-walking group. The continuous walkers showed no changes in glycemic control.

Fantin F, Rossi. A et al., (2012) conducted a study in 21 community-dwelling women, with and without hypertension, with a mean age of 68.19±5.72 years and a mean BMI of 28.63 ± 4.69. They participated in moderate physical activity sessions for one hour per day and 2 days each week under the supervision of a qualified physical education instructor for a total of 24 weeks. At the beginning of the study, at 3 months and at 6 months,
the study participants' body weight, and body composition were assessed. Total low-density-lipoprotein and high-density lipoprotein cholesterol, triglycerides (TGs), blood pressure (BP) as determined by carotid-femoral and carotid-radial pulse wave velocity (PWVcf, PWVcr), were assessed. A significant decline in PWVcf, even after adjusting for mean arterial pressure, heart rate and triglycerides was observed. In a sub-analysis that examined the effect of physical activity separately in the hypertensive and normotensive subjects, observed a significant decline in PWVcf in the hypertensive subjects and a non-significant tendency in the normotensive subjects. The data showed an association between light aerobic physical activity in the elderly and decreased PWVcf, even after adjusting for changes in systolic BP (SBP), TGs and central adiposity.

Di Raimondo D, Tuttolomondo A. et al., (2012) conducted a study to assess whether fast walking might lead to a different reduction of blood pressure levels in hypertensive patients in relation to different circadian profile of blood pressure. 84 hypertensive patients were selected with evidence of stage I hypertension and non-dipper nocturnal profile. All subjects underwent a six weeks physical intervention based on fast walking, three sessions a week. Main outcome measurements was 24-hour blood pressure levels. After the sixth week of physical exercise there was not any significant change in 24-hour mean systolic blood pressure and diastolic blood pressure when compared to baseline (respectively 143.2±5.2 vs. 141±4.4 and 91.4±4.8 vs. 90.1±2.5); also no differences in heart rate have been found.

Andrea Margaret Mcneillyi, Conor Mcclean (2012) conducted a study to examine the effects of 12-weeks exercise training in obese humans with impaired glucose tolerance (IGT). Eleven participants (6 males and 5 females; 49 ± 9 years; mean Body Mass Index (BMI) 32.4 kg ), completed a 12-week
brisk walking intervention (30 min per day, five days a week, at 65% of age-predicted maximal heart rate (HRmax). Anthropometric measurements and blood pressure (BP) were examined at baseline and post intervention. Fasting blood glucose, glycosylated haemoglobin, insulin, blood lipids, were also determined. Body fat was measured as a percentage of overall body mass using an automated bioelectrical impedance device (Bodystat, UK) according to procedures described by Desport et al. (2003). Systemic arterial blood pressure (BP) was measured in the brachial artery using an Omron M5-1 fully automated BP monitor (Surrey, UK). Plasma glucose concentration was determined by an immobilized enzyme membrane method in conjunction with a Clarke electrode (Dr. Leyland Clark, Ohio, USA) on a YSI 2300 analyser (Yellow Springs, USA). Glycosylated haemoglobin (% HbA1c) was assessed using an Adams A1c HA-8160 analyser (ARKRAY, Japan). Insulin concentration (mIU ml -1) was determined by a commercially available kit, using the Architect TMi optical system (Abbott Laboratories, USA). The coefficient of variations for glucose (CV), glycosylated haemoglobin and insulin were all less than 2%. Total cholesterol, triglycerides and high-density lipoprotein cholesterol (HDL-C) were measured by enzyme assay kits, using an automated analyser (AerosetTM, Abbott Labs, USA). Estimates of low density lipoprotein cholesterol (LDL-C) concentration were calculated using the Friedewald formula (Friedewald, Levy and Fredrickson, 1972) Post intervention, systolic BP (145.4 ± 14.5 vs. 135.8 ± 14.9 mmHg), triglycerides (1.52 ± 0.53 mmol L -1 vs. 1.310.54 mm ± ol L -1), lipid hydroperoxides (1.20+0.47mM L-1 vs. 0.79 ± 0.32mM L -1) and anthropometric measures decreased significantly (P<0.05). Moderate intensity exercise training improves upper limb vascular function in obese humans with IGT, possibly by improving triglyceride metabolism, which may subsequently reduce oxidative stress.
Hornbuckle LM, Liu. P.Y et al. (2012) conducted a study on African-American women. The study's purpose was to evaluate the effects of walking (W) and walking plus resistance training (WRT) on cardiovascular disease risk factors in inactive middle-aged (49.0 ± 5.5 yr) African-American women (body mass index = 34.7 ± 6.4 kg·m⁻²). Body composition, blood pressure, HDL cholesterol, triglycerides, glycosylated hemoglobin (HbA1c) were measured before and after a 12-week exercise intervention. Subjects were randomly assigned to one of two training groups. The W group (n = 25) was instructed to increase daily pedometer-measured walking to ≥10,000 steps per day, whereas the WRT group (n = 19) was given the same walking prescription plus supervised resistance training 2 days per week. Two-way repeated-measures ANOVA with an intention-to-treat analysis was performed to examine changes between groups. Significance was accepted at P ≤ 0.05. WRT significantly decreased total fat mass (42.6 ± 11.1 to 41.8 ± 10.8 kg, P = 0.036) compared with W. WRT also significantly decreased pre- to post intervention body fat (45.8% ± 6.2% to 45.3% ± 6.2%, P = 0.018), HbA1c (5.9% ± 1.2% to 5.6% ± 1.0%, P = 0.028), and mean glucose calculated from HbA1c (122 ± 39 to 114 ± 32 mg·dL⁻¹, P = 0.028), whereas W group showed no changes. Blood pressure, HDL cholesterol, triglycerides were not affected by either intervention.

Pizarro AN, Ribeiro JC et al. (2012) conducted a study on active commuting to/from school, is an important source of physical activity that has been declining over the past years. The aim of this cross sectional study was to examine the lipid profile measurements, blood pressure and waist circumference between active commuting to/from school in 10 to 12 year old children. Participants were 229 adolescents, selected through consecutive sampling, (121 girls) with mean age of 11.65 (±0.73) years old from Porto, Portugal. Means of transport to/from school was accessed by asking: "How do you usually travel to school?" and "How do you usually travel from
school?" Active commuting was considered if children reported at least one of the trips (to or from school) by active means. Total physical activity was obtained with Actigraph accelerometer for 7 consecutive days. Lipid profile measurements were conducted with Cholestech LDX analyser. Waist circumference and blood pressure were measured by standard methods. Adjusted binary logistic regression analysis suggested that walkers have higher odds to have a better waist circumference (OR = 2.64, 95% CI = 1.63-6.01) and better high density lipoprotein cholesterol (OR = 2.14, 95% CI = 1.01-4.52) profiles than non-active commuters.

Lakshminarayanan S, Bala SM (2012) conducted a study to assess the effect of regular brisk walking on blood pressure and blood sugar levels in a rural Indian community. This community-based study was carried out in Periakkattupalayam and Rangareddipalayam in south India, with 485 subjects, aged 20 to 49 years. The study was done in four phases: Awareness campaign, baseline assessment of participants, intervention phase (10 weeks), interim, and final assessment. Brisk walking for 30 minutes on four days / week was promoted by forming 30 small walking groups, in a home-based setting, with professional supervision. Village leaders and self-help group members were the resource people for the promotion of physical activity. Analysis was done by using paired ‘t’ test. This study was effective in significantly decreasing the BP by 1.56 / 0.74 mm Hg, fasting blood sugar levels by 2.82 mg%, body weight by 0.17 kg, and BMI by 0.06 kg / m(2).

Sophie Lalande, Kazunobu Okazaki, et al., (2010) conducted a study to examine the effects of a 3-month interval walking on peak aerobic capacity and cardiovascular risk factors in middle-aged sedentary individuals. Participants were divided into 2 groups: a non-training control group (n = 17) and an interval walking training group (n = 29). Participants in the interval walking training group were instructed to perform 5 or more sets of 3-minutes
low-intensity walking interspersed by 3-minutes of moderate to high-intensity walking (>70% of peak aerobic capacity) on 4 or more days/week. Measurements of peak aerobic capacity, blood pressure, blood lipids, and glucose concentration were performed before and after training. Twenty-six individuals completed the interval walking programme averaging 4 days/week for 34 minutes of which 16 minutes were moderate to high-intensity walking, with a total energy expenditure of 776 kcal week. Three months of interval walking increased peak aerobic capacity (from 20.4 ± 3.0 to 26.0 ± 5.2 mL/kg/min; P< .001) and reduced resting systolic blood pressure (127 ± 11 to 119 ± 11 mm Hg; P=.01). There was an inverse correlation between initial level and training-induced changes in glucose, HbA1c, high-density lipoprotein, and low-density lipoprotein. Conversely, 3 months of non-training did not improve physical fitness or cardiovascular risk factors.

Morton RD, West DJ, (2010) examined the effects of a supervised, heart rate intensity prescribed walking training programme on cardio respiratory fitness and glycemic control in people with type 2 diabetes mellitus. 27 individuals (21 males, 6 females) with type 2 diabetes were randomly assigned to an experimental ("walking") or control group. Participants completed a Balke-Ware test to determine peak heart rate, peak oxygen consumption (VO$_2$-peak), and peak gradient. The walking group then completed a 7-week (four sessions a week) supervised, heart rate prescribed walking training programme, whereas the control group continued daily life. After training, participants completed another Balke-Ware test. Fasting blood glucose and glycosylated hemoglobin were measured at rest. The results showed that walking training elicited 80% (s = 2) of peak heart rate and a rating of perceived exertion of 11 (s = 1). Peak heart rate and VO$_2$-peak were higher in the walking than in the control group after training (P < 0.05). Based on the peak gradient before training, the respiratory exchange ratio was significantly lower (P < 0.05) and there was a strong trend for VO$_2$ (P = 0.09)
and heart rate (P = 0.09) to be lower after training at the same gradient in the walking compared with the control group. These improvements increased walking peak gradient by 5 min (s = 4 min) compared with the control (P < 0.05). There was no change in fasting blood glucose or glycosylated hemoglobin after training. Despite no change in glycemic control, heart rate prescribed walking improved peak and sub-maximal cardio respiratory responses.

Danell J. Haines, Liz Davis, et al.,(2010) conducted a study to evaluate the effectiveness of 12-week walking programme supplemented with a pedometer, computer educational programme, and weekly e-mails. The recruited participants (N= 125) from a large mid western college campus faculty/staff wellness programme and on-campus weight watchers classes. Participants were required to attend a study orientation and to complete consent and health insurance portability and accountability Act (HIPAA) forms, Physical activity readiness questionnaire (PAR-Q), 8 and the Godin leisure time exercise questionnaire 9 to determine their present physical activity status. Participants then underwent biometric tests: finger stick to determine total blood cholesterol and blood glucose, height and weight measurements to determine BMI, and sphygmomanometer and stethoscope measurement to determine blood pressure. Exclusion criteria included symptomatic coronary heart disease, immobility that restricts walking, a current systolic blood pressure higher than 160 mm Hg and a diastolic blood pressure higher than 95 mm Hg, and pregnancy. Of the 125 participants who registered for the programme, 120 were deemed eligible and included. Half (50%) of the participants, noted as graduates, completed the follow-up biometric tests after the 12-week programme, and half did not and were noted as dropouts. Observed differences between baseline and follow-up in BMI (p=.024), blood glucose (p=.06), and total cholesterol (p=.09). The programme had a moderate effect on fitness, health awareness, nutrition, and
health. Blood pressures classified using the DHHS (JNC 7) classification, it is slightly more for the programme dropouts (41.7%) than programme graduates (38.3%). Comparison of participants with stage 1 or 2 hypertension shows that 13.4% of the programme graduates fell into this classification, whereas 21.6% is for the programme dropouts. According to the American Diabetes Association, a person with fasting plasma glucose from 100–125 mg/ml has pre diabetes. Mean blood glucose readings were 96.71 (SD= 17.58) for the program graduates and 106.48 (SD= 26.29) for the program dropouts (p= .371). Overall, baseline total cholesterol readings for graduates and dropouts were normal, with readings of 184.68 mg/ml (SD= 34.74) and 192.02 (SD= 36.94; p= .498), respectively. A pedometer monitored walking programme is one way that a worksite health initiative can improve the health and wellness of its employees and simultaneously reduce health-care costs.

Bemelmans RH, Blommaert PP (2009) conducted a study on the relationship between the walking speed and changes in cardiovascular risk factors during a 12-day walking tour to Santiago de Compostela. The participants were healthy middle-aged men (n=15) and women (n=14). The subjects were walked 281 km of the classical route to Santiago de Compostela in 12 days in 2009. Walking speed was recorded and blood pressure, lipids and glucose were measured every other day. Changes in risk factors were compared between gender-pooled groups with faster and slower walking speed. Second, the relationship between walking speed and changes in risk factors was quantified using a linear mixed effects model. In the faster walking speed (4.6±0.2 km/h) group, high-density lipoprotein cholesterol (HDL-c) increased more than in the slower walking speed (4.1±0.2 km/h) group (difference in change between groups: 0.20; 95% CI -0.02 to 0.42 mmol/l), while low-density lipoprotein cholesterol (LDL-c) and total cholesterol decreased more in the slower walking speed group (differences in changes between groups: LDL-c: -0.50; 95% CI -0.88 to -0.12 mmol/l and
total cholesterol: -0.75; 95% CI -1.19 to -0.31 mmol/l). A 1 km/h higher walking speed was related to an increase in HDL-c (0.24; 95% CI 0.12 to 0.30 mmol/l), LDL-c (0.18; 95% CI -0.16 to 0.42 mmol/l) and total cholesterol (0.36; 95% CI 0.12 to 0.60 mmol/l), adjusted for age, gender, smoking, body mass index and heart rate, during the whole walking tour.

Gurbuz buyukyazil et al., (2008) conducted a study to find out the effects of an 8-week walking programme on serum lipids, in post – menopausal women. 24 subjects were divided equally into two equal groups. Variables are maximal oxygen consumption, systolic and diastolic blood pressures, body weight, cholesterol and low density lipoprotein cholesterol. Exercise group completed an eight week walking programme at moderate speed. However, there were no significant changes in the measured blood lipids (triglyceride, total cholesterol, high density lipoprotein cholesterol, low density lipoprotein cholesterol), of exercise group, There was no significant change in any of the measured parameters in control group. It was concluded that despite its protective effects against coronary heart disease risks, the duration and intensity of this programme is not sufficient to cause significant change in blood lipids.

Swartz and Miller et al (2008) conducted a study to investigate the relationship between objectively determined walking behavior and glucose control among older adults. The average number of steps/day reported by the entire group was 3,939 ± 232 for six months. Data were collected on 142 older adults (age 72.1 ± 9.2 years; 37 males, 105 females). Fasting plasma glucose (FG) was assessed. The result has shown significant decrease in the plasma glucose. This study demonstrated that, walking an additional 0.5-0.75 miles was associated with better glucose control.

Shantha Meena (2007) examined the effect of walking and yogasanas on the selected physiological and biochemical variables of middle aged
women. Thirty middle aged women were selected and first 10 volunteers underwent 12 weeks training programme on yogasanas. The second 10 volunteers underwent training programme on walking for 30 minutes. The third 10 volunteers acted as the control group. The blood cholesterol was assessed before and after the training programme for all the three groups. ANCOVA was used to analyze the data obtained. The results showed that there is greater improvement in cholesterol levels in the experimental groups.

X Guo, Z Jia, et al., (2006) conducted a study to investigate the association between mode of transportation to work and dyslipidaemia. During the period between January and February 2006, telephone interviews were conducted with 2506 randomly selected urban residents aged 18 years or older in the 8 districts of Beijing, using a multiple stratified random sampling technique. Of the selected individuals, 1024 (40.86%) members of the work force were subsequently tested total cholesterol (TC), triglyceride (TG), high-density lipoprotein cholesterol (HDL-C) and low-density lipoprotein cholesterol (LDL-C). Multiple logistic regression modeling was used, adjusted for potential confounders. All completed questionnaires were coded and entered into Epi Data V.3.02 database software (EpiData Association, Odense, Denmark) and used the Kruskal–Walls test to analyse time to and from work, and weekly physical activity time. A binary logistic regression model (p entry = 0.05, p removal = 0.10) was used to estimate prevalence odds ratio (POR) and 95% confidence intervals (95% CI) for comparison of factors associated with dyslipidaemia. The level of significance was defined as p 0.05. BMI was classified into three groups based on the Adult Treatment Panel III (ATPIII) standard, and age was classified into five groups for examining dyslipidaemia of different age levels. All analyses were performed using SPSSV.14.0 (SPSS, Chicago, Illinois, USA) Results shows that probability of dyslipidaemia in workers who travel to work by bus, car or taxi is higher than that of workers who walk to work.
Kevin (2006) conducted a study to evaluate the endurance training has little effect on active muscle free fat acid (FFA), lipoprotein cholesterol or triglyceride net balances. 8 sedentary men (26±1 year, 77.4±3.7 kg) were studied in the postparandial state during 90 minutes of rest and 60 minutes of exercise twice before (45% and 65% VO$_2$ peak) and twice after nine weeks of endurance training (55% and 65% VO$_2$peak). Measurements across an exercising leg were taken to be a surrogate for active skeletal muscle. To determine limb lipid exchange, femoral arterial and venous blood samples drawn simultaneously at rest and during exercise were analyzed for total and individual FFA, HDL-C, LDL-C and triglyceride concentrations, and limb blood flow was determined by thermo dilution. The transition from rest to exercise resulted in a shift from net leg total FFA release (-44-16 mol/min) to uptake (193-49 mol/min) that was unaffected by either exercise intensity or endurance training. The relative net leg rerelease and uptake of individual FFA closely resembled their relative abundances in the plasma with 21 and 41% of net leg total FFA uptake during exercise accounted for by palmitate and oleate, respectively. Endurance training resulted in significant changes in arterial concentrations of HDL-C and LDL-C but there was no net triglyceride or LDL-C or HDL-C release across the resting or active leg before or after endurance training. It was concluded that, endurance training favorably affects blood lipoprotein profiles, even in young, healthy normolipidemic men, but muscle contractions perse have little effect on net leg LDL-C, OR TG uptake or HDL-C release during moderate-intensity cycling exercise. Therefore, the favourable effects of physical activity on the lipid profiles of young, healthy, normolipidemic men in the postprandial state were not attributable to changes in HDL-C or LDL-C exchange across active skeleton muscles.

George A, Kelley, DA; Kristi S, Kelley (2005) the purpose of the study was to use the meta-analytic approach to examine the effects of walking on
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non-HDL-C in adults. Twenty-two randomized controlled trials representing 30 outcomes from 948 subjects (573exercise, 375control) met our inclusion criteria. Across all designs and categories, random effects modeling resulted in a significantly greater decrease in the walking group when compared with the control group of approximately 4% for non-HDL-C (x± standard error of the mean, 5.6±1.8mg/dL, 95% confidence interval, -8.8 to -2.4mg/dL). Meta-regression showed a statistically significant association between changes in non-HDL-C and the year of publication, with greater reductions associated with more recent publication year. The results of this meta-analytic review suggest that walking reduces non-HDL-C in adult humans.

Jogeswar (2005) assessed the effects of brisk walking on selected physical fitness variables of diabetic patients. Randomly selected 60 subjects were divided into control and experimental groups, (30 in each) group. 16 weeks brisk walking was given to experimental group and along with regular treatment. The control group received regular medical treatment. At the end of the 16 weeks, a post test was conducted and the data was analyzed by computing ANCOVA. Findings revealed significant increase in cardiovascular endurance, right shoulder flexibility, left shoulder flexibility and trunk and hip flexibility.

German H. Rodriguez, and Zehra Siddiqui (2003) conducted a study with a sample of 6088 participants. The participants were included in the longitudinal analysis during the period from 2001-2003. A self-administered questionnaire was used to assess the physical activity (PA) habits of those interviewed. Physical activity was divided into leisure time physical activity (LTPA), jogging, and walking habits. LTPA was classified into four group types: 1) sedentary, 2) light (PA), 3) moderate PA, and 4) high PA. Walking was divided into three categories depending on the hours per day (0-0.5, 0.5-1, and > 1). Walking and jogging speeds were categorized as slow, average,
fast, and very fast. Each person self-reported the amount of activity and the intensity of this activity. Central obesity, triglycerides, HDL, blood pressure and non-fasting glucose were tested. Data were compared across groups using one-way analysis of variance. Association between exercise volume and intensity the prevalence of central obesity, triglycerides, HDL, blood pressure and non-fasting glucose in the sedentary group was 31% (odds ratio [OR] 0.66; 95% confidence interval [CI] 0.55-0.80; P< 0.001) as compared to 10.9% (OR 0.37; CI 0.19-0.73; P< 0.001) in the group with a high level of LTPA. In men, the corresponding values were 36.8% (OR 0.72; CI 0.59-0.88; P< 0.001) and 13.9% (OR 0.38; CI 0.25-0.59; P< 0.001). This potentially demonstrates a clear association between a higher intensity of LTPA and decreased central obesity, triglycerides, blood pressure and non-fasting glucose and high level of HDL.

Y. Fujini et al., (2002) designed a study on walking exercise and its relationship to serum lipids in Japanese. This study sought to investigate the effects of walking on serum lipids among the middle aged and elderly. The subject group included 3312 adults Japanese who underwent routine health examination at Yukuhashi city, Fukuoka. The amount of walking in which the subjects engaged and other lifestyle characteristics were examined by a self reported questionnaire. Analyses of variance were performed to calculate adjusted means of total cholesterol, HDL cholesterol, triglyceride, and LDL cholesterol using walking time as the level of a factor. Multiple logistic regression analysis were also performed to estimate odds ratios and 95% confidence intervals for unfavorable lipid profiles. For both sexes, the adjusted mean for total and LDL cholesterol was higher in individuals who walked than in those who did not walk, and also individuals who walked had higher odds ratios for higher total cholesterol levels than those who did not walk. For men the adjusted mean for HDL cholesterol was higher in individuals who walked than in those who did not walk. No significant
difference was observed in triglyceride or the ratio of total cholesterol to HDL cholesterol between individuals who walked and those who did not walk.

Sugiura et al., (2002) examined the effect of long term moderate exercise and increase in number of daily steps on serum lipids in women. The subjects (40-60 years of age) were randomly divided into an exercise group (n=14) and a controlled group (n=13). The women in the exercise group were asked to participate in a 90-minute physical education class once a week and to record their daily steps as measured by a pedometer for 24 months. The results of mean of daily steps were significantly higher in the exercise group from about 6800 to over 8500 steps (p<0.01). In the control group the number of daily steps ranged from 5700 to 6800 steps throughout the follow up period. A significant interaction between the exercise group in the changes of total cholesterol (TC), high density lipoprotein cholesterol (HDL-C) and TC:HDL-C ratio were observed (p<0.05). By multiple regression analysis, the number of daily steps was related to HDL-C levels after 24 months, and the change in TC and HDL-C concentrations. It was concluded that daily exercise as well as increasing the number of daily steps can improve the profile of serum lipids.

Asikainen et al., (2002) conducted a study on walking trails in postmenopausal women: effects of one verses two daily bouts on aerobic fitness. The purpose of the study was to find out the effects of one verses two daily bouts of walking on aerobic fitness and body composition in postmenopausal women. One hundred and thirty subjects were randomized into exercise group or a control group. The subjects walked five days per week for fifteen weeks at 65% of their maximal aerobic power expending 300kcal in exercise in one group (group S1) or two daily sessions (group S2). VO2 max was measured in a direct maximal treadmill test. Body max index (BMI) calculated and the percentage of body fat (fat%) estimated using
skin fold measurements. The net change in VO$_2$max was 2.5 ml min/kg (95% CI 1.5, 3.5) (8.7%) in group SI and 2.5 ml min/kg (95% CI 1.5, 3.5) (8.8%) in group S2. The net change in body mass was -1.2 kg (95% CI 1.9, -0.5) in group SI and -1.1 kg (95% CI 1.8, -0.4) in group S2. The net fat % change was -2.1% (95% CI 2.7, -1.4) in group SI and -1.7% (95% CI 2.3, -1.0) in group S2. Exercise improved the maximal aerobic power and body composition equally when walking was performed in one or two daily bouts.

Tomas Fritz and Urban Rosenqvist (2001) conducted a study to determine the immediate effect of walking on blood glucose levels in type 2 diabetes patients. Thirty-nine persons with type 2 diabetes, aged 63 were selected from Krokom in the north of Sweden. Participating patients walked for half an hour on one occasion and on another day they remained physically inactive for half an hour. The two test situations were performed in the afternoon. The participants were asked not to eat 2 hours prior to arriving. Blood glucose was measured before and after walking and resting. The difference between post-rest and post-walk decline was statistically significant when tested by paired t-test (p<0.001).

Cooper et al., (2000) conducted a study on the magnitude of blood pressure response to a programme of moderate intensity exercise. Randomized controlled trial among sedentary adults with unmedicated hypertension was conducted. Current guidelines for the management of hypertension recommend regular, moderate intensity aerobic exercise such as brisk walking as a means of blood pressure reduction. To investigate the effect of a six week programme of moderate intensity exercise on day time ambulatory blood pressure (10:00 to 10:00 pm) among unmedicated, sedentary adults aged 25 to 35 years with office blood pressure of 150 mmHg to 180 mmHg systolic and 90 mmHg to 110 mmHg diastolic. The participants carried out thirty minutes of moderate intensity exercise (brisk walking or equivalent)
five days per week for six weeks compared with controls who maintained existing levels of physical activity. The results show that the net hypotensive effect was not statistically significant (systolic = -3.4 mmHg, 95% CI = -7.4 to 0.6; diastolic = -2.8 mmHg, 95% CI = -5.8 to 0.2). Adjusting for baseline difference in mean ambulatory blood pressure in an analysis of covariance led to a reduction in the estimated magnitude of the effect (systolic = -1.9 mmHg, 95% CI = -5.4 to 1.7, p = 0.31; diastolic = -2.2 mmHg, 95% CI = -4.9 to 0.5, p = 0.11). Despite high compliance with the exercise programme, the magnitude of the hypotensive effect of moderate intensity exercise was not as great as that found in studies of higher intensity exercise among hypertensives. Expectations of general practitioners and patients that a programme of moderate intensity exercise will lead to a clinically important reduction in the individual’s blood pressure are unlikely to be released.

Martin, Dubbert, and Cushman (1999) conducted a study on controlled trials of aerobic exercise in hypertension. To determine the antihypertensive efficacy of aerobic exercise training in mild essential hypertension, a prospective randomized controlled trial was conducted comparing an aerobic exercise regimen to a placebo exercise regimen, with a crossover replication of the aerobic regimen in the placebo exercise group. The study took place in an outpatient research clinic in a university affiliated medical center. Twenty-seven men with untreated diastolic blood pressure (DBP) of 90 to 104 mm Hg were randomized to the two exercise regimens. Ten patients completed the aerobic regimen. Nine patients completed the control regimen, seven of whom subsequently entered and completed the aerobic regime. The aerobic regimen consisted of walking, jogging and stationary bicycling, or any combination of these activities for 30 minutes, four times a week at 65-80% maximal heart rate. The control regimen consisted of slow calisthenics and stretching for the same duration and frequency but maintaining less than 60% maximal heart rate. DBP decreased 9.6+/-4.7 mmHg in the aerobic exercise group but
increased 0.8+/−6.2 mmHg in the placebo control exercise group (p=0.02). Systolic blood pressure decreased 6.4+/−9.1 mmHg in the aerobic group and increased 0.9+/−9.7 mmHg in the control group (p=0.11). Subsequently, seven of the nine controls entered a treatment crossover and completed the aerobic regimen with significant reduction in both DBP (-6.1+/−3.2 mmHg, m p <0.01) and SBD (-8.1+/−5.7 mmHg, p<0.01). BP changes were not associated with any significant changes in weight, body fat, urinary electrolytes, or resting heart rate. This randomized controlled trial provides evidence for the independent BP lowering effect of aerobic exercise in unmedicated mildly hypertensive men.

Mooneyhan, et al (1999) conducted a study on the effects of frequency and duration of Physical Education programme on the health related physical fitness of sixth graders. The purpose of this investigation was to determine the effect that the number of weekly physical education lessons and the number of minutes of physical education per week and health-related fitness of sixth grade children. Seven hundred eighty nine sixth grade children (boys 409 girls 380) participated in the study. All were participants in the Fit for Life (Brynteson, Barber, Gain and Adams, 1991) project that includes fitness testing at the beginning and end of the student’s sixth grade year. The fitness levels of each child were determined using the procedures and criteria established by the Physical Best Health Assessment (Mc Swegin, Pemberton, Petray, and Going, 1989) Fitness items included, cardio-vascular fitness (1 mile walk/run test), body composition (skin fold test), muscular strength (pull-ups test), muscular endurance (sit-ups test), and flexibility (sit-and-reach test). Using walk as a criterion, multivariate analysis of covariance indicated significant differences in both frequency and duration of physical education programme. Subsequent unvaried analysis based on frequency revealed significant differences in flexibility, aerobic capacity, muscular strength, muscular endurance, and body composition.
Walker, Karen Z, L Sunil Piers et al (1999) conducted a study to examine the impact of a 12-week walking programme on body composition and risk factors for cardiovascular disease in women with type 2 diabetes and in normoglycemic women. There were 11 women with type 2 diabetes and 20 normoglycemic women of similar age and BMI who were asked to walk one hour per day on 5 days each week for 12 weeks. Fitness (estimated VO$_{2\text{max}}$) was assessed with a 1.6-km walking test; body composition was measured by dual-energy X-ray absorptiometry, metabolic and lipid concentrations were measured in serum. After 12 weeks, estimated VO$_{2\text{max}}$ improved in both groups (P < 0.005). In the diabetic women, BMI and fat content of the upper body and android waist region decreased (P < 0.05). Concentrations of fasting blood glucose (P < 0.05) HbAlc (P < 0.05), total cholesterol (P < 0.005), and LDL cholesterol (P < 0.05) decreased, while HDL cholesterol and sex hormones were unchanged. In contrast, normoglycemic women failed to lose body fat after 12 weeks of exercise in a walking programme. However, their HbAlc, total cholesterol, LDL cholesterol, sex hormone-binding globulin, and total testosterone concentrations decreased (P < 0.05).

K. Woolf-May, E.M. Kearney et al., (1997) conducted a study on the effect of two different 18-week walking programme on aerobic fitness and selected blood lipids. Forty-nine previously sedentary or low active individuals aged 40± 7 years were allocated to three groups. The long walking group participated in an 18-week walking programme which consisted of walks lasting 20 to 40 minutes; the repetitive short walking group completed walks of between 10 and 15 minutes, up to three times a day, with not less than 120 minutes between each walk; and the control group maintained their low level of activity. The results showed a statistically significant reduction in heart rate during a standardized step test (pre- Vs post-intervention) in both walking groups, indicating an improvement in aerobic fitness compared
with the controls post-intervention, the walking groups showed no statistically significant changes in blood lipid of the walking groups.

Alpert et al., (1990) had investigated the effects of aerobic walking on a sample of 24 preschoolers. Thirty minutes of walking were provided daily for a period of 8 weeks for a group of 12 children while the remaining 12 children engaged in free play on the school playground. The children were given pretests and posttests on the following measures: a sub maximal exercise test on a pediatric bicycle, an agility test, a health knowledge test, and an observational measure of their Gross-Health activity. The results showed that the walking group has decreased the heart rate and improved the agility and cardiovascular fitness.

**Studies Related to Yogic Practices and physical fitness components, kinanthropometric variable, physiological and bio-chemical variables.**

M. Sathish (2013) conducted a study to find out the effect of yogasana practice on physical fitness variables among college obese students. As the study is intended to focus mainly on the impact of asana practice, forty male obese students between the age group of seventeen to twenty-five years, from Rama Krishna Mission Vidyalaya College of Arts and Science, Periyanaiickenpalayam, Coimbatore, Tamilnadu, were selected as subjects for this study. The subjects were divided into two groups namely control group and experimental group. The experimental group underwent the asana practices for six weeks, five days in a week from 6.00 am to 7.00 am. The control group did not do any training programme. The pre and post –test were conducted to find out the difference. Cooper’s Run / Walk test was conducted to assess the cardio respiratory endurance and sit and reach test was conducted to assess the flexibility of low back and posterior thigh. The pre and post means of each group’s t test were used to find out significant difference between the control and the experimental groups. The obtained ‘t’
ratio was 2.43, and 12.88 is higher than the table value. The required table value is 2.09. The study showed that there was significant improvement in the yogasana practice in physical fitness variables such as cardio respiratory endurance, and flexibility of college obese students.

R. Narayanasamy, Dr. V. Jayanthi, et al., (2012) conducted a study to find out the effect of isolated and combined treadmill and yogic exercises on muscular endurance and flexibility. For this purpose, forty sedentary middle aged men with age group of 35 to 40 years, around Annamalainagar, Chidambaram, Tamilnadu, were selected as subjects. They were divided into four equal groups, each group consisted of ten subjects, in which group – I underwent treadmill exercise (walking), group – II underwent yogic exercises, group – III underwent combined treadmill and yogic exercises and group – IV acted as control group. The training period for this study was five days in a week for twelve weeks. Prior to and after the training period, the subjects were tested for leg strength, muscular endurance and flexibility. The selected criterion variables, such as, muscular endurance and flexibility, were tested by administering sit-ups and sit and reach test. Analysis of Covariance (ANCOVA) was applied as statistical tool. Whenever the posttest mean found significant, the Scheffé S was applied as post-hoc test. The table value required for significance at .05 level with df 3 and 37 and 3 and 36 are 2.85 and 3.8 . The ‘F’ value of muscular strength and flexibility are 28.427 and 10.61 respectively. The results of the study showed that there was significant difference among treadmill exercise group, yoga exercise group, combined treadmill and yoga exercise group and control group on muscular endurance and flexibility.

Abel AN, Lloyd LK, Williams JS (2012) conducted a cross-sectional study to describe the resting heart rate, blood pressure, lung function and aerobic fitness characteristics of long-term yoga practitioners. A secondary
purpose was to examine the relationship between previous yoga experience and these physiological measures. Thirty-one yoga practitioners were placed into 2 groups according to years of experience (low = <3 months and high =1 yr). All subjects completed a battery of tests to measure resting blood pressure and heart rate, pulmonary flow rates and capacities, and aerobic fitness. After 10 minutes of rest (while in the seated position), resting BP (Baumanometer, Standby Model) and resting HR (Polar Heart Rate Monitor, Model FT4), Pulmonary flow rates and capacities were measured with a hand-held pneumotach and custom spirometry software (True One, Parvomedics). The prediction equations provided by Crapo, Morris, and Gardener (4) were used for analysis Unpaired t-tests demonstrated no significant differences between the two groups in any of the measured variables. A significant but weak correlation was detected between yoga experience and both percentage of predicted forced vital capacity (r = 0.38, P<0.05) and forced expiratory volume in the first second (r = 0.37, P<0.05). These results suggest that this form of yoga training does not provide an adequate stimulus to alter resting hemodynamics, pulmonary function or aerobic fitness.

M.G. Saravanan Dr. S. Chidambara Raj (2012) conducted a study to find out the effect of yogic practices and aerobic exercise on vital capacity and blood pressure. Thirty school aged boys with age between 15 and 17 years were selected for the study. They were divided into three equal groups, each group consisted of ten subjects, in which group I underwent yogic practice and group II underwent aerobic exercise, five days per week for twelve weeks and group III acted as control, who did not participate in any training. The subjects were tested on selected criterion variables such as vital capacity, systolic and diastolic blood pressure at prior to and immediately after the training period. Vital capacity was assessed by using wet spirometer. Blood pressure was measured with the help of sphygmomanometer. Analysis of covariance (ANCOVA) was used to find out the significant difference if
any, between the experimental groups and control group on selected criterion variables separately. Since, there were three groups were involved. The adjusted post-test mean difference in vital capacity between yogic practice group and aerobic exercise group (0.071), and yogic practice group and control group (0.107) and aerobic exercise group and control group (0.178), were significant at .05 level of confidence. The adjusted post-test mean difference in systolic blood pressure between yogic practice group and control group (4.742) and aerobic exercise group and control group (5.009) were significant at 0.05 level of confidence. But there was no significant difference between yogic practice group and aerobic exercise groups (0.07) on systolic blood pressure after the training programme. The adjusted post-test mean difference in diastolic blood pressure between yogic practice group and aerobic exercise groups (1.287), yogic practice group and control group (1.713) and aerobic exercise group and control group (3.00), were significant at .05 level of confidence. The results showed that the selected criterion variables such as vital capacity was improved significantly for both the training groups when compared with the control group and the systolic and diastolic blood pressure were reduced significantly for yogic practice group and aerobic exercise group. But there was no significant difference was found between the training groups on selected criterion variables.

Gabriel A. Carranque, Enrique F. et.al (2012) conducted a study to examine the effects of long-term yoga practice on blood parameters. Twenty-six healthy volunteers of whom sixteen were advanced practitioners of yoga took part in the study. The remaining ten participants were not practitioners and constituted the control group. Blood samples were taken to determine the following hematological parameters. Hemoglobin, platelets and erythrocyte sedimentation rate; and biochemical parameters: renal and hepatic profile, glucose, uric acid, total protein and albumin. The Mann-Whitney U test was performed to ascertain the statistical analysis. The experimental group showed
higher hemoglobin levels (p>0.01) and erythrocyte sedimentation rate (p>0.01) and lower albumin levels (p>0.05). The regular practice of yoga brings about changes in basic hematological parameters.

Malhotra V, Singh .S., et.al.(2010) fifty six patients of type 2 diabetes mellitus (NIDDM), in the age group of 30 – 60 years, were selected. The yogasanas regime included the suryanamkar tadasan, thrikonasan, padmasan pranayam, paschimottansan ardhmatsyendrasan, shavasan, pavanmukthasan, sarpasan and shavasan. The yoga exercises were performed for 30-40 minutes every day for 40 days. The blood glucose, serum insulin, lipid profile, body mass index and cardiac function were measured before and after 40 days of the yogic regime. Another group of 50 type 2 diabetes subjects of comparable age and severity, called as the control group, were kept on light physical exercises like walking. Their basal and post 40 days parameters were recorded for comparison. There was a reduction in the weight and even in the distribution of fat in the body space, as shown by a significant decrease in the waist to hip ratio in NIDDM patients on yogasanas. There was significant reduction in the fasting blood glucose levels total cholesterol, triglyceride, LDL and VLDL cholesterol and found that there was almost no effect in high density lipoprotein cholesterol.(HDL) levels from 43.8 ± 2.6 mg / dl to40.7 ± 1.9 mg / dl, which was insignificant at p value > 0.05.

Narra Srinivas, Dr.S.Chan Basha et al., (2010) conducted a study to assess significant changes on the physical, physiological and bio-chemical variables due to yogasanas and aerobic intervention. Forty five forestry graduates were selected randomly from the group of eighty. The subjects’ age ranged from 18 years to 23 years. The subjects were fully residential and hence there was no difference in their feeding habits and life pattern and hence were considered as a homogeneous group. The selected subjects
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(N=45) were divided into three groups equally and randomly. Of which experimental group -I underwent yogasanas training, experimental group -II underwent aerobics training and group- III acted as control group. All the two experimental groups were treated with their respective training for one and half hour per day for three days a week for a period of sixteen weeks. The physical fitness variables like abdominal strength, shoulder strength and flexibility, the physiological variables like resting heart rate, diastolic blood pressure and oxygen consumption (VO$_2$max) and the bio-chemical variables, like blood cholesterol, low density lipoprotein cholesterol, high density lipoprotein cholesterol, and triglycerides were assessed. The criterion measures to assess the physical fitness variables are bent knee sit ups (to assess abdominal strength), pull ups (to assess Shoulder strength), sit and reach test (to assess flexibility) the cognitive measures for physiological variables are pulse count (to assess resting heart rate), sphygmanometer(for diastolic blood pressure), running on treadmill and using benedict roth spiro meter (oxygen consumption (VO$_2$max) and blood test was conducted to assess the blood cholesterol, low density lipoprotein cholesterol, high density lipoprotein cholesterol, and triglycerides. The results shows that the yogasanas and aerobic trainings have highly effective in the improvement of abdominal strength, shoulder strength, and flexibility when compared to the control group. significant improvements were found in the yogasanas and aerobic training groups when compared to the control group towards improving the selected criterion variables viz., resting heart rate, diastolic blood pressure and oxygen consumption (VO$_2$max). Significant improvements were found between yogasanas and aerobic training groups when compared to the control group towards improving the selected criterion variables such as blood cholesterol, low density lipoprotein cholesterol. High density lipoprotein cholesterol, and triglycerides. It is found that the yoga
training group is found to be better than the aerobic training in improving the resting heart rate, diastolic blood pressure, oxygen consumption (VO₂ max).

Selvam. D (2008) conducted a study to find out the effect of yogasana practice on cardio respiratory endurance and percentage of body fat among obese college women. To achieve the purpose of this study 40 college obese women who were studying in various colleges of Salem district during the academic year 2007-2008 were randomly selected as subjects. The age of the subjects were ranged from 17-25 years. The selected subjects were divided into two groups of twenty subjects each. Group-I considered as experimental group who underwent yogasanas practice for twelve weeks and group-II considered as control group. Cardio respiratory endurance and percentage of body fat were selected as dependent variables. The experimental group underwent yogasanas practice for 6 days per week for 12 weeks. On every day of the training session the yogasanas were practiced approximately 45 minutes. The control group did not participate in any special training programme. The data were collected on selected criterion variables such as cardio respiratory endurance and percentage of body fat were measured by using Cooper’s 12 min run/walk test and skin fold caliper test at before and after the twelve weeks of yogasanas practice as pre and post test. Analysis of covariance (ANACOVA) was applied to find out significant difference if any between the experimental and control group as a result of twelve weeks of yogasanas practice. The ‘F’ value for the cardio respiratory endurance and for the body fat is 348.15 and 130.52 respectively. (The table values required for significance at 0.05 level of confidence for 1 and 38 & 1 and 37 are 4.096 and 4.104 respectively). The results shows that there was significant improvement in cardio respiratory fitness and significant reduction in body fat due to yoga intervention.
Rube Jesintha and John Parthiban (2007) studied the influence of yogic practices on resting pulse rate and cardio respiratory endurance of school kho kho players. For the study 32 school girls who were studying in government higher secondary school in Kalanivasal, Pudukkottai district, Tamilnadu, India., were selected as randomly and assigned to two groups. group I underwent yogic practices (n=16) and group II (n=16) acted as control group. The data collected from the groups were statistically analysed with analysis of covariance (ANCOVA). Resting pulse rate and cardio respiratory endurance showed significant difference between the groups.

Padmadevi (2007) investigated the effects of yogic practices, physical exercises and combination of both the trainings on selected physiological and psychological variables of college girls. The resting pulse rate, cardio respiratory endurance and breath holding time as physiological variables and anxiety, aggression, achievement motivation and self confidence as psychological variables. A hundred and twenty college women students were selected as subjects at random and their age ranged from 17 to 21 years. Further, they were divided into four equal groups and the treatment was given as follows. Group I- physical training, group II–yogic practices, group III- combination of both the training, and group IV- control group. Pre test was conducted for the entire four groups prior to the training and the post test was conducted after six weeks of experimental treatment. Analysis of covariance was used to find out the significant effects of the treatment groups. It was concluded that combination of both trainings improved all the variables.

Murugesan Raghavan,G., et al., (2007) studied the effect of selected yogasanas on muscular strength among higher secondary school boys. Subjects were forty higher secondary school boys from K.V.R.Higher Secondary School, Virudhunagar, Tamilnadu. They were divided into two
groups as experimental group and control group to test the muscular strength and the hip flexibility. Sit and reach and Push-ups tests were administered at the beginning and end of six weeks experimental treatment respectively. It was found that there was significant difference in muscular strength and the hip flexibility between experimental group and the control group.

Ramesh, et.al., (2007) investigated the effect of selected yogasanas and pranayama on selected physical and physiological variable of school boys. Agility, flexibility, systolic blood pressure, diastolic blood pressure and pulse rate were selected as variables of the study. 30 school boys were selected randomly as subjects. Their ages ranged from 12-15 years. They were divided into two equal groups and assigned an experimental and control groups. The changes in the selected parameters were attributed to the regular practice of yogasana and and pranayama training. The results indicated significant increases in efficiency of selected variables during eight weeks of training.

Samsudeen and Kalidasan (2007) investigated the influences of game specific field training and yogic practices on physical, physiological, psychological and performance variables among college level cricketers. Four matched group each having sixteen boys of 18 to 25 years of age served as subjects. Group - I involved in game-specific field training, group - II was given game specific field training combined with yogic practices, group III underwent yogic practices alone and group IV (control) was not exposed to any specific training or conditioning. The training was administered for a period of twelve weeks, six days a week, two sessions each day and each game specific field training session lasted two hours. Yogic practices were melted out for 45 minutes to groups I and III. Flexibility, endurance, resting pulse rate, breath holding time, sports competitive anxiety, self confidence, and technical skill level
were selected as parameters for the study. The standardized test was administered before and after the experimental treatment for all parameters barring technical skill. Analysis of covariance was used to analyze the collected data. The results indicated that the training groups- I and II produced positive impact on all the selected parameters. The analysis also reveals that game-specific field training combined with yogic practices (Group II) showed significant improvement on all selected parameters among cricket players.

Badr Aljasir (2007) conducted a study on yoga practice for the management of Type II diabetes mellitus in adults. The effect of practicing yoga for the management of type II diabetes was assessed in this systematic review through searching related electronic databases and the grey literature to the end of May 2007 using Ovid. All randomized controlled clinical trials (RCTs) comparing yoga practice with other type of intervention or with regular practice of both, were included regardless of language or type of publication. Each study was assessed for quality by two independent reviewers. Mean difference was used for summarizing the effect of each study outcomes with 95% confidence intervals. Publication bias was assessed by statistical methods. Five trials with 363 participants met the inclusion criteria with medium to high risk of bias and different interventions characteristics. The study results showed improvement in outcomes among patients with diabetes type II. These improvements were mainly among short term or immediate diabetes outcomes and non all were statistically significant. The results were inconclusive and non significant for the long term outcomes. No adverse effects were reported in any of the included studies. Short-term benefits for patients with diabetes may be achieved from practicing yoga.
Parthiban (2007) conducted a study on the effect of yogic technique on blood pressure. Twenty women were selected randomly between the age group of 40-55 years. They were treated as experimental group, they underwent yogic technique five days a week, for six weeks. Data were collected before and after yogic technique. The significance of the difference among the means of experimental group was found out by pre test and post test. The data were analyzed and dependent ‘t’ test was used with 0.05 level. The ‘t’ ratio for systolic blood pressure and diastolic blood pressure was significant and the improvement was due to the effect of yogic techniques.

Kyeongra Yang (2007) conducted a study on yoga programme for four leading risk factors of chronic diseases. The purpose of this study was to review published studies using yoga programmes as and to determine 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 2007. This study found that yoga interventions are generally effective in reducing body weight, blood pressure, glucose level and high cholesterol.

Ali and colleagues (2007) conducted a study on mind-body practices for hypertension. The participants in these trials were men and women, greater than 18 years of age with hypertension defined as a systolic blood pressure of greater than 140 mm Hg and diastolic pressure greater than 90 mm Hg. The types of intervention undertaken by the study, participants were mind-body techniques with greatest rates of utilization being meditation, yoga and guided imagery techniques. The absolute reduction in diastolic blood pressure found in yoga intervention.

Prasad et al., (2006) investigated the impact of pranayama and yoga on lipid profile in normal healthy volunteers. The present study was
conducted on normal healthy volunteers, 41 men and 23 women, to evaluate the Impact of pranayama and yogasanas on lipid profiles and free fatty acids in two stages. In stage I, pranayama was taught for 30 days and in stage II yogic practices were added to pranayama for another 60 days. A significant reduction was observed in triglycerides, free fatty acids and VLDL cholesterol in men and free fatty acids alone were reduced in women at the end of stage I. Significant elevation of HDL cholesterol was seen only in the men at the end of stage I. At the end of stage-II, free fatty acids increased in both men and women, and women demonstrated a significant fall in serum cholesterol, triglycerides, LDL and VLDL cholesterol. The results indicated that HDL cholesterol was elevated for men with pranayama, while triglycerides and LDL cholesterol decreased in women after yoga asanas.

Johnson Premkumar and Mariayyah (2006) analysed the effect of selected yogic practices and physical exercises in amplifying the cardio respiratory endurance among the residential male college students. With the assistance and help of the experts in the field of yoga, sports and previous researches on these areas, a comprehensive and suitable yoga package and a physical exercise package was evolved. Sixty residential male college students were selected at random and divided into three groups of twenty each namely, Group A, Group B and group C. The first two groups are experimental groups and the third group is a control group. The experimental group A underwent a designed yogic practices training for three months and similarly the group B was treated with designed physical exercises. The control group (group C) did not undergo any special training. The status of cardio respiratory endurance of all the groups was measured through Cooper’s 12 Minutes run/walk test and was recorded as initial scores. The same test was administered after three months of specific training and was recorded as the post test. The obtained pre test and post test
were analysed by using analysis of covariance for significant improvements. Post-hoc test was applied to find out the better group among the three. The designed training package was suitable and made positive training impacts on cardio respiratory endurance among the subjects at various levels.

Sakthi Gnanavel and Buvaneswari (2006) investigated the effects of selected psycho-physiological variables of working women. Fifteen normal female volunteers had undergone eight week training programme on asanas, pranayama and meditation. The psychological parameters (personal stress and health systems) and physiological parameters (pulse rate and heart rate) were taken before and after the yoga practice programme. The results showed that there is greater improvement in all aspects of experimental group than the control group.

Uthirapathy (2005) examined the effect of training in yogic practices and aerobic exercises on stress hormone, circulatory and metabolic responses among college players. 45 over stressed subjects were selected randomly for the study. They were divided into three groups namely control group, aerobic exercises group and yogic practice group respectively for an experimental period 12 weeks, six days a week and control group was not given any sort of special training. The training effect of yogic practices had better influence on resting heart rate, systolic blood pressure, diastolic blood pressure, blood sugar and serum cholesterol level.

Bijlani RL. et al. (2005) done a research on “A Brief but Comprehensive Lifestyle Education Program Based on Yoga Reduces Risk Factors for Cardiovascular Disease and Diabetes Mellitus”. The study contains the following. Objectives: The objective of the study was to study the short-term impact of a brief lifestyle intervention based on yoga on some of the biochemical indicators of risk for cardiovascular disease and diabetes mellitus. The variables of interest were measured at the beginning (day 1) and
end (day 10) of the intervention using a pre-post design. Setting: The study is the result of operational research carried out in our Integral Health Clinic (IHC). The IHC is an outpatient facility which conducts 8-day lifestyle modification programmes based on yoga for prevention and management of chronic disease. A new course begins every alternate week of the year. The study was based on data collected on 98 subjects (67 male, 31 female), ages 20-74 years, who attended one of our programs. The subjects were a heterogeneous group of patients with hypertension, coronary artery disease, diabetes mellitus, and a variety of other illnesses. Intervention: The intervention consisted of asanas (postures), pranayama (breathing exercises), relaxation techniques, group support, individualized advice, lectures and films on the philosophy of yoga and the place of yoga in daily life, meditation, stress management, nutrition, and knowledge about the illness. The outcome measures were fasting plasma glucose and serum lipoprotein profile. These variables were determined in fasting blood samples, taken on the first and last day of the course. Results shows that Fasting plasma glucose, serum total cholesterol, low-density lipoprotein (LDL) cholesterol, very-LDL cholesterol, the ratio of total cholesterol to high density lipoprotein (HDL) cholesterol, and total triglycerides were significantly lower, and HDL cholesterol significantly higher, on the last day of the course compared to the first day of the course. The changes were more marked in subjects with hyperglycemia or hypercholesterolemia. These observations suggest that a short lifestyle modification and stress management education program leads to favorable metabolic effects within a period of 9 days.

Telles, et al., (2004) investigated whether yoga reduces heart rate and whether the 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 all the participants were asked to attempt to voluntarily reduce their heart rate, using any strategy. Both the baseline heart rate and the lowest heart rate achieved voluntarily during the six-minute period were significantly lower in the yoga group on day 30 compared to Day 1 by a group average of 10.7 beats per minute (i.e., bpm) and 6.8 bpm, respectively. 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.

Nandi et al., (2004) studied the effects of aerobic exercise, yogic practice and the combination of both on cardio respiratory endurance. Eighty school boys (9th and 10th grade) were randomly selected and then subdivided into four equal groups (n=20 in each group). Three training programme viz., aerobic exercise, yogic practice and combination of aerobic exercise and yogic practice were randomly allotted to three groups, where the remaining one group was the control. The performance on cooper’s test (12 minutes run or walk) of all the three groups were recorded before and after 12 weeks training programme. Result of ANCOVA reveals that the aerobic group showed greater cardio respiratory endurance ability. However the yogic practices group as well as the combination of aerobic exercises and yogic practice also have a significant improvement on the development of cardio respiratory endurance (post test f value=3.785.2.73 at .05 level).

Govindarajalu, et.al., (2004) examined the effect of yoga training on biochemical changes among normal college students. Thirty under graduate (19-23 years) college men were selected randomly as subjects. They were observed for a period of 10 weeks in a self controlled study and then exposed to an experimental treatment of yoga training for a period of eight weeks. The training(a few compulsory and optional asanas) was programmed
for a duration of six days per week in the morning and evening sessions of one and half an hour for a total period of 10 weeks. Prior to self control and before and after experimental treatment, the data collected on High density lipoprotein (HDL), Low density Lipoprotein (LDL), Red blood cells (RBC) and white blood cells (WBC). Statistical analysis results by ANOVA revealed that there was significant mean gain in the selected biochemical variables for the experimental groups.

Harinath. K et al., (2004) studied thirty healthy men in the age group of 25-35 years who volunteered for the study. They were randomly divided in two groups of 15 each. Group - I 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 -II subjects practiced selected yogic asanas (postures) for 45 minutes and pranayama for 15 minutes during morning, whereas during evening hours these subjects performed preparatory yogic postures for 15 minutes pranayama for 15 minutes and meditation for 30 minutes daily, for 3 months. Heart rate, cardio respiratory performance and blood pressure, was measured before and after 3 months. The systolic blood pressure, diastolic blood pressure and mean arterial blood pressure, did not show any significant changes. There was no significant changes in heart rate also, but improved the cardio respiratory performance.

Madanmohan, Kaviraja Udupa, et al., (2004) conducted a study on 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. Exercise produced a significant increase in HR, systolic pressure, and a significant decrease in diastolic pressure. After two months of yoga training, exercise induced changes in these parameters were significantly reduced.
Govindarajalu N., Gnanadeepam. J. et al., (2003) investigated the effect of yoga practices on cardio respiratory endurance on high school girls. Sixty high school girls were volunteered in a pre experimental group design, where the selected yoga practices was given at an intervention to the experimental group ‘A’ (n =30) for a period of eight weeks. The control group ‘B’ (n=30) was not allowed to participate in the experimental treatment. The pre and post tests were conducted on cardio respiratory endurance. The results of ANOVA revealed that there was no significant change in the cardio respiratory endurance.

Mishra et.al., (2003) examined the cardiac efficiency of long distance runners and yoga practitioners. Cardiac efficiency of 120 male students, in the age range of 16 to 17 years, from the Aggarsain Public School, Kurukshetra, Haryana, was tested through Harvard Step test. The students were divided into three equally matched groups viz, Long distance running Group (Gr.A), yoga group (Gr. B), and control group (Gr.C). Duration of the experimental period was 6 months that was divided into two sessions of three month each. Result of 2×3 Factorial ANOVA revealed that yoga practitioners have higher cardiac efficiency than long distance runners.

Bharshankar and others (2003) conducted a study to examine the effect of yoga on cardio vascular function in subjects above 40 years of age. Pulse rate, systolic and diastolic blood pressure were also studied in 50 control subjects and 50 study subjects who had been practicing yoga for five years. It was observed that significant reduction in pulse rate occurs in subjects practicing yoga and systolic and diastolic pressure between the study group and control group was also statistically significant. These results indicate that yoga significantly improved the cardiovascular function.

Gore, et al., (2003) investigated the effects of yoga and aerobics training on cardio respiratory functions in obese people. As an outcome of
one month programme of weight reduction using yoga practice and aerobics, Female residential yoga group (FRYG) of 25-40 age range, showed a significant and consistent reduction in systolic blood pressure (SBP) in all the testing sessions. Their Peak Expiratory Flow Rate (PEFR) also improved in two of the follow up (FU) testing sessions. FRYG of 41-70 age range reduced their SBP significantly in two of the FU sessions as well as a significant increase in the PEFR was recorded. Pulse rate (PR) did not show significant change. FNYRG (Female Non Residential Yoga Group) of 25-40 age range with the normal BP and PR initially, showed a significant reduction in DBP in two of the FU testing sessions, while the increase in the PEFR was not significant. FNRYG of age 41-70 showed a significant improvement in PEFR in post-test and first FU; yet reduction in BP was not significant statistically. Female aerobic group (FAG) of age range 25-40 showed non-significant reduction in BP and PEFR. However FAG of age range 41-70 reduced their BP significantly in 2nd, 3rd, and 6thFU, but their PEFR and PR did not change significantly. Male residential yoga group (MRYG) of 41-70 age range did not show significant change in BP, and PEFR, however, MAG (Male Aerobic Group) of same age range showed significant reduction in SBP only, in one of the FU testing sessions. Their PEFR showed non-significant reduction. MAG of age range 25-40 showed insignificant reduction in BP and PEFR.

Lohan and Rajesh (2002) studied the effect of asanas and pranayama on physical and physiological components of boys between age group 12-16 years. One hundred and twenty subjects were equally divided into asana, pranayama, combined and controlled groups. Ten weeks training was given to test the abdominal strength, speed, agility, power and endurance by using AAPHER Youth fitness test battery and blood pressure, heart rate, vital capacity and pulse rate. Pre test and post test scores were analysed by using ANACOVA. It was concluded that physical and physiological fitness were
improved significantly by the training of selected yogic exercise. The combined group of asanas and pranayama showed significant improvement in the physical and physiological fitness parameters.

Tran et al., (2001) conducted a study on the effect of yoga practice on the health-related aspects of physical fitness. Ten healthy untrained volunteers (nine females and one male) ranging in age from 18 to 27 years were studied to determine the effect of yoga practice on the health-related aspect of physical fitness including muscular strength and endurance, flexibility, cardio respiratory fitness, body composition and pulmonary function. Subjects were required to attend a minimum of two yoga classes per week for a total of eight weeks. Each yoga session consisted of ten minutes of pranayama (breath control exercises), fifteen minutes of dynamic warm up exercises, fifty minutes of asanas (yoga postures), and ten minutes of supine relaxation saravana (corpse pose). The subjects were evaluated before and after the eight week training programme. Isokinetic strength for elbow extension, elbow flexion and knee extension increased by 31%, 19% and 28% (p<0.05), respectively, whereas isometric muscular endurance for knee flexion increased 57% (p<0.01). Ankle flexibility, shoulder elevation, trunk extension and trunk flexion increased by 13% (p<0.01), 155% (p<0.001), 188% (p<0.001), and 14% (p<0.05) respectively. Absolute and relative maximal oxygen uptake increased by 7% and 6% respectively (p<0.01). These findings indicate that regular yoga practice can elicit improvements in the health related aspects of physical fitness.

U.S. Ray and others (2001) conducted a study on the effect of yogic exercise on physical health of young fellowship course trainees. The study was undertaken to observe the beneficial effect of yogic practices during training period on the young trainees. 54 trainees of 20-25 years of age were 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 exercise during this period. Physiological parameters like heart rate and blood pressure, in resting condition and body flexibility (shoulder, hip, trunk and neck flexibility) were recorded. There was significant improvement in yoga group.

Reddy and Ravikumar (2001) conducted a study on yogasana and aerobic dance and their effects on selected health fitness components in girl subjects. The speed, shuttle run, agility, sit and reach to test flexibility and 9 min run/walk to test cardio respiratory endurance were conducted for control, yogasana and aerobic dance groups. The training was given for a period of 12 weeks with 10 subjects in each group. The data were analyzed by ‘t’ test, analysis of co-variance and post hoc test was done with Scheffe’s test. It was concluded that the practice of yogasanas improved significantly the speed, agility, flexibility and cardio-respiratory endurance, while practice of aerobic dance also improved significantly the above factors and there was no difference in between yogasanas and aerobic dance groups after training with regard to the speed, agility, flexibility and cardio-respiratory endurance.

Jeyaveerapandian (2000) conducted a study on the outcome between physical exercises and Yogic exercises on selected physical and physiological variables during off-season among the sports participants. 90 subjects were selected randomly from various games and they were equally divided into three groups. Group- I practiced yogic exercises, group II practiced physical exercises and group- III was the control group. They practiced daily one hour for 6 weeks. After the experimental period (six weeks) the yogic exercises group showed significant improvement in
abdominal muscular endurance, flexibility, heart rate and systolic blood pressure.

Murugesan, Govindarajulu and Bera (2000) selected thirty three hypertensives, aged 35-65 years, from Govt. General Hospital, Pondicherry and examined with four variables viz; systolic and diastolic blood pressure, pulse rate and body weight. The subjects were randomly assigned into three groups. The experimental group-I underwent selected yoga practices, experimental group-II received medical treatment by the physician of the said hospital and the control group did not participate in any of the treatment stimuli. Yoga training was imparted in the morning and in the evening with 1 hour per session, for a total period of 11-weeks. Medical treatment comprised drug intake every day for the whole experimental period. The result of pre-post test with ANCOVA revealed that both the treatment stimuli (i.e., yoga and drug) were effective in controlling the variables of hypertension.

Birkel D.A. Edgren L. (2000) observed that yoga improved vital capacity of college students. To determine the effect of yoga postures and breathing exercise on vital capacity, researchers measured vital capacity using the spiro pet spirometer. Vital capacity determinants were taken near the beginning and end of two 17 week semesters. 89 men and 198 women were taught yoga poses, breathing techniques, and relaxation in two 50 minutes class meetings for 15 weeks. The study showed a significant improvement in vital capacity across all categories over time.

Datar and Kulkarni (1997) conducted a study on yogic practices and cardiovascular efficiency. The subjects were 48 males and 52 females of age group 16-24 years. Yoga training was given for a period of 21 days (3 weeks). Cardiac efficiency was measured using Harward step test, before and at the end of training period. There is a significant
improvement in the cardio vascular efficiency measured in terms of fitness index both in males and females

Bera T.K. and Rajapurkar M.V. (1993) conducted a study on body composition, cardio vascular endurance and anaerobic power of yogic practitioner. Forty male high school students aged 12 to 15 years, practiced in a study on yoga in relation to body composition, cardio vascular endurance and anaerobic power. The students were assigned to a yoga group and control group. The yoga group practiced selected yogic postures for forty-five minutes for twelve weeks. The control group did not undergo any special training. Body composition, cardio vascular endurance and anaerobic power were measured. The result revealed a significant improvement in ideal body weight, body density cardio vascular endurance and anaerobic power following yoga.

Telles, et al (1993) studied the physiological changes in sports teachers following 3 months of training in yoga. The report shows that in a group of 40 physical education teachers who already had an average of 8.9 years physical training, 3 months of yogic training produced significant improvement in general health (in terms of body weight and BP reduction and improved lung functions). There was also evidence of decreased autonomic arousal and more of psycho physiological relaxation (heart rate and respiratory rate reduction) and improved somatic steadiness (decreased errors in the steadiness test). This suggests that practicing yoga will help to bring about a balance in different autonomic functions, so that functioning is optimised.

Patel C. and North W R (1992) studied a randomized controlled trial of yoga and bio-feedback in management of hypertension. Thirty four hypertensive patients were assigned at random either to six weeks of yoga methods with bio-feed back or to general relaxation. Both group showed a
reduction in blood pressure although the decrease was significantly greater for the yoga group. The control group was then trained in yoga relaxation and their blood pressure fell to that of other groups.

SUMMARY OF REVIEW OF RELATED LITERATURE

The investigator reviewed the related literature on studies pertaining to walking on health related physical fitness, physiological, kinanthropometric and bio-chemical variables and yogic practices on health related physical fitness, physiological, kinanthropometric and bio-chemical variables and found that no attempt seem to have been made to find out the combined effect of walking and yogic practices on health related physical fitness, physiological, kinanthropometric and bio-chemical variables. Hence, with the experience gained through the review of the above the investigator found this study justifiable and has formed suitable methodology to be followed for the present study.