

## **CHAPTER – II**

### **REVIEW OF RELATED LITERATURE**

The present reviews are based upon the available literature in respect to the study under investigation and therefore confined to the studies to which the investigator has accessed. All the relevant literature thus obtained by the researcher has been presented in this chapter to furnish necessary background material to evaluate the significance of the study. The scholar has gleaned through almost every source like research quarterly, journals of various kinds, periodicals, encyclopedias, relevant book and e-resources for making a proper shape of the study.

#### **2.1. STUDIES ON AEROBIC EXERCISES**

**Panbilnathan and Kulothungan (2011)** studied the effect of different intensities of aerobic exercise on body composition variables among middle aged men. Sixty male subjects were selected randomly and divided into four groups and each group consisting of fifteen subjects each. The age ranged from 35 to 45. Group 1 underwent low intensity aerobic exercise, group II underwent moderate intensity aerobic exercise, group III underwent high intensity aerobic exercise and group IV acted as control group. The experimental groups underwent aerobic exercise programme in their respective intensity for three days per week for twelve weeks. Control group did not undergo any training programme rather than their routine work. The body composition variables were percentage body fat and lean body mass which were measured by using skin fold caliper. Prior to and after the training period all subjects were tested. The results of pre-test and post-test were compared with using analysis of co-variance. The results showed that high intensity aerobic exercises were significantly better than low and moderate intensity aerobic exercises in percentage body fat. The moderate and high intensity aerobic exercises significantly influenced lean body mass of middle aged men.

**Nagaraj et al. (2011)** studied the effect of stretching exercises and aerobic exercises on flexibility of school boys. For this study sixty school boys were selected at

random from Velankanni Matriculation Higher secondary school, Puducherry and their age ranged from 14 -17years. The selected subjects divided in to four groups and each group consisted of fifteen subjects. Group I underwent stretching exercises, group II underwent aerobics exercises, group III underwent combined exercises (stretching and aerobics exercises) and group IV was control group. The three experimental groups were subjected to the training programme for 10 weeks for three days per week. Control group did not undergo any training programme rather than their routine work. Flexibility was measured by using sit and reach box. Prior to and after the training period all the subjects were tested. The results of pre-test and post-test were compared with using analysis of covariance. The result showed that combined exercises (stretching and aerobics exercises) were significantly better than stretching exercises and aerobics exercises in flexibility.

**Goulopoulou et al. (2010)** examined the effect of aerobic exercise training on vagal and sympathetic influences on the modulations of heart rate and systolic blood pressure in response to an oral glucose load in obese individuals with and without type 2 diabetes mellitus (T2D). Beat to beat arterial pressure and continuous electrocardiogram were measured after a 12-hour overnight fast and in response to glucose ingestion (75 g dextrose) in obese subjects with (T2D group, n = 23) and without (OB group, n = 36) T2D before and after 16 weeks of aerobic exercise training at moderate intensity. Autonomic modulation was assessed using spectral analysis of systolic blood pressure variability (BPV), heart rate variability (HRV) and analysis of baroreflex sensitivity (BRS). Glucose ingestion significantly increased low-frequency (LF(SBP)), lowfrequency HRV (LF(RRI)) and the ratio of low- to high-frequency components of HRV (LF(RRI)/HF(RRI)) and decreased the high-frequency power (HF(RRI)) ( $P < .05$ ). Exercise training increased LF(RRI) and LF(RRI)/HF(RRI) responses and reduced HF(RRI) and LF(SBP) to glucose ingestion in both groups ( $P < .05$ ), but increased fasted BRS in the OB group only ( $P < .05$ ); glucose intake had no effect on BRS ( $P > .05$ ). In conclusion, a 16-week exercise training program improved cardiac autonomic modulation in response to an oral glucose load in obese adults, independently of diabetes status, and in the absence of remarkable changes in body weight, body composition, fitness level and glycemic control.

**Mahendran (2009)** studied the effect of 12 weeks aerobic exercises on selected health related physical fitness and physiological variables among adolescents. Thirty healthy, untrained school boys were selected from Sengunthar higher secondary school in Thuraiyur and their age was ranged from 12 to 15 years. The subjects were equally divided into two groups namely control and experimental group. The experimental group underwent aerobic exercises training for forty five minutes duration for twelve weeks for five classes per week. Control group was kept under observation without training. Selected health related variables such as muscular strength was measured by using hand grip dynamometer, muscular endurance was measured by using bent knee sit ups, cardio-respiratory endurance was measured using 12- minutes run/walk and flexibility was measured through sit and reach box. The body mass index was calculated by measuring the height and body weight of the subjects. The height was measured in meters by using a stadiometer and weight was measured in kilograms by using a weighing machine. The following equation was used to calculate the body mass index (BMI) i.e.  $BMI = \text{weight in kg} / \text{height in meter square}$ . The results of pre- test and post- test were compared by using analysis of covariance (ANCOVA). All the variables were significantly improved among experimental group.

**Ravikumar (2009)** conducted a study to find out the effect of selected yogic practices and aerobic exercises on somato type components and its relationship with health related physical fitness and biochemical variables. Forty-five college male students were selected randomly from the Government boys' hostel, lawspet, Puducherry. Their age was ranged from 18 to 25 years. They were divided into three groups namely control group, yogic group and aerobic group. In the training period the yogic group and the aerobic group underwent fourteen weeks of training on their respective program. The yogic group was trained on asanas and pranayama. The aerobic group was trained on aerobic exercises with rhythmic music with various types of aerobic movements. The progressive load method was used and the duration of training was 5 days per week. The data pertaining to pre test and post test of experimental groups were derived from the following variables. Health related physical fitness components such muscular strength and endurance, muscular flexibility, cardio

vascular endurance & body composition. The results of the study indicated that that the health related physical fitness components significantly improved after yogic group and aerobic exercise group than the control group.

**Toy (2008)** studied the effect of aerobic dance training on Vo2 Max and Body Composition in early middle aged women. Twenty subjects were selected to experimental group (No: 10) and control group (No: 10) for the study. The experimental group underwent twelve weeks of aerobic dance training. The control group which was not undergone any training. The selected variables were vo2 max, body weight, and BMI and percentage body fat. After twelve weeks of aerobic dance training, a significant reduction was noted in body weight, BMI and percentage body fat and a significant difference was found in Vo2 max. The study highlighted that the systematic aerobic dance training helps to increase the physical and cardio respiratory fitness among middle aged women.

**Koutedakis et al. (2007)** conducted a study to assess effects of three months of aerobic and strength training on selected performance and fitness-related parameters in modern dance students. The sample consisted of 32 men and women (age 19 +/- 2.2 years) who were randomly assigned into exercise (n = 19) and control (n = 13) groups. Anthropometric and flexibility assessments, treadmill ergometry, strength measurements, and on a separate dance technique test were conducted pre- and post exercise training in both groups. It was concluded that in modern dance students (a) a 3-month aerobic and strength training program had positive effects on selected dance performance and fitness-related parameters, (b) aerobic capacity and leg strength improvements did not hinder dance performance as studied herein, and (c) the dance-only approach did not provide enough scope for physical fitness enhancements.

**Viskic et al. (2007)** analyzed the impact of special programmed physical education including dance, aerobics and rhythmic gymnastics on the development of motor and functional abilities and morphological characteristics of female fourth grade high schoolers in Zagreb. A total sample of 220 high schoolers aged 16-18 years were divided into two groups: experimental group of 115 students attended the program

composed of dance structures and aerobics, and control group of 105 students attended classic program of physical education. A set of 3 morphological variables, 6 motor variables and one functional variable were applied in both groups on three occasions during an academic year (initial, transient and final measurements). Two-factor analysis of variance (MANOVA repeated measure design) showed the experimental program to significantly influence the development of coordination/agility and specific rhythm coordination, functional aerobic ability, repetitive and explosive strength and flexibility, along with significant reduction of overweight and adipose tissue. Study results clearly indicated that the existing programs of physical education should be revised and replaced by more appropriate ones.

## **2.2 STUDIES ON YOGA**

**Maniazhagu et al. (2012)** designed a study to find out the isolated and combined effects of pranayama and suryanamaskar on muscular endurance and cardio respiratory endurance. To achieve the purpose 60 school boys were randomly selected from Subaiah Ambalam Matric Hr. Sec. School Karaikudi, Tamilnadu in the age group of 15 to 17 years. They were divided into four equal groups namely experimental group I, II, III and control group. Experimental group I underwent pranayama practice, experimental group II underwent suryanamaskar practice and experimental group III underwent combined training for five days in a week for eight weeks and control group was not given any specific training. The criterion variables selected for the study were muscular endurance and cardio respiratory endurance. All the subjects were tested before and after the training period of eight weeks. The analysis of covariance was used to analysis the data. The study revealed that the selected criterion variables were significantly improved due to the influence of isolated and combined effect of pranayama and suryanamaskar.

**Saroja (2012)** designed a study to find out the effects of complex training and the combined effects of complex training and yogic practices on selected physical and physiological variables among college boys. To achieve the purpose 45 college boys from Alagappa University College of Physical Education, Karaikudui, Tamilnadu in the age group of 18 to 25 years were randomly selected as subjects. They were divided

into three equal groups namely complex training group, combination of complex training and yogic practices group and control group. The physical fitness variables such as speed, strength, explosive power and physiological variables such as resting pulse rate and blood pressure were selected for the study. All the subjects were tested before and after the training period of six weeks. The analysis of covariance was used to analysis the data. It was concluded that combined effects of complex training and yogic practices significantly improved the selected physical fitness and physiological variables in greater magnitude than the complex training alone among the college male students.

**Priya and Gopinath (2011)** studied the effect of yogic practice on flexibility among school boys. Forty subjects were selected from A.R.R Matriculation higher secondary school and their age ranged from 15 to 17 years. The subjects were divided into two groups namely the control and the experimental group. The experimental group underwent selected asanas and pranayama for five days per week for twelve weeks. Control group did not undergo any training programme rather than their routine work. Flexibility was measured by using sit and reach box. Prior to and after the end of practice period all subjects were tested. The results of pre-test and post test were compared with using analysis of co-variance. Finding of the study showed significant improvement on flexibility due to the twelve weeks of yogic practice when compared to control group.

**Komathi and Kalimuthu (2011)** Framed a study to find out the effect of yogic practices on abdominal strength among school boys. Forty subjects were selected from A.R.R Matriculation higher secondary school and their age was ranged from 15 to 17 years. The subjects were divided into two groups namely the control and the experimental groups. The experimental group underwent selected asanas and pranayama for five days per week for twelve weeks. Control group did not undergo any training programme rather than their routine work. The abdominal strength was measured by using sit ups. Prior to and after training period, all the subjects were tested. The results of pre-test and post-test were compared using analysis of covariance.



Finding of the study showed that significant improvement was found on abdominal strength due to the twelve weeks yogic practice when compared to the control group.

**Chatterjee et al. (2010)** observed the effect of selected yogic exercises on human growth hormone level in a middle aged Indian group. Five middle aged (4 male, 1 female) healthy volunteers were participated in this prospective study, for maintaining homogeneity of the yogic practices group anthropophysiological test: height, weight, BMI, grip strength, resting pulse rate, blood pressure, resting respiratory rate and peak expiratory flow rate were measured before and after six weeks of yoga intervention. Basal level of serum human growth hormone were measured prior to and six weeks of yoga intervention programmed by Enzyme Linked - Immuno Sorbent Assay, Single experimental group design was adopted and mean and SD and paired t-test were calculated. Six weeks of yoga intervention produced an improvement in Growth hormone.

**Elavarasi & Gopinath (2010)** investigated the effects of yogic practices and physical exercises on flexibility and blood pressure among working women. To achieve the purpose forty five sedentary working women from various faculties (except department of physical education and sports sciences) of Annamalai University, Tamilnadu in the age group of 35 to 40 years were selected. They were divided into three equal groups of 15 subjects each and assigned to experimental group –I, experimental group-II, and control group. The experimental group –I underwent yogic practices, experimental group-II underwent physical exercises and control group was not given any specific training. All the subjects underwent flexibility and blood pressure (systolic and diastolic). They assessed before and after training period of 8 weeks. The analysis of covariance was used to analyse the data. The study revealed that both the group have improved the flexibility and reduced the blood pressure. However no significant differences existed among the training groups.

**Punithavathi (2010)** Carried out a study to investigate the effects of aerobic exercises and yogic practices on selected physical, physiological and biochemical variables among school girls. 45 girls were selected from St. Joseph of Cluny Hr. Sec.

School, Pondicherry. The age group of the subjects ranged between 14 to 18 years. The subjects were divided into three groups and each group consisted of fifteen subjects. The two experimental groups underwent two different training programmes namely aerobic exercises and yogic practices and the third group acted as control group which was not subjected to any training. The data on the selected variables were collected before and after the training period. The pretest and post test data collected from control, aerobic and yogic experimental groups were statistically analyzed to find out the significance of the variables such as speed, muscular endurance, cardio respiratory endurance, resting pulse rate, breath holding time, respiratory rate, protein and lactic acid, by the use of analysis of covariance (ANCOVA). The findings revealed that there was a significant improvement on all the selected variables due to experimental treatment.

**Rajkumar (2010)** did a research on the impact of yogic practices and physical exercises on selected physical variables among inter-collegiate soccer players. To achieve this purpose, sixty (60) male intercollegiate soccer players from Chennai were selected at random. The selected subjects were divided into three equal groups of 20 each, namely yogic practice group (Group A), physical exercises group (Group B) and control group (Group C). The experimental groups have undergone 12 weeks of training. The control group (Group C) maintained their daily routine activities and no specific training was given for control group. The subjects of all the three groups were tested using standardized tests and procedures on the selected physical variables before and after the training period to find out the training effects using the following test items: 50 meters run to measure speed, shuttle run to measure agility, sit and reach to measure flexibility. The yogic practice group showed significant improvement on flexibility. The physical exercises group showed significant improvement on speed, agility, then the other two groups after 12 weeks of training.

**Saravanan & Kanagasabai (2010)** conducted a study to find out the effects of selected yogic practices on selected physiological variables of college men. To achieve the purpose 60 men students were selected from department of physical education and sports science, Annamalai University, Tamilnadu as subjects. Their age ranged from 18



to 25 years. They were divided into three equal groups of 20 subjects and assigned to experimental group –I, experimental group-II, and control group. In a week the experimental group –I underwent asana practices, experimental group-II underwent pranayama practices and control group was not given any specific training. All the subjects underwent the test of resting pulse rate, blood pressure and breath holding time before and after training period of 12 weeks. The analysis of covariance was used to analyse the data. The study revealed that the resting pulse rate, blood pressure and breath holding time were significantly improved due to the influence of yogic practices.

**Sugumar & Raghavan (2010)** found out the effect of Pranayama practice on breath holding time, blood clotting time, blood pressure and resting respiratory rate of college women players. 24 female students from Sivanthi Adithanar college of physical Education, Thiruchendur were selected as subjects randomly as subjects and divided into two groups as Pranayama group (PG) and control group (CG) breath holding time blood clotting time blood pressure and resting respiratory rate were tested at the beginning and end of six weeks experimental treatment. The collected data was statistically analysed by using dependent ‘t’ test and analysis of variance (ANCOVA). It was found that there was significant improvement of breath holding time and blood clotting time of PG when compared to the CG. At the same time there was no improvement in blood pressure and resting respiratory of PG when compared to the CG.

**Chen et al. (2009)** investigated the effect of yoga exercise on the health-related physical fitness of school age children with asthma. The study employed a quasi-experimental research design in which 31 voluntary children (exercise group 16; control group 15) aged 7 to 12 years were purposively sampled from one public elementary school in Taipei County. The yoga exercise program was practiced by the exercise group three times per week for a consecutive 7 week period. Each 60-minute yoga session included 10 minutes of warm-up and breathing exercises, 40 minutes of yoga postures, and 10 minutes of cool down exercises. Fitness scores were assessed at pre-exercise and at the seventh and ninth week after intervention completion. A total of 30 subjects (exercise group 16; control group 14) completed follow-up. Results included: 1. compared with children in the general population, the study subjects all fell

below the 50<sup>th</sup> percentile in all five physical fitness items of interest. There was no significant difference in scores between the two groups at pre-exercise for all five fitness items. 2. Research found a positive association between exercise habit after school and muscular strength and endurance among asthmatic children. 3. Compared to the control group, the exercise group showed favorable outcomes in terms of flexibility and muscular endurance. Such favorable outcomes remained evident even after adjusting for age, duration of disease and steroid use, values for which were unequally distributed between the two groups at pre-exercise. 4. There was a tendency for all item-specific fitness scores to increase over time in the exercise group. The GEE analysis showed that yoga exercise indeed improved BMI, flexibility, and muscular endurance. After 2 weeks of self-practice at home, yoga exercise continued to improve BMI, flexibility, muscular strength, and cardiopulmonary fitness.

**Krishan and Sharma (2009)** did a research on effects of yogic practices and callisthenic exercises on resting pulse rate variable of secondary school boys. A total 120 boys in Hamirpur (40 yogic practices group, 40 calisthenics exercises group and 40 control group) were put under yogic practices, calisthenics exercises and control group. A pretest was taken for all the 120 subjects. Six weeks training of yogic practices and calisthenics exercises were given to the respective groups. A post test was taken after six weeks of the training. Analysis of variance was applied to compare the four groups, for their heart rate response pattern, and Scheffe's post hoc test was applied to find out the superiority of the group. The result of the study indicated that resting pulse rate of yogic practices group was better than the other two groups.

**Founra et al. (2008)** conducted a study to determine the effects of a twice daily SN yoga practice on resting heart rate (HR) and blood pressure (BP), flexibility, upper body muscle endurance, and perceived well-being in low to moderately active adult males and females. Participants (24 females, 6 males; mean age 34 years) were randomly assigned to a yoga or control group using the fishbowl technique of random assignment with replacement. After a 3 hour introduction to proper SN techniques, the subjects were directed to perform two SN routines daily for 10 minutes each followed by a 5 minute relaxation period, 5 times per week for a period of 6 weeks. Pre and post

measurements were conducted for HR, BP, hamstring flexibility, upper body muscle endurance, and perceived well-being. Inferential statistics with repeated measures (2-way ANOVA) was used to analyze the data. A significant increase was found in flexibility with an improvement of 2.9 inches ( $p=.000$ ) and 4.4 push-ups ( $p=.003$ ) after yoga the training program, with little or no change in the control group. It was concluded that SN was effective in increasing hamstring flexibility and improving upper body muscle endurance.

**Madanmohan (2008)** studied the effect of six weeks yoga training on weight loss following step test, respiratory pressures, hand grip strength and handgrip endurance in young healthy subjects. Out of 46 healthy subjects (30 males and 16 females, aged 17–20 yr), 23 motivated subjects (15 male and 8 female) 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. In the yoga group, weight loss in response to Harvard step test was  $64\pm 30$  g after yoga training as compared to  $161\pm 133$  g before the training and the difference was significant ( $n = 15$  male subjects  $<0.01$ ). In contrast, weight loss following step test was not significantly different in the control group at the end of the study period. Yoga training produced a marked increase in respiratory pressures and endurance in 40mm Hg test in both male and female subjects ( $P<0.05$  for all comparisons). In conclusion, 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 could produce significant improvements in respiratory muscle strength and endurance.

**Harinath et al. (2004)** had conducted a study on the effects of Hatha yoga and Omkar meditation on cardio respiratory 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. Orthostatic tolerance, heart rate, blood pressure, respiratory rate, dynamic lung function (such as forced vital capacity, forced expiratory volume in 1 second, forced expiratory volume percentage, peak expiratory flow rate, and maximum voluntary ventilation), and psychologic profile were measured before and after 3 months of yogic practices. Serial blood samples were drawn at various time intervals to study the effects of these yogic practices and Omkar meditation on melatonin levels. Yogic practices for 3 months resulted in an improvement in cardio respiratory performance and psychological 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 ( $r = 0.71$ ,  $p < 0.05$ ) with well-being score. These observations suggested that yogic practices could be used as psycho physiologic stimuli to increase endogenous secretion of melatonin, which, in turn, might be responsible for improved sense of well-being.

**Barshankar et al. (2003)** examined the effect of yoga on cardiovascular function in subjects above 40 yrs of age. Pulse rate, systolic and diastolic blood pressure and Valsalva ratio were studied in 50 control subjects (not doing any type of physical exercise) and 50 study subjects who had been practicing yoga for 5 years. From the study it was observed that significant reduction in the pulse rate occurs in subjects practicing yoga ( $P < 0.001$ ). The difference in the mean values of systolic and diastolic blood pressure between study group and control group was also statistically significant ( $P < 0.01$  and  $P < 0.001$  respectively). The systolic and diastolic blood pressure showed significant positive correlation with age in the study group ( $r_1$  systolic = 0.631 and  $r_1$  diastolic = 0.610) as well as in the control group ( $r_2$  systolic = 0.981 and  $r_2$  diastolic = 0.864). The significance of difference between correlation coefficient of both the groups was also tested with the use of Z transformation and the difference was

significant ( $Z$  systolic= 4.041 and  $Z$  diastolic= 2.901). Valsalva ratio was also found to be significantly higher in yoga practitioners than in controls ( $P < 0.001$ ). The results indicated that yoga reduces the age related deterioration in cardiovascular functions.

**Lohan and Rajesh (2002)** studied the effect of asanas and pranayamas on physical and physiological components of boys between the age group of 12-16 years. One hundred and twenty subjects were equally divided into asana, pranayama, combined and control groups. Ten weeks training programme 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 analyzed by using ANCOVA. It was concluded that physical and physiological fitness was improved by the training of selected yogic exercise. The combined group of asanas and pranayama showed significant improvement in the physical and physiological fitness parameters.

**Maity & Samanta (2001)** conducted a study on the effect of calisthenics and yogasanas on motor fitness status of fifth grade girls. Pre test and post test scores of Oregon motor fitness test obtained from the calisthenics group, yogasana group and control group were analysed by using 't' test after 12 weeks training. It was concluded that (i) improvement of motor fitness as assessed on Oregon motor fitness test after 12 weeks of treatment justified the fact that both the programmes of calisthenics and yogasana were effective in developing motor fitness of fifth grade girls. (ii) calisthenics exercise programme was found superior to yogasana in improving performance in each individual test item of Oregon motor fitness test except crossed arm – curl ups.

**Samsudeen (2011)** investigated the effect of asana, pranayama, meditation and game-specific training on selected physical fitness components and performance parameters among district level cricketers. Forty eight male college level cricketers were randomly selected from various affiliated clubs of Madurai district and their age ranged between 18 and 25 years. Group-1 was involved in game-specific field training, Group-2 was given game-specific field training combined with yogic practices and Group-3 (Control) was not exposed to any specific training / conditioning. The game-specific field training schedule was specifically designed to improve the cricket playing

ability and fitness levels of the cricketers for a period of twelve weeks, five days a week and two sessions each day, each session lasted two hours. The yoga practices included selected asana, pranayama and meditation technique. The motor components namely speed, explosive strength, endurance and flexibility were selected as variables for this investigation. Fifty meters run, standing broad jump, twelve minutes run, walk and sit and reach tests were administered to test the physical fitness components of the subjects. Three qualified coaches subjectively rated the cricket playing ability of each player. The pre and post test were conducted one day before and after the experimental treatment. Analysis of covariance was used to analyse the collected data. Schaffer's test was used as a post hoc test to determine which of the paired mean differ significantly. The results of the study revealed that both game-specific training and game-specific combined with yogic practice produced positive impacts on the selected motor components and performance parameters.

**Padmadevi (2007)** investigated the effects of yogic practices, physical exercises and combination of both the trainings on selected physiological and psychological variables of college women. 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 were selected. Hundred and twenty college women were selected as subjects at random between the age group of 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 and Scheffee's post hoc test was used to find out the paired mean significant in selected difference. It was concluded that combination of both trainings (Group III) improved significantly in all the selected variables.

**Dhungel et al. (2008)** made a research on effect of alternate nostril breathing exercise on cardiorespiratory function. The responses of alternate nostril breathing



(anb), the nadisudhi pranayama on some cardio-respiratory functions were investigated in healthy young adults. The subjects performed ANB exercise (15 minutes every day in the morning) for four weeks. Cardio-respiratory parameters were recorded before and after 4-weeks training period. A significant increment in peak respiratory flow rate (PEFR L/min) and pulse pressures (PP) was noted. Although Systolic blood pressure (SBP) was decreased insignificantly, the decrease in pulse rate (PR), respiratory rate (RR), diastolic blood pressure (DBP) was significant. Results indicated that regular practice of ANB (Nadisudhi) increases parasympathetic activity.

**Sekhon (2013)** found out the effects of the yoga training, aerobic training and detraining on muscular endurance among college boys. To achieve this purpose, forty five college boys were selected as subjects from various departments of Nagaland University, Lomami. Their age was ranged between 18 to 21 years and were randomly divided into three groups of 15 each. Group I acted as experimental group (yoga training) and group II acted as experimental group II (aerobic training) and group III acted as control group. The subjects were tested on selected criterion variable such as muscular endurance prior to and immediately after the training period and measured by Bent knee sit ups. The collected data from the three groups before, during and after the experimentation was statistically analyzed by using two-way (3x3) factorial analysis of variance with last factor repeated measures. The data collected from the three groups at post test and detraining (three cessation) was statistically analyzed by using two way (3x4) factorial ANOVA with last factor repeated measures. Two way factorial ANOVA was used to find out the significant differences, if any, and the Scheffe's test was applied as post hoc test to determine which of the paired mean had significant differences. The 0.05 level of confidence was fixed to test the significance. The result of the study revealed that there was a significant difference among the experimental and control group on muscular endurance.

**Reddy and Ravikumar (2001)** conducted a study on yogasanas and aerobic dance and their effects on selected motor fitness components in girls subjects. The speed, shuttle run, agility, sit and reach test and 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 was analysed by 't' test, analysis of co-variance and post hoc test was done with Scheffes test. It was concluded that the practices of yogasana improved significantly the speed, agility, flexibility and cardio-respiratory endurance, while practices 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.

**Tiken et al. (2002)** conducted a study on the influence of specific yoga and aerobic exercise on physical fitness of SAI (NERC IMPHAL) STC Athletes. 30 boys and 30 girls from SAI NERC Imphal were divided into two groups according to their mean age height of 17.5 years and 15 years and 172.8cms and 156.4cms respectively. Training was given twice in a week for four months. Vertical jump to test explosive power, pushups and sit ups to test strength endurance, sit and reach to test flexibility, 50 yards dash to test speed and 12 min run walk to test endurance were conducted for aerobic exercise and yoga group before the training and after the two months and four months of training. It was concluded that (i) Improvement of physical fitness assessed on three selected physical fitness tests after four months of yoga and aerobic had justified the fact that both yoga and aerobic exercises were effective in developing physical fitness and (ii) in yoga and aerobic exercise groups, boys were found superior to girls group in sit and reach (flexibility) and 12 min run walk (endurance), 50 yards (speed).

**Singh and Deol (2012)** analyzed the differences on physiological variables of basketball players at different levels of competitions. The Study was conducted on 50 basketball male players (25 inter-collegiate and 25 under-19 School male basketball players). In this study the following physiological variables were taken (i) vital capacity (FVC, PIF & PEF) (ii) Vo<sub>2</sub>max. Results showed that there existed a significant difference between inter collegiate and under-19 school male basketball players. The study also showed that vital capacity and Vo<sub>2</sub>max were higher for inter collegiate basketball male players when compared to under-19 school basketball male players.

**Selvalakshmi (2007)** conducted a study on the effect of varied aerobic training program on obese women working in companies. In this study, two randomized groups of obese women working in IT companies and their effects on cardio respiratory functions was tested. The obese women were grouped into three namely, control, floor aerobics and step aerobics groups. The collected data on the cardio respiratory parameters prior to and after 12 weeks of varied aerobics training were statistically analyzed using analysis of co-variance (ANCOVA). The result showed significant improvement on vital capacity due to varied aerobic exercises, whereas no significant improvement in resting heart rate was recorded.

**Sisodiya and Abhinav (2012)** investigated plyometric exercises, circuit training and their combined effect on the basketball playing ability. The criterion players of J.N.V. University and Govt. College of physical education, Jodhpur. The age of players ranged from 18 to 25 years. The selection of subjects and training treatments were assigned to the groups using random group design. The three experimental groups participated in the training for a period of eight weeks (training was carried out three week on Mondays, Wednesdays and Fridays). The first group (A) performed plyometric exercises the second group (B) performed circuit training kept participating in the college and university physical education programme. Each subject of experimental and control group was tested at the beginning and at the end. Significant differences between the pre-test and post-test means of the three experimental groups were analyzed by applying ANOVA. The level of significance chosen was 0.05. The analysis of variance exhibited that the resistance, plyometric exercises, circuit training and combined training in terms of experimental and control groups brought significant improvement in playing ability skills in basketball. The analysis of variance for throws for accuracy, speed dribble and field goal speed skills indicated significance. The critical difference for adjusted means revealed that the mean gain made by all experimental groups showed statistically significant difference between experimental groups.