CHAPTER –II
Review of Related Literature
Review of related literature

In this chapter, a review of the literature relevant to this study is presented in the following four sections

1. Studies on physical and physiological variables
2. Studies on hematological variables
3. Studies on psychological variables
4. Studies on performance related variables

This chapter ends with a short summary on the impact of previous research on the present study. A review of relevant literature is essential to get a full picture of what is to be done with regard to the present study. Innovative ideas and reforms are being introduced almost in all fields of the study. The relevant literature pertaining to the present study has been abstracted in the chapter to provide the background material, to evaluate the significance of this study as well as to interpret its findings.

2.1 Studies on Physical variables

Radhakrishnan, (2007) studied the effect of selected yogasanas on low back pain for a group of middle aged women. To achieve the purpose of the study among the women working as lecturers, teachers, typists and clerks who attended yoga class, a case history of the ailment (low back pain) were selected. Further a qualified medical officer who made a thorough medical examination to ascertain the possible causes for back and isolated those subjects who would not suffer any contra indication owing to administration of yogasanas screened the women. Using random sampling method, 45 women were selected for this study. Their age ranged from 35-40 years. Flexibility and range of pain were taken for this study.
The subjects were divided into three groups and each group consisted of 15 women. Group-I was the control group. Group II underwent the training of general asanas and fitness exercises. Group III underwent selected therapeutic asanas. The subjects were tested on, low back pain, hip flexibility at the beginning (pre test) and at the end of the experimental period (post test). The conclusions of the study were that, yogasanas increase the hip flexibility, range of pain and it increases abdominal strength/endurance, the results of the study indicates that lack of physical exercise is also one of the causes for low back pain.

*Murugesan et.al, (2007)* studied the effect of selected yogasanas on muscular strength and flexibility among higher secondary school boys. Subjects were forty higher secondary school boys from K.V.R.Higher Secondary School, Virudhunagar. They were divided into groups as experimental group and control group to test the muscular strength and hip flexibility. Pull-ups and sit reach tests were administered at the beginning and end of six weeks experimental treatment respectively. The collected data were statistically analysed by using ‘T’ tests for correlated means. It was found that there was significant difference in muscular strength and flexibility between experimental group and control group.

*Raj kumar and Durgesh (2007)* investigated the effect of calisthenic exercise and yogic asanas on the improvement of trunk and shoulder flexibility among PU college students. Sixty girls studying in class twelfth in V.G. WOMEN’S PU College Gulbarga, were selected randomly and divided into three groups. Two groups A and B are experimental groups and C is the control group. Each group having twenty subjects under 16-18 years of age were served as subjects. Group A performed yogic asanas, Group B was subjected to calisthenics exercise and group C served as the control. The duration of the training programme was 8 weeks. The significant mean difference between the pre test and post test for trunk and shoulder flexibility were analysed using the ‘t’ ratio and
Analysis of co-covariance. The analysis showed that both the experimental groups brought about a significantly better performance as compared to the control group in the two variables. The analysis of data also revealed that yogic asana experimental group proved to be effective as compared to the callisthenic exercises group.

**Rube Jesintha and John Parthiban (2007)** Studied the influence of yogic practices on resting pulse rate, breath holding time and cardio respiratory endurance of school Khokho 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, Breath holding time and cardio respiratory endurance showed significant difference between the groups.

**Oken, et.al., (2006)** examined randomized, controlled, six-month trial of yoga in healthy seniors and the effects on cognition and quality of life. The yoga intervention produced improvements in physical measures (eg, timed 1-legged standing, forward flexibility) as well as a number of quality-of-life measures related to sense of well-being and energy and fatigue compared to controls.

**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.

_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 sub divided into four equal groups (n=20 in each group). Three training programmes viz., aerobic exercise, Yogic practice and combination of aerobic exercises 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 programmes. 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 greater cardio respiratory endurance(post test f value=3.785.2.73 at .05 level)

_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 2\textsuperscript{nd}, 3\textsuperscript{rd}, and 6\textsuperscript{th} FU, 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 non significant reduction in BP and PEFR.

Govindarajalu et al., (2003) investigated the effect of yoga practices on flexibility and cardio respiratory endurance on high school girls. Sixty high school girls were volunteered in a pre experimental group design, where the practice of selected yoga practices was given at an intervention to the experimental group ‘A’ (n1 =30) for a period of eight weeks. The control group ‘B’ (n1=30) was not allowed to participate in the experimental treatment. The pre and post tests were conducted on flexibility and cardio respiratory endurance. The results of ANOVA revealed that there was an improvement in the flexibility and no significant change was evident in the cardio respiratory endurance. Thus, short term yoga is useful in
improving flexibility, but not the cardio respiratory endurance, even at the stage of puberty in girls.

_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 $2 \times 3$ Factorial ANOVA revealed that yoga practitioners have higher cardiac efficiency than long distance runners.

_Baldwin, (1999)_ investigated the psychological and physiological differences between adult exercisers who added a weekly yoga class to their regular exercise program and those who did not. Subjects were pre tested and post tested for mood state, stress response, recovery heart rate, and spinal/hamstring flexibility. Over a period of eight weeks, subjects in both groups continued their normal exercise habits and maintained exercise logs. Subjects in the Yoga Group added a weekly yoga class. Subjects in the Control Group received a yoga class at a later time. At the end of eight weeks, exercise logs were collected and post tests were conducted. The results suggested: (1) more positive mood change in the Yoga Group over eight weeks, (2) more immediate positive affect from yoga than from cardiovascular or resistance training activities, (3) more compliance with yoga than with cardiovascular or resistance training activities, (4) comparable perceived exertion ratings for 'moderate' Hatha Yoga and routine aerobic exercise, (5) an 8% gain in spinal and hamstring flexibility in the Yoga Group over eight weeks, and (6) decreased vulnerability to stress in the Yoga Group, at the same time that sources of stress for that group increased.
Sakthignanavel, (1998) investigated the effect of pranayama with Aerobic exercise with Aerobic fitness. There are evidences that the practice of pranayama and aerobic exercises improves physical and mental performance. The present investigation was undertaken to study the effect of pranayama with aerobic exercise on muscular endurance, vital capacity and cardio respiratory endurance. Thirty normal male volunteers had undergone a 12 weeks training course of pranayama (n1=10), aerobic exercise (n2=10) and pranayama with aerobic exercise (n3=10). The suitable parameters were used before and after the training. The results show that the pranayama group marked as higher degree in vital capacity (p<0.05). The aerobic group shows greater cardio respiratory endurance and muscular endurance than the other groups (p<0.05). But the combined pranayama and aerobic exercise group shows a greater improvement in all aspects than the other three groups (p<0.05).

Datar and Kulkarni (1997) conducted a study on yogic practices and cardio vascular 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 and Rajapurkar (1993) examined forty male high school students of age 12-15 yrs, who participated in a study on yoga in relation to body composition, cardiovascular endurance and anaerobic power. The subjects were assigned to a yoga group and control group. Body composition, cardiovascular endurance and anaerobic power were measured. The results revealed a significant improvement in ideal body weight, body density, cardiovascular endurance and anaerobic power following yoga.
Review of Related Literature

Rengasamy Dhanaraj, (1992) investigated the effect of selected Yogic and Physical exercise on Flexibility and Cardio respiratory endurance of Madurai Kamaraj University players. One hundred and fifty subjects were randomly selected and randomly assigned to Yogic exercise group, physical exercise group and a control group. Experimental period was six weeks. Subjects in the yogic exercises group showed better results in flexibility and cardio respiratory endurance.

2.2 Studies on Physiological Variables

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 (Jalandhar bandha) 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 analysed 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.

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.
**Shenbagavalli and Raj Kumar (2007)** investigated the effect of pranayama on selected physiological variables among men volleyball players. Twenty-four male subjects for this study were selected from Dr. Sivanthi Aditanar college of physical education, Tiruchendur randomly and divided into two groups as experimental and control groups. Data were collected from each subject before and after the training. The collected data were statistically analysed by using analysis of covariance (ANCOVA). It was found that there was significant difference on selected physiological variables of resting pulse rate, breath holding time and diastolic blood pressure in the experimental group when compared to the control group.

**Bowman, et al., (2007)** examined the age-associated reduction in baroreflex sensitivity modifiable by exercise training. The effects of aerobic exercise training and yoga, a non-aerobic control intervention on the baroreflex of elderly persons was determined. Baroreflex sensitivity was quantified by the $\alpha$-index, at high frequency (HF; 0.15–0.35 Hz, reflecting parasympathetic activity) and mid-frequency (MF; 0.05–0.15 Hz, reflecting sympathetic activity as well), derived from spectral and cross-spectral analysis of spontaneous fluctuations in heart rate and blood pressure. Twenty-six (10 women) sedentary, healthy, normotensive elderly (mean 68 years, range 62–81 years) subjects were studied. Fourteen (4 women) of the sedentary elderly subjects completed 6 weeks of aerobic training, while the other 12 (6 women) subjects completed 6 weeks of yoga. Heart rate decreased following yoga ($69 \pm 8$ vs. $61 \pm 7$ min$^{-1}$, $P < 0.05$) but not aerobic training ($66 \pm 8$ vs. $63 \pm 9$ min$^{-1}$, $P = 0.29$). $V_{O_2}^{\text{max}}$ increased by 11% following yoga ($P < 0.01$) and by 24% following aerobic training ($P < 0.01$). No significant change in $\alpha_{\text{MF}}$ ($6.5 \pm 3.5$ vs. $6.2 \pm 3.0$ ms mmHg$^{-1}$, $P = 0.69$) or $\alpha_{\text{HF}}$ ($8.5 \pm 4.7$ vs. $8.9 \pm 3.5$ ms mmHg$^{-1}$, $P = 0.65$) occurred after aerobic training. Following yoga, $\alpha_{\text{HF}}$ ($8.0 \pm 3.6$ vs. $11.5 \pm 5.2$ ms mmHg$^{-1}$, $P < 0.01$) but not $\alpha_{\text{MF}}$ ($6.5 \pm 3.0$ vs. $7.6 \pm 2.8$ ms mmHg$^{-1}$, $P = 0.29$) increased. Short-duration aerobic training does
not modify the $\alpha$-index at $\alpha_{MF}$ or $\alpha_{HF}$ in healthy normotensive elderly subjects. $\alpha_{HF}$ but not $\alpha_{MF}$ increased following yoga, suggesting that these parameters are measuring distinct aspects of the baroreflex that are separately modifiable.

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 suitable 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.

Gore, (2005) conducted the study on the effect of 6 weeks yoga training on boys undergoing weight training. It was concluded that 6 weeks of yoga training was beneficial to 5 young weight lifters in the experimental group in comparison to 5 young weight lifters of the control group in respect of the improvement in chest circumference, blood pressure, peak expiratory flow rate and pulse rate.

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.

Pete Arambula, et al., (2004) examined the physiological correlates of a highly practiced Kundalini Yoga meditator. Thoracic and abdominal breathing patterns, heart rate (HR), occipital parietal electroencephalograph (EEG), skin conductance level (SCL), and blood volume pulse (BVP) were monitored during pre baseline, meditation, and post baseline periods. Visual analyses of the data showed a decrease in respiration rate during the meditation from a mean of 11 breaths/min for the pre- and 13 breaths/min for the post baseline to a mean of 5 breaths/min during the meditation, with a predominance of abdominal/diaphragmatic breathing. There was also more alpha EEG activity during the meditation ($M = 1.71 \mu V$) compared to the pre- ($M = .47 \mu V$) and postbaseline ($M = .78 \mu V$) periods, and an increase in theta EEG activity immediately following the meditation ($M = .62 \mu V$) compared to the pre-baseline and meditative periods (each with $M = .26 \mu V$). These findings suggest that a shift in breathing patterns may contribute to the development of alpha EEG, and those patterns need to be investigated further.

Kasiganesan Harinath, (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, where as 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. 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 psychological profile were measured before and after 3 months 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 cardiorespiratory 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 blood 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.

_Madanmohan, et.al, (2004)_ studied the effects of yoga training on cardiovascular response to exercise and the time course of recovery after the exercise. Cardiovascular response to exercise was determined by the Harvard step test using a platform of 45 cm height. The subjects were asked to step up and down the platform at a rate of 30/min for a total duration of 5 min or until fatigue, whichever was earlier. Heart rate (HR) and blood pressure response to exercise were measured in the supine position before exercise and at 1, 2, 3, 4, 5, 7 and 10 minutes after the exercise. 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.

_**Swami Vivekananda Yoga Research Foundation (2002)**_ examined 35 male volunteers whose ages ranged from 20 to 46 years and studied in two
sessions of yoga-based guided relaxation and supine rest. Assessments of autonomic variables were made for 15 subjects, before, during and after the practices, whereas oxygen consumption and breath volume were recorded for 25 subjects before and after both types of relaxation. A significant decrease in oxygen consumption and increase in breath volume were recorded after guided relaxation (paired t test). There were comparable reductions in heart rate and skin conductance during both types of relaxation. During guided relaxation the power of the low frequency component of the heart-rate variability spectrum reduced, whereas the power of the high frequency component increased, suggesting reduced sympathetic.

_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. After the experimental period (six weeks) the yogic exercises group showed significant improvement in abdominal muscular endurance, flexibility, heart rate and systolic blood pressure.

_Schell, et.al., (1994)_ examined the Physiological and psychological effects of Hatha-Yoga exercise in healthy women. Heart rate, blood pressure, and the hormones cortisol, prolactin and growth hormone were measured in a yoga group and a control group of young female volunteers reading in a comfortable position during the experimental period. The yoga group had decreased heart rate during yoga. The yoga group had higher scores on life satisfaction and lower scores on excitability, aggressiveness, openness, emotionality and somatic complaints and coping with stress and mood by the end of the experiment. The yoga group also had higher scores on high spirits and extraverted ness.
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 psychophysiological relaxation (heart rate and respiratory rate reduction) and improved somatic steadiness (decreased errors in the steadiness test). The changes at the end of 3 months in volar GSR in different direction (increase/decrease/no change), depending on the initial values. This suggests that practicing yoga may help to bring about a balance in different autonomic functions, so that functioning is optimised.

Patel, (1975) examined 34 hypertensive patients who were assigned at random either to six weeks’ treatment by yoga relaxation methods with biofeedback or to placebo therapy (general relaxation). Both groups showed a reduction in blood-pressure (from 168/100 to 141/84 mm/Hg in the treated group and from 169/101 to 160/96 mm/Hg in the control group). The difference was highly significant. The control group was then trained in yoga relaxation, and their blood-pressure fell to that of the other group (now used as controls).

2.3 Studies on Hematological variables

Shantha meena, (2007) examined the effect of yogasanas and aerobic training on the selected physiological and bio chemical 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 control group. The suitable physiological and bio chemical parameters
(blood pressure and cholesterol) were taken before and after the training programme for all the three groups. ANCOVA was used to analyse the data obtained. The results showed that there is greater improvement in blood pressure and cholesterol levels in the experimental groups.

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. A 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.

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.
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 hours for a total period of 10 weeks. Prior to self control and before and after experimental treatment, the data collected on Lactate dehydrogenate(LDH), 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 bio chemical variables for the experimental groups.

Damodaran, et.al, (2002) investigated therapeutic potential of yoga practices in modifying cardiovascular risk profile in middle aged men and women. Twenty patients with mild to moderate essential hypertension underwent yogic practices daily for one hour for three months. Results showed decreased blood pressure, blood glucose, cholesterol and triglycerides and improved subjective well-being and quality of life.

Udupa, (1996) conducted a study on biochemical changes following a selective combined practice of yoga namely yogic postures, pranayama and relaxation type of meditation of volunteers. Their age was 20 to 25 years. The volunteers who practiced the yoga practices showed that there was a reduction of blood sugar and serum cholesterol, on the other hand the serum protein improved during the same period.
Singh and Udupa (1977) conducted a series of comparative psychological studies on apparently normal educated male volunteers who had been practicing certain meditative and cultural six months. They found that six months of yogic practices induced a feeling of well-being, a reduction in body weight and increased vital capacity. It was also observed that blood sugar and serum cholesterol levels of fasting were lowered and certain endocrine functions, specially adrenocortical, thyroid and testicular functions were accelerated. On the other hand, physiological studies revealed an improvement in memory and performance, lowered mental fatigue rate, a reduction in neuroticism index and a lowered incidence of physiological and psychological complaints assessed using the Cornell medical index.

2.4 Studies on Psychological variables

Abrahamsen, et al., (2008) the study is founded on achievement goal theory (AGT) and examines the relationship between motivation, social support and performance anxiety with a team of handball players (n=143) from 10 elite teams. Based on these theories and previous findings, the study has three purposes. First, it was predicted that the female athletes (n=69) would report more performance worries and more social support use than males (n=74). The findings support the hypothesis for anxiety, but not for social support use. However, females report that they felt social support was more available than males. Second, we predicted and found a positive relationship between the interaction of ego orientation and perceptions of a performance climate on performance anxiety, but only for females. As predicted, perceived ability mediated this relationship. Finally, we predicted that perceptions of a performance climate were related to the view that social support was less available especially for the male athletes. Simple correlation supports this prediction, but the regression analyses did not reach significance. Thus, we could not test for mediation of social support between
motivational variables and anxiety. The results illustrate that fostering a mastery climate helps elite athletes tackle competitive pressure.

**Kimberley Bethany, (2007)** studied the impact of yoga on psychological health in older adults. Older adults (N = 98; Mean age = 77.04, SD = 7.28) were randomly assigned to 3 groups: Chair Yoga, Chair Exercise, and no-treatment control group. Classes were held for 45-minute weekly sessions, over six weeks, and daily home practice was supported. All participants were assessed pre-intervention, post-intervention, and at one-month follow-up for anger, anxiety, depression, well-being, general self-efficacy, and self-efficacy for daily living. Time by group interactions was significant for all trait variables. Yoga participants improved more than both exercise and control participants, in anger (ES = 1.01, 0.12, and 0.11 respectively, from pretest to posttest; and 0.89, -0.01, and 0.17 from pretest to follow-up), anxiety (ES = 0.58, 0.31, 0.18, and 0.89, 0.28, 0.27), depression (ES = 0.53, 0.07, 0.05, and 0.54, 0.01, 0.04), well-being (ES = 0.49, 0.36, 0.01, and 0.53, 0.28, -0.08), general self-efficacy (ES = 0.98, 0.35, -0.12, and 0.73, 0.43, -0.12), and self-efficacy for daily living (ES = 0.87, 0.35, 0.07, and 0.51, 0.24, 0.09). Changes in self-control were associated with changes in general self-efficacy and trait anxiety. Self-control is proposed as a mechanism underlying the impact of yoga on psychological health.

**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 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 groups. Schefee’s post hoc test was used to find out the paired mean significant difference. It was concluded that combination of both trainings improves all the variables.

*Kirkwood, et.al., (2005)* Between March and June 2004, a systematic review was carried out of the research evidence on the effectiveness of yoga for the treatment of anxiety and anxiety disorders. Eight studies were reviewed. They reported positive results, although there were many methodological inadequacies. Owing to the diversity of conditions treated and poor quality of most of the studies, it is not possible to say that yoga is effective in treating anxiety or anxiety disorders in general. However, there are encouraging results, particularly with obsessive compulsive disorder. Further well conducted research is necessary which may be most productive if focused on specific anxiety disorders.

*Claudio Robazza and Laura Bortoli (2007)* investigated the notion of directional perceptions beyond anxiety to anger in order to assess rugby players’ perception of the facilitative or debilitative effects of trait anger symptoms. A cross-sectional study design was employed using normative measures of anger and anxiety. The frequency and direction of symptoms of competitive trait anger were assessed among 197 Italian rugby players together with the intensity and direction of multidimensional trait anxiety. Findings revealed a general tendency of rugby players to experience a moderate frequency of anger symptoms and to interpret their symptoms as facilitative rather than debilitative. Regarding the direction of symptoms, cognitive anxiety was a significant predictor of anger, while self-
confidence was a significant predictor of control of anger. Support was provided for assessment of individual's interpretation of anger symptoms.

**Kristiansen, et al., (2007)** explored the relationship between task involvement and coping with stress in elite competition. Participants were 82 elite wrestlers, both male (n=60) and female (n=22), from four different European countries, of age between 16-37. The data for the study were gathered over an 18-month period, and both qualitative in-depth interviews (n=6) and quantitative approaches were used. The quantitative study measured motivation from an achievement goal theory perspective: achievement goal orientation [Perception of Success Questionnaire], perceptions of the motivational climate [Perceived Motivational Climate in Sport Questionnaire] and coping strategies (Brief COPE). The qualitative part explored motivation and coping in depth. As expected, task involved wrestlers coped better in competitive situations due to their use of more adaptive coping strategies. The wrestlers' experiences seemingly make them prefer to stay task involved and use adaptive coping strategies (both problem-focused and emotion-focused strategies) in competition.

**Li CH, Chi L (2007)** explored the main and interactive effects of goal orientations and perceived competence on intensity and direction of the symptoms of pre competitive cognitive and somatic anxiety. 109 handball players from 16 high school teams (M = 16.2 yr., SD = 1.5) participated. All were asked to complete the Task and Ego Orientation in Sport Questionnaire, Perceived Competence Questionnaire, and a modified version of the Competitive State Anxiety Inventory-2. Using separated multiple hierarchical regression analyses, direction of the symptoms of pre competitive somatic anxiety was predicted by perceived competence and interaction of ego orientation x perceived competence. Perceived competence and the interaction of ego orientation x task orientation x perceived competence were significant predictors of direction of the symptoms of
The results suggest that perceptions of competence and task orientation moderate the relationship between ego orientation and direction of the symptoms of pre-competitive anxiety.

Smith, et. al., (2006) The aims of this study were twofold: (a) to determine if dispositional achievement goal orientation profiles that are reported in the literature would be observed in a sample of youth athletes, and (b) to examine potential achievement goal orientation profile differences on perceptions of the motivational climate, perceptions of peer relationships, and motivation-related responses. Male soccer players (n=223) aged 9-12 years (mean=10.9, s=0.6) completed a multi-section questionnaire containing assessments of dispositional goal (task, ego) orientations, the perceived task- and ego-involving features of the motivational climate, perceived peer acceptance and friendship quality (positive friendship quality, conflict), perceived ability, soccer enjoyment, and satisfaction with one's performance and the team. Four profiles were observed that closely matched those observed by Hodge and Petlichkoff (2000), though in the present study a lower proportion of participants exhibited achievement goal profiles consisting of relatively high ego orientation. Achievement goal profile differences were found for all variables except positive friendship quality, with a general trend for those reporting relatively lower task goal orientation to exhibit less adaptive responses. Overall, the findings support achievement goal frameworks (e.g. Nicholls, 1989) and suggest that further examination of dispositional achievement goals may afford a deeper understanding of social relationships and motivational processes in youth sport.

Abrahamsen, et.al., (2006) the research was to develop and validate a Norwegian version of the sport anxiety scale (SAS-N), a multidimensional sport performance trait anxiety inventory. The SAS consists of three unique dimensions measuring somatic anxiety, worry and concentration disruption, respectively. The
translation-back translation method was used in the development of the SAS-N, and athletes from different sports in Norway (N=282) participated in the study. The findings are similar to those of the English original, and lend support for the use of this instrument with Norwegian athlete subjects.

**Kirkwood et.al., (2005)** Between March and June 2004, a systematic review was carried out of the research evidence on the effectiveness of yoga for the treatment of anxiety and anxiety disorders. Eight studies were reviewed. They reported positive results, although there were many methodological inadequacies. Owing to the diversity of conditions treated and poor quality of most of the studies, it is not possible to say that yoga is effective in treating anxiety or anxiety disorders in general. However, there are encouraging results, particularly with obsessive compulsive disorder. Further well conducted research is necessary which may be most productive if focused on specific anxiety disorders.

**Woolery et.al., (2004)** tested a short-term course of Iyengar yoga among patients with mild depression as measured using BDI (scores of 10-15) but without a psychiatric diagnosis. Iyengar yoga is based on the teachings of B.K.S. Iyengar who considered specific asanas and sequences of asanas to be particularly effective for alleviating depression. The asanas recommended are those that involve opening and lifting of the chest, inversions and vigorous standing poses. The 28 adult volunteers, all aged less than 30 years were randomly assigned to two 1-hour yoga classes each week for 5 weeks or to a waiting list control group. Methods of randomisation, allocation concealment and blinding of assessors were not reported. A total of 5 patients withdrew (3 out of 13 in the yoga group, 2 out of 15 in the control group), a significant proportion in a small trial such as this and the reasons were not given. However, a significant reduction in BDI and State Trait Anxiety Inventory (STAI) was observed in the yoga group but not in the
control group who had received no intervention. The effects emerged by the middle of the course and were maintained till the end.

*Kamakhya, (2004)* examined Yoga nidra and its impact on students well being. The study aimed at finding out the effect of yoga nidra on stress, anxiety and general well being on the students at the yoga clinic of Dev Sanskriti Viswavidyalaya. The practice time was 30 minutes daily for a total duration of 6 months. 40 Students were taken from P.G.Yoga classes for observing the effects as well as 12 were in control group. The result shows a significant change as yoga nidra positively decreased the stress level of the subjects where as no significant change has been seen in anxiety level. Moreover, Yoga nidra positively increased the general well being of the subjects.

*Hanton, Thomas and Maynard (2004)* investigated the symptom responses associated with competitive anxiety through a fine-grained measurement approach. Incorporating dimensions of intensity, perceptions of direction, and frequency of intrusions, possible time-to-event changes were assessed with respect to the between-subjects variable of skill level. Male athletes (N=82), separated into two skill classifications (club N=45 vs. national N=37), completed the competitive state anxiety inventory-2 (CSAI-2) modified to account for the dimensions of intensity, direction and frequency at five pre competition times (1 week, two days, one day, 2 h, 30 min). Multivariate analysis of variance (skill level \( \times \) time-to-competition) with follow-up analyses indicated main effects for skill level and time-to-competition with no interactions. For skill level differences, national athletes were more facilitative in their interpretation of the symptoms associated with cognitive and somatic anxiety. For change-over-time effects, intensities of cognitive and somatic anxiety increased and self-confidence decreased between 2 h and 30 min precompetition. Frequencies of cognitive anxiety increased from seven to two days, one day to 2 h and 2 h to 30 min
precompetition; frequencies of somatic anxiety increased from seven days to two
days and 2 h to 30 min pre-event; frequencies of self-confidence increased from
seven to two days. Findings support the notion of measuring the separate
dimensions of symptoms associated with competitive anxiety and emphasise the
importance of assessing these constructs as processes that unfold over-time.

*Wien Klin Wochenschr, (2003)* claimed that regular practice of
Transcendental Meditation (TM) improves cognitive function and increases
intelligence. This systematic review assesses the evidence from randomised
controlled trials for cumulative effects of TM on cognitive function. Searches were
made of electronic databases and the collected papers and official websites of the
TM organisation. Only randomised controlled trials with objective outcome
measures of the cumulative effects of TM on cognitive function were included.
Trials that measured only acute effects of TM, or used only neurophysiologic
outcome measures were excluded. 107 articles reporting the effects of TM on
cognitive function were identified and 10 met the inclusion criteria. Most were
excluded because they used no controls or did not randomise subjects between
interventions. Of the 10 trials included, 4 reported large positive effects of TM on
cognitive function, four were completely negative, and 2 were largely negative in
outcome. All 4 positive trials recruited subjects from among people favorably
predisposed towards TM, and used passive control procedures. The other 6 trials
recruited subjects with no specific interest in TM, and 5 of them used structured
control procedures. The association observed between positive outcome, subject
selection procedure and control procedure suggests that the large positive effects
reported in 4 trials result from an expectation effect. The claim that TM has a
specific and cumulative effect on cognitive function is not supported by the
evidence from randomised controlled trials.
Sheldon Hanton, et.al., (2003) examined performers’ retrospective explanations for the relationship between self-confidence, competitive anxiety intensity, and symptom interpretation toward performance. Semi-structured interviews were conducted with 10 elite performers to determine how self-confidence levels influenced the perceived effects of pre-competitive anxiety intensity and identify the confidence management strategies used to protect symptom interpretation. Two causal networks were identified, showing self-confidence to influence the relationship between competitive anxiety intensity and symptom interpretation. In the absence of self-confidence, increases in competitive anxiety intensity were perceived as outside of the performers’ control and debilitating to performance. Under conditions of high self-confidence, increases in symptoms were reported to lead to positive perceptions of control and facilitative interpretations. To protect against debilitating interpretations of competitive anxiety, performers reported the use of cognitive confidence management strategies including mental rehearsal, thought stopping, and positive self-talk. The findings highlight self-confidence as an essential quality for elite athletes to possess in order to protect against potentially debilitating thoughts and feelings experienced in competitive situations.

David Fletcher and Sheldon Hanton (2001) studied the Cross-sectional design assessing psychological constructs during competition. The independent variable was psychological skill usage ("high" and "low" groups) and dependent variables were competitive anxiety responses. Non-elite competitive swimmers (N=114) completed a modified version of the Competitive State Anxiety Inventory-2 (CSAI-2) which examined both intensity and direction dimensions prior to racing. Following the event these participants completed the Test of Performance Strategies (TOPS) which measures psychological skills usage. Based on the TOPS scores the swimmers were dichotomised using post-hoc median-split into high and low usage groups for certain psychological skills. MANOVAs
revealed significant differences in the CSAI-2 scores between the high and low usage groups for the skills of relaxation, self-talk and imagery. ANOVAs indicated significant differences on all CSAI-2 subscales for relaxation groups, and differences on cognitive intensity, somatic direction and self-confidence for self-talk groups, and self-confidence for the imagery groups.

Cecchini, et al., (2001) one of the fundamental problems facing teachers of physical education (PE) is how to increase pupils' motivation. From the point of view of goal achievement, guidelines need to be established so that information may be used to increase the effect in classes. This study examined the relationship between the motivational climate created by the PE teacher and the intrinsic motivation of the preparatory sessions together with self confidence and anxiety prior to competition and pre and post competition mood states. The sample was made up of school children (M age = 11.7) from a state school (N = 115), who, after an introduction to an athletic course of 12 sessions, took part in a sports competition. During this time, a teacher (trained to this effect) manipulated the motivational climate, adapting the strategies of TARGET (11, 12, 26, 28). The mastery climate was linked to enjoyment, perceived ability, and effort in the PE classes, as well as to pre competition somatic anxiety and post competition vigor. On the other hand, the performance climate was associated with self confidence, pre competition vigor, and post competition stress. The results are discussed in relation to achievement goal theory and motivational climate manipulation.

Ommundsen and Roberts (1999) examined the relationship between different profiles of the motivational climate in team sport and achievement, and socially related cognitions among Norwegian team sport athletes. Players (N=148) assessed their perception of the motivational climate using the Norwegian version of the Motivational climate in sport questionnaire, sources of satisfaction in team sport, achievement strategies, perceived purposes of sport, and
conceptions of ability. Multivariate analysis of variance (2x2) showed both main effects for profiles of the motivational climate and an interaction effect. Athletes perceiving the climate as high in mastery and high in performance oriented criteria reported psychological responses that were more adaptative than those perceiving the climate as low in mastery and high in performance criteria. With one exception, the findings showed that those high in mastery and low in performance were more likely to emphasize self-referenced criteria when judging perceived ability in team sport. For both social responsibility and lifetime skills as purposes in sport, it was the high performance and low mastery athletes who were least likely to endorse these purposes. And importantly, the high mastery climate seemed to moderate the impact of being in a high performance climate. The pattern of findings suggests that perceiving the motivational climate as performance oriented may not be motivationally maladaptive when accompanied by mastery oriented situational cues.

_Ntoumanis and Biddle, (1998)_ examined the relationships of achievement goal orientations and perceived motivational climate to perceptions of the intensity and direction of competitive state anxiety in a sample of university athletes representing various team sports. Although some studies have demonstrated that task orientation and mastery climate are associated with adaptive emotional patterns and ego orientation and performance climate are linked to less adaptive emotions, others have not verified these findings. In the present study, structural equation modeling was used to test these links. The results showed that perceptions of a performance climate were associated with ego orientation, whereas perceptions of a mastery climate were linked to task orientation. Furthermore, no significant links were found between task orientation and direction of competitive anxiety, while it was shown that the impact of ego orientation on the intensity and direction of cognitive and somatic anxiety was exerted through self-confidence. No significant direct links were found between
motivational climates and competitive anxiety, thus implying that motivational climates may have an indirect impact on affective responses through the different goal orientations. The findings of the present study are discussed along with suggestions for examining situational and individual difference variables that may explain the relationships between intensity and direction of competitive anxiety and achievement goals and motivational climates.

Hallgeir Halvari and Tor Oskar Thomassen (1997) investigated the Sources of sports careers among 150 Norwegian senior high school students who participated in competitive sports. The sample results show that the level (i.e., local to international) of career achieved is significantly facilitated by a strong motivation to succeed, impeded by a strong motivation to avoid failure, and facilitated by both a strong sports-related future orientation and greater sports experience. Ball-game athletes' careers were more strongly influenced by their motivation to succeed than by their motivation to avoid failure. The reverse was the case among athletes in individual-endurance sports. Furthermore, interactions show that some of the influence of achievement motivation on athletes' careers is dependent on the duration of their competitive sports experience and the extent of a developed sports-related future orientation. Among athletes in endurance and ball-game sports, the variables accounted for 45% and 29%, respectively, of the variance in sports career.

Karwande and Anilkumar (1981) made a study on the “comparative effect of yogic and physical exercises on anxiety level and mental fatigue of children”. This study was carried out with sixty male students from VII and VIII standards. The average age of the subjects was 12 years. The test of anxiety level and the test of mental fatigue were taken as criterion measures for the purpose of the study. The tests were taken before and after the experimental period of six weeks. He concluded that anxiety level could be reduced either by training in selected asanas
or related physical exercises. Mental fatigue can be reduced either by training in
selected asanas was superior to the training in physical exercise for both variables
through the difference was not statistically significant.

Kocher (1973) made a study on yoga practices as a variable in neuroticism,
anxiety and hostility. He concluded that significant reduction in total neuroticism,
anxiety level and general hostility was observed in twenty subjects of
experimental group against seventeen subjects of control group after eight month
training programme in yoga.

2.5 Studies on Performance related variables

Raja Gopal and Jim reeves (2007) investigated the effect of yoga
relaxation technique on skill acquisition in volleyball. Forty subjects were selected
by random group design method from Einstein college of Engineering,
Tirunelveli. The subjects were equally divided into two as group I and groupII
(n=20) The experimental group I was given the skill training with yoga relaxation
technique and the experimental group II was given the skill training with physical
relaxation technique. The experimental group practiced the training programme
for six weeks and three days per week. The dependent variables selected for the
study were passing and service. To evaluate the passing and service, Kaul’s
volleyball passing test and Russell- lunge volleyball test were used respectively.
All the subjects were tested before and after the experimental period on the
selected dependent variables. The obtained data from the experimental group were
statistically analysed using dependent ‘t’ test for significant differences on passing
and serving. 0.05 level of confidence was employed in all cases to find out the
significance. The result of the study reveals that there is significant difference in
the skill acquisition between skills training with yoga relaxation technique group
and the skills training with physical relaxation technique group. The analysis also
reveals that the skill training with yoga relaxation technique is much higher than
the skills training with physical relaxation technique group in the skill acquisition.

_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. Three
qualified coaches subjectively rated the technical skill level of each player before
and after the treatment. Analysis of covariance was used to analyse 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) show significant
improvement on all selected parameters among cricket players.

_Viveganandan and Aravinda (2007)_ examined the effect of transcendental
meditation (TM) on jump service of intervarsity men volleyball players. For the
study, 20 subjects were taken during the coaching camp of calicut university men
volleyball team at Christ college, Irinjalakuda. AAPHERD volleyball test were
administered to assess the jump service. The subjects were divided into two equal
Review of Related Literature

groups, Experimental (N=10) and control (N=10) groups. Group I underwent TM programme and group II acted as control group. The TM programme was practiced by experimental group twice a day (morning and Evening) for 3 weeks. In each session, 15-20 minutes of TM programme was practiced before they join the coaching session. The pre test and the post test data were analysed by applying ‘t’ test and One-way analysis of variance. The results showed significant improvement in jump service due to the effect of TM meditation.

Raja Singh Rogland, (2006) investigated the contribution of selected psychological profiles on skill performance of university basketball players. Forty men basketball players from different universities were selected as subjects. For the purpose of the study, Basketball skills performance, namely dribbling, passing and shooting were measured using standardised tests. Their psychological characters anxiety, aggression, achievement motivation and self concept were measured through multiple correlation techniques. It was found that there was a significant relationship between the skills performance of dribbling, passing and shooting and the combined effects of anxiety, aggression, achievement motivation and self concept.

Duncan et.al., (2006) Investigated the anthropometric and physiological characteristics of junior elite volleyball players. Twenty five national level volleyball players (mean (SD) age 17.5 (0.5) years) were assessed on a number of physiological and anthropometric variables. Somatotype was assessed using the Heath-Carter method, body composition (% body fat, % muscle mass) was assessed using surface anthropometry, leg strength was assessed using a leg and back dynamometer, low back and hamstring flexibility was assessed using the sit and reach test, and the vertical jump was used as a measure of lower body power. Maximal oxygen uptake was predicted using the 20 m multistage fitness test. Results indicated that Setters were more ectomorphic (p<0.05) and less
Review of Related Literature

mesomorphic (p<0.01) than centers. Mean (SD) of somatotype (endomorphy, mesomorphy, ectomorphy) for setters and centers was 2.6 (0.9), 1.9 (1.1), 5.3 (1.2) and 2.2 (0.8), 3.9 (1.1), 3.6 (0.7) respectively. Hitters had significantly greater low back and hamstring flexibility than opposites. Mean (SD) for sit and reach was 19.3 (8.3) cm for opposites and 37 (10.7) cm for hitters. There were no other significant differences in physiological and anthropometric variables across playing positions (all p>0.05). Setters tend to be endomorphic ectomorphs, hitters and opposites tend to be balanced ectomorphs, whereas centers tend to be ectomorphic mesomorphs. These results indicate the need for sports scientists and conditioning professionals to take the body type of volleyball players into account when designing individualised position specific training programmes.

Kalidasan, (1998) in his study on influence of training with and without selected yogic practices on the test match skill level among cricketers concludes that the performance of the boys who had training with yogic practices was better in technical skills and performances, than those of the other groups.

Grgantov, et al., (1998) Studied the structural analysis of the volleyball game elements based on certain anthropological features. The importance of the morphological features and motor, functional and specific cognitive abilities as regards successful performance of six elements of the volleyball game (Serve, Serve Receiving, Setting, Spike, Block and Court Defense) was assessed by 9 volleyball experts. Three groups were established by using hierarchical cluster analysis according to the playing distance from the net. Block and spike elements belong to group A hence this group is named playing above the net ; the serve receiving, setting and defense elements make group B, so it is named ‘playing in one’s half of the court’ ; ‘the serve makes’ group C. Based on the arithmetic means of the judges' rating it might be concluded that group A is characterized by a very high level of explosive power, longitudinal dimensionality of the skeleton
and coordination, and in general a higher level of power and endurance than in the other groups. Group B is characterized by a very high level of accuracy and coordination. The characteristic of this group is a very high level of anticipation, speed of reaction, agility, a highly developed sense of distance and flexibility. Group C is characterized by a very high level of accuracy and a highly developed sense of distance and explosive power.

Zwart, (1987) examined attentional and anxiety responses of athletes to mental training techniques. This study explores the changes in competition anxiety, attentional direction and Focus and performance in 13-15year old swimmers after exposure to a super fearing mental training programme. The sports competition anxiety test (SCAT) (Martens 1975) was employed as a measure of competition anxiety. The results of the statistical analysis indicate that there was a statistically significant reduction in competitive anxiety in athletes after exposure to the super learning mental training programme There was also a greater improvement in competitive swimming performance in athletes who reported low competition anxiety than those athletes who reported higher levels of competition anxiety.

Genvchi, (1981) conducted a study to determine the relationship between Competitive Trait anxiety (CTA), State anxiety and golf performance in a field setting. Ten Moderately high CTA collegiate golfers (N=30) performed in a practice round on day of a competitive tournament. State anxiety results indicated a significant CTA main object, with low CTA subject main object, with low CTA subjects displaying lower state anxiety than the moderate or high CTA subjects. The main effect of competition was also significant with post-hoc tests indicating higher levels of state anxiety during day 19w day-2 than during the practice round. Performance results produced significant CTA MAIN EFFECT WITH 10W CTA subjects displaying high levels of performance than moderate or high CTA
SUBJECTS. Correlation between SCAT state anxiety indicated that SCAT was a good predictor of pre competitive anxiety.

Griffith et al. (1979) examined the relationship between the anxiety levels of 62 scuba diving students and standardized that there was no relationship between anxiety and performance on relative simple tasks, while there was a relationship between anxiety and performance on the more complex manoeuvres.

Corron, (1977) studied the interference effects of high emotional arousal on performance and found a detrimental effect on highly anxious male college students in a balancing task. Where as low anxiety subjects were unaffected. He concluded that in tasks of low difficulty, high anxious subjects were found to be superior to low anxiety subjects. However, in tasks of high difficulty low anxiety people (subjects) proved superior. Experience in the activity tended to reduce the adverse effects of anxiety.

Jones, (1973) conducted a study to find out the effect of anxiety and the need for achievement of the performance of high school wrestlers. The data were obtained from the Thematic Perception. It was concluded that the personality trait of anxiety and the need for achievement had a tendency to influence both the expectancy and the actual performance of these high school wrestlers. Those who measured low in anxiety level performance better than those high in anxiety group. The group scoring the highest in performance was low in anxiety and high in need for achievement. The lowest level of performance was demonstrated by the group with high anxiety and low need for achievement.

There are 30 reviews referred to in this section about physical and physiological variables. They revealed that the flexibility can be increased significantly due to yogic practices and physical exercises. And it was also
reported that heart rate was lowered effectively. It was reported that yogic practices lowered the systolic blood pressure and diastolic blood pressure effectively. Besides the results of the past studies it is also revealed that there was an improvement in cardio respiratory endurance also.

There are 7 reviews referred to in this section about hematological variables. It was reported that yogic practices and other physical exercises lowered the low density lipoprotein levels and blood cholesterol effectively. Besides, the results of the past studies revealed that there was an improvement in high density lipoproteins levels.

There are 22 reviews referred to in this section about psychological variables. They revealed that the competitive state anxiety was decreased significantly due to yogic practices and physical exercises. Hence it was reported that competitive trait anxiety was lowered effectively. It was found that the results of the past studies revealed that there was an improvement in achievement motivation.

There are 12 reviews referred to in this section about performance related variables. They revealed that the performance of various games can be increased significantly due to yogic practices and physical exercises.