CHAPTER II

REVIEW OF RELATED LITERATURE

In the present chapter the investigator is made an attempt to report the literature based upon the various aspects of juveniles/delinquents programme.

A study of relevant literature is an essential step to get a full picture of what has been done and said abroad and in one’s own country with regard to the problem.

Similar studies were seen conducted in various countries regarding the problems of juvenile delinquency with regard to the children having excess energy who were not able to utilize this energy profitably to the betterment of the society and for the refinement of the children themselves. The related studies pertaining to this research are presented in the following heads:

1. Studies related to Juvenile Delinquency
2. Studies related to Yogic Practices on Motor Fitness Components
3. Studies Related to Yogic Practices on Physiological Variables
4. Studies Related to Yogic Practices on Psychological variables
5. Studies on Physiological Variables
6. Studies on Psychological Variables
2.1 STUDIES ON JUVENILE DELINQUENCY

Cavin (2001) made a study to identify and explore personality characteristics of juvenile delinquents, to compare those characteristics with those of the general population, and determine if there are significant differences, as measured by the Myers-Briggs Type Indicator (MBTI), between the personality characteristics of juvenile delinquents and the general population. Procedures

Juvenile delinquents who were adjudicated into a Texas Youth Commission facility in North Texas were subjects for this study. Participants included 186 males who ranged in age from 14 years to 20 years. Statistical analyses were performed for each of the research findings. When comparing MBTI scores of juvenile delinquents to the general population, significant differences were found on the dichotomous scales, temperaments, function pairs, and types. Conclusions based upon the findings of this study, the following conclusions were made. All type preferences are represented within the juvenile delinquent population. The MBTI can be useful in responding to the education and rehabilitation needs of juvenile delinquents. Knowledge of personality type can help caregivers meet the needs of juvenile delinquents. Understanding personality type preference can serve to provide a deeper understanding of the behaviors that lead to adjudication of juvenile delinquents. A discovery of the types of adolescents who are adjudicated could lead to preventive measures, early detection, and early intervention for students at risk of becoming juvenile delinquents.
Dietrich et al (2001) examined relationships between prenatal and postnatal exposure to Pb (serial blood Pb determinations) and antisocial and delinquent behaviors (self- and parental reports) in a prospective longitudinal birth cohort of 195 urban, inner-city adolescents (aged 15-17 years). Prenatal exposure to Pb was significantly associated with a covariate-adjusted increase in the frequency of parent-reported delinquent and antisocial behaviors, while prenatal and postnatal exposure to Pb was significantly associated with a covariate-adjusted increase in frequency of self-reported delinquent and antisocial behaviors, including marijuana use. Use of marijuana itself was strongly associated with all measures of delinquent and antisocial behavior. This prospective longitudinal study confirmed earlier clinical observations and retrospective studies that have linked Pb exposure with antisocial behavior in children and adolescents. Both prenatal and postnatal exposure to Pb were associated with reported antisocial acts and may play a measurable role in the epigenesist of behavioral problems independent of the other social and biomedical cofactors assessed in this study.

Wong et al. (2001) examined the interactive effects of criminogenic factors on delinquency among youth in China and Hong Kong. Subjects in the retrospective study comprised 63 male youth (aged 12-18 years) residing in Hong Kong and Guangzhou, China, 32 of whom were convicted delinquents. Subjects completed interviews concerning parental closeness and supervision, reaction to
parental supervision, academic performance, and relationships with classmates and teachers, reactions to teaching practices, and time spent in sports activities, youth clubs, and religious activities. Results show that 65% of Hong Kong delinquent Subjects, and 40% of Guangzhou delinquent Subjects came from broken homes. Nearly all delinquent Subjects reported that they were ignored by their parents and seldom felt understood. Delinquent Subjects exhibited higher school dropout rates, which they attributed to their own behavioral problems, academic difficulties, or poor teacher-student relationships. Non-delinquent Subjects associated with friends from school; in contrast, delinquent Subjects met their peers in video arcades, street corners, or playgrounds and had close ties to neighborhood gangs.

Gibson and Ann (2001) made a qualitative effort towards understanding a possible connection between the student-teacher relationship and an outcome of delinquency for African-American males. Of particular interest are the messages that students receive from their teachers. These messages may be direct and verbal or subtle and non-verbal. Some messages facilitate school failure and/or delinquency. African-American males are the focus of the study because of a growing concern about their over representation amongst delinquents. African-Americans constitute 12.7 percent of the United States population (Census Bureau, 1998). Yet, on any given day, African-American juveniles represent approximately 43 percent of those in detention facilities (Roscoe & Morton,
The primary subjects were 16 delinquents and eight non delinquents (ages 15-18 years, primarily 9th and 10th graders) and some of their teachers. The subjects came from two Bronx, New York high schools. One site was a comprehensive public high school, the other an alternative, public high school. The students were observed for at least two-thirds of a semester in their classes. They, their teachers and school staff were interviewed to formulate a thorough picture of the socializing effect of school towards a positive life trajectory or a negative one. Results were analyzed using Numerical Unstructured Data Indexing Searching Theorizing (NUDIST) software.

Sizer (2001) examined juvenile delinquency from an ecological perspective. Study participants were referred by Lexington County Department of Juvenile Justice after being arrested on first-time nonviolent charges. Data was collected at three time periods, pre, post, and follow-up. This study used only pre data. The sample was comprised of eighty-seven youth, with ages ranging from 11 to 17. Bi-variate correlations and structural equation modeling was utilized to examine the data. Correlated analyses revealed that family conflict, positive peer interactions and negative peer influences significantly related to juvenile delinquency. When examining perceived support quality across ecological contexts, only stressful support significantly related to juvenile delinquency. Social welfare was the only community support type that significantly related to delinquency. When community support was grouped by category, relational,
occupational, and human services, only relational and occupational support significantly related to juvenile delinquency. Many, support variables were significantly related to each other, indicating possible indirect routes to juvenile delinquency. Structural equation modeling, modeling that examined the influence of family, peer, and community influences together with juvenile delinquency, fit the data reasonably well. Indicating, juvenile delinquency might be better explained by integrating multiple contexts and community influences. Implications for theory, practice, and policy are included.

Rapadas (2001) observed that juvenile delinquency has been the topic of numerous researches within the United States and Europe. There have been relatively few investigations into juvenile delinquency in the Pacific Islands. The present investigation studied juvenile delinquency in Guam, a Pacific Island undergoing significant social, economic, and cultural changes. A sample of archival juvenile delinquent records over the last 10 to 13 years from the island's Youth Correctional Facility were used to reveal patterns, changes, similarities and differences among demographic, clinical, and offense variables. In addition, a small sample of delinquent and non-delinquent youth was interviewed to gain a deeper understanding of their life experiences. The results of the study reveal that among the juvenile delinquent population, young Chamoru males and females, when compared to its population at large, are over represented in all areas of concern in the study. They experience the highest rates of alcohol and drug use,
are more actively suicidal, commit more overall offenses, make up the majority of
criminal recidivists, and more frequently report belonging to gangs. Chuukese
male delinquents on Guam are also over represented in the DYA population when
compared to their current population numbers on Guam. Overall admissions have
dropped over the last five years due in large part to rigorous follow-up, aftercare,
and an early out program. Recidivism rate has stayed consistent at around 50 to
60% despite the drop in admissions. The majority of delinquents are between the
ages of 12 through 17. More than half was aged 15 through 17. For Guam's
delinquent population, gang behavior is limited. Assault and property crimes were
the most frequent criminal offenses committed by juvenile delinquents, but the
majority of all offenses were status offenses. An analysis on clinical diagnoses
given to juvenile delinquents reveals that 'oppositional defiant disorder', 'conduct
disorder', and 'substance abuse disorders' were the three most frequently given
diagnoses. Other less frequent diagnoses included 'child abuse victim', 'borderline
IQ', 'adjustment disorder', 'dysthymia', 'learning disorders' and 'PTSD'. Interviews
of delinquent and non-delinquents revealed that many delinquent teenagers have a
long history of unstable nuclear family situations and often live with relatives.
Delinquents have spent a large part of their lives living with people other than
their natural parents. Delinquent teenagers interviewed in this study have a history
of school failures and are usually in grades that do not fit their age group. Many
delinquents report not having many close friends in contrast to the non-
delinquents who report having many close friends. Non-delinquents appeared to have more involvement in school clubs, athletics, and community activities. Finally, recommendations for improving upon the recent work that the Department of Youth Affairs has done to lower overall admissions into DYA are discussed. It involves system changes and priority shifting, establishment of focus groups, use of the media, and an awareness of the cultural decline that the indigenous, Chamoru people of Guam are undergoing.

According to Hammel (2001) before the MMPI-A can be confidently used with female delinquents, the construct validity of its scales and subscales needs to be demonstrated. This study was a first step toward establishing the MMPI-A's validity with female delinquents. Base rates, response patterns, and configurations for 225 incarcerated female delinquents, ranging in age from 13 to 17 years of age (mean age = 16 years; SD = 10.6 months), were compared with non delinquent females from the MMPI-A standardization sample. Results suggest that the MMPI-A scales and subscales differentiate female delinquents from non-delinquents. Differences were consistent with predictions based on previous MMPI research and research findings on the characteristics of female delinquents, lending support to the construct validity of the MMPI-A with this specialized population. To examine whether the MMPI-A is useful in identifying subgroups of incarcerated female delinquents, a post-hoc k-means cluster analysis was conducted on the MMPI-A Basic Scales. Five subgroups were identified.
External correlates, such as delinquent history, psychological diagnoses, level of substance abuse, family characteristics, history of abuse, educational achievement, history and/or current psychiatric treatment, suicidal ideation and behavior, and behavior while incarcerated were tested for differences among the five subgroups. Further support for the construct and concurrent validity of the MMPI-A with female delinquents was demonstrated, since significant differences in external correlates among the subgroups corresponded with MMPI-A interpretive guidelines. This study was a first step towards establishing the construct validity of the MMPI-A with female delinquents. Results suggest that this instrument will most likely prove to be a useful clinical tool for mental health professionals in correctional settings who work with delinquent females. Correctional resources can be most effectively allocated when treatment and rehabilitation needs are accurately assessed up-front. Further research is still needed, however, before confidence in the MMPI-A's appropriateness for female delinquents is adequately established. Research is needed to replicate current findings, and then to systematically investigate external correlates for the MMPI-A scales and subscales.

According to Schiller (2001) until recent years, female juvenile delinquency has been associated with sexual promiscuity and with an inequity of greater incarceration for female juvenile delinquents than male juvenile delinquents regardless of their offenses. As female juvenile delinquency
increased, the concern for this social problem increased. However, very little is known about the female juvenile delinquent, or about her characteristics. A comprehensive literature review dates juvenile delinquency as far back as the middle ages, with more advanced theories and empirical studies emerging during the middle 19th century to present. Unfortunately, there is a dearth of information on the female juvenile delinquent, and a scarcity of empirical studies. This study explores the qualitative and quantitative studies that address female juvenile delinquency and extracts those characteristics that have received empirical support for their association with the female delinquent. Using these identified characteristics: commitment to negative peers, individual bond, commitment to school, neutralization (normalization of delinquent behaviors), locus of control, self-esteem, attitude toward delinquency, risk-seeking, belief in limited opportunities, ethnicity, age, grade, academic classes, place of residence, history of substance abuse, and history of smoking cigarettes, a typology of the incarcerated female delinquent was hypothesized. This study used a cross-sectional approach to explore these characteristics and included 286 incarcerated girls, in the southern part of Florida during September 2000. Using multivariate statistics, a typology of the female juvenile delinquent emerged. Although three subgroups emerged, the hypotheses were only partially supported. The original subgroups of The Innovator, The Conformist, and The Risk-Taker, were not mutually exclusive. The subgroups The Innovator and The Risk-Taker were
grouped together, The Conformists remained a subgroup, and the third subgroup emerged 'The Impressionable.' Although the study was limited to incarcerated female offenders in the state of Florida, the data analysis found that 95% of the girls were classified correctly into these three subgroups. The results of these findings offer important information on understanding the female juvenile delinquent, her characteristics, the impact of her environment on her behavior, and the need for further research. Further research might include replicating this study nationally, with the inclusion of a comparison group, and with additional variables.

**Maki et al. (2001)** notes that delinquents and offenders use games as defense mechanisms to avoid anxiety, as well as to avoid responsibility and accountability for their behavior. The author presents 20 examples of these games as an impetus for discussion of negative attitudes and behaviors seen among delinquents, and to make some suggestions regarding what can be done to redirect and help them to take responsibility for their behavior.

**Pommier et al. (1995)** determined the impact on several self-perception, behavioral, and family functioning (FF) variables of an Outward Bound School program for 39 adolescent status offenders that included a family training component (FINS). Data were collected before the program begun; 4 wks after the program began, and again after 4 mo. eight specific self-perception domains and Global Self-Worth were evaluated for each S using Harter's Self-Perception
Profile for Adolescents (SPPA). Family Cohesiveness and Adaptability scores and level and intensity of adolescents' behavior problems were determined using Olsen's Family Adaptability and Cohesion Evaluation Scale-II and the Eyberg Child Behavior Inventory, respectively. A 2 X 2 ANCOVA, Group by Time repeated measures design with the pre-test used as the covariate was used to determine interaction effects for the SPPA and FF variables. A repeated measures ANCOVA with the pre-test used as the covariate was used to determine differences for the Behavior Intensity and Problem variables. Results revealed that at the 4 wk post-test, treatment group Subjects had significantly higher scores on all variables compared to the control group. For several scores of the SPPA and the FF variables, differences had disappeared by the time the 2nd post-test was conducted.

Hind (1995) investigated the satisfaction reported by young offenders following the playing of 2 interactive computer games requiring identical skills but involving differing levels of perceived aggression and planning for successful completion. Questionnaires and measures of self-esteem were administered to 72 incarcerated young offenders aged 15-18 years. 40 of these Subjects had a record of violent offending. Subjects' responses were compared to a control group of 30 young, male non-offenders. Subjects were asked to play 2 short computer games, and to rate their satisfaction with both. The results indicate that the computer game which involved pattern planning to achieve success was reported as being
less satisfying than that which simply required the "destruction" of objects. Further, between group differences were obtained on game satisfaction and self esteem scores.

**Hoshino (1995)** studied students' and juvenile delinquents' attitudes towards community activity programs designed to prevent delinquency. Human Subjects: 933 normal male and female Japanese adolescents (junior and senior high school students in 6 prefectures). 854 male and female Japanese adolescents (juvenile delinquents detained by the police in 21 prefectures) 1,024 normal Japanese adults (teachers, volunteers, government officials, and police officers sponsors of community activity programs in the prefectures where the students and delinquents lived). A survey was conducted 1.5 years after the 5-day school system was introduced. The questions concerned the preference for, incentive to participate in, and assessment of organized recreational programs, regular sports practice, educational programs, job-training programs, city beautification activities, and social service activities

**Fisher et al. (1995)** responds to M. Abbott et al's methodological challenge to S. Fisher's study of adolescent fruit machine gamblers, carried out with young video game players. It is argued that important differences in the game under study, the measure of pathological gambling used and sample characteristics seriously undermine the extent to which a comparison and extrapolation of findings are achieved. In this analysis, the author highlights areas
of constructive criticism as well as limitations to the challenge with the aim of progressing academic endeavor in this important field.

**Abboti et al. (1995)** conducted a methodological challenge to S. Fisher's (1992) study of adolescent fruit machine gamblers, using young video game players. 183 11-16 year old video game players (152 males; 31 females) were recruited from 4 amusement arcades to answer a computerized questionnaire. Use of an analysis similar to Fisher confirmed results for adolescent fruit machine users. However, a separation of key variables and the use of a multiple regression analysis showed that of money spent, time spent and impaired choice, only the 1st was a significant predictor of delinquency. Results suggest that delinquents have more disposable income to spend on their leisure activities. Video game playing and possibly fruit machine gambling appear to be independently associated with delinquency; in video game playing this association is not mediated by dependency.

**Suzuki (1994)** conducted a 1.5-year follow-up of the weekend lifestyle impact of reducing the school week from 6 days to 5 days once a month in public schools. The 1st assessment of the new system was conducted 3 mo after its introduction. Human Subjects: 933 normal male and female Japanese adolescents and adults (junior and senior high school students). 854 male and female Japanese adolescents and adults (juvenile delinquents selected by the police) (junior and senior high school students). A questionnaire survey was performed. Positive uses
of free time, effects on family relationships, and unfavorable effects on
development (e.g., increased time spent at amusement centers and game rooms)
were compared for non delinquents and delinquents. Results of this study were
compared with the results of the 3-mo assessment.

**Hoshino (1993)** studied the degree of awareness of and participation in
recreational, sports, and educational community programs designed to prevent
juvenile delinquency. Subjects were 1,301 normal junior and senior high school
students and 1,289 juvenile delinquent junior and senior high school students who
had police records. Questionnaires were administered 3 mo after a 5-day school
wk was introduced. The desire for a positive relationship with police officers was
seen in both groups.

**Sherer (1994)** presents the development and application of a
computerized therapeutic simulation game for raising the moral level of or
resocializing youth in distress. The effects of the game on moral development
were determined by a moral development measure. The level of moral
development of 13-member research group (mean age 15.3 years) and 14 controls
(mean age 15.21 years) were measured before and after exposure to the
therapeutic game. Subjects met for 16 weekly sessions consisting of 1 hour of
computer game followed by approximately 1 hour of discussion. A total of 5
indices of moral development were used. Two of these, Moral stage and
Punishment, revealed a positive effect on the participants. Reports by counselors
indicated that the youth were stimulated by the computer game experience. Youth themselves thought the situations presented were on target. Short, less complicated situations produced the best results.

**2.2 STUDIES ON MOTOR FITNESS VARIABLES DUE TO YOGIC PRACTICES**

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

_**Maity and 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 programmers of calisthenics and yogasana were effective in developing motor fitness of fifth grade girls. (ii) Calisthenics exercise programme was found superior to yogasanas in improving performance in each individual test item of Oregon Motor Fitness test except crossed arm – curl ups.

_Tiken, et.al. (2002)_ have conducted a study on 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 and height of 17.5 years and 15 years and 172.8 cms and 156.4 cms 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 exercise 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).

**Tran, et.al. (2001)** had conducted a study on the effect of hatha yoga practice elicited improvement on the health – related aspects of physical fitness. Ten healthy, untrained volunteers (nine female and one male), ranging in age from 18-27 years, were tested on muscular strength and endurance, flexibility, cardiorespiratory fitness, body composition and pulmonary functions. Training was given two days in a week for a period of eight weeks. It was found out that regular hatha yoga can elicit improvement in the health – related aspects of physical fitness.

The effect of yoga training on reaction time, respiratory endurance and muscular strength was investigated by Madanmohan et al., (1993). Twenty seven subjects were given yoga training for 12 weeks to test the visual and auditory reaction time, maximum expiratory pressure, maximum inspiratory pressure, 40 mm kg test, breath holding time after expiration, breath holding time after inspiration, and hand grip strength. It was concluded that yoga practice for 12 weeks results in significant reduction in visual and auditory reaction times and significant increase in respiratory pressures, breath holding time and hand grip strength.
Lohan and Rajesh (2002) studied the effect of asanas and pranayamas on physical and physiological components of boys between age group 12-16 years. One hundred and twenty subjects were equally divided into asana, pranayama, combined and controlled groups. Ten weeks training 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 ANACOVA. 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.

Chan, et al., (2001) made a study to determine the relationship between the psychometric profile and health related fitness of Chineese youths in Hong Kong. They selected 1,615 Chineese school boys as subjects. The physical self description questionnaire suggested by Marsh et al (1994) was used to provide psychometric profiles. Anaerobic fitness estimated from mile run, flexibility scores from sit and reach test, push up scores, curl up scores and percentage of body fat were also collected as health related fitness factors. The results indicated that health related fitness is highly related to psychometric items such as perceived sport competence, perceived activity level, perception of body fat and global physical self concept. These results indicated the promotion of
psychometric self perception of youth. The fact that male adolescents have more positive physical self perception than female signify the need to reevaluate the social values concerning physical fitness and perception that were placed on youth.

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

Harinath et. al., (2004) had conducted the study on 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 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 suggest that yogic practices can be used as psycho physiologic stimuli to increase endogenous secretion of melatonin, which, in turn, might be responsible for improved sense of well-being.

Alpert et al., (1990) had investigated the effects of aerobic exercise on a sample of 24 preschoolers. Thirty minutes of aerobic exercises were provided daily for a period of 8 weeks for a group of 12 children while the remaining 12 children engaged in free play on the school playground. The children were given pretests and posttests on the following measures: a sub maximal exercise test on a pediatric bicycle (baseline and three workloads), an agility test, a health knowledge test, a self-confidence scale, and an observational measure of their gross-motor activity. Despite comparability on pretests, significant group X repeated measures effects suggested that the aerobic exercise group showed decreases in heart rate at all three workloads as well as increases in agility and self-esteem following the exercise program. These findings suggest that cardiovascular fitness, agility, and self-confidence can be facilitated in preschoolers by an aerobic exercise program.

2.3 STUDIES ON PHYSIOLOGICAL VARIABLES DUE TO YOGIC PRACTICES

Madan Mohan, et.al.(2000) studied the effects of yoga training on cardiovascular response to exercise and the time course of recovery after the
exercise. Cardiovascular response to exercise was determined by Harvard step test using a platform of 45 cm height. The subjects were asked to step up and down the platform at a rate of 30/min for a total duration of 5 min or until fatigue, whichever was earlier. Heart rate (HR) and blood pressure response to exercise were measured in supine position before exercise and at 1, 2, 3, 4, 5, 7 and 10 minutes after the exercise. Rate-pressure product \([\text{RPP} = (\text{HR} \times \text{SP})/100]\) and double product \((\text{DoP} = \text{HR} \times \text{MP})\), which are indices of work done by the heart were also calculated. Exercise produced a significant increase in HR, systolic pressure, RPP & DoP and a significant decrease in diastolic pressure. After two months of yoga training, exercise induced changes in these parameters were significantly reduced. It is concluded that after yoga training a given level of exercise leads to a milder cardiovascular response, suggesting better exercise tolerance.

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

Madanmohan et.al (2005) undertook a comparative study of the effect of short term (three weeks) training in savitri (slow breathing) and bhastrika (fast breathing) pranayams on respiratory pressures and endurance, reaction time, blood pressure, heart rate, rate-pressure product and double product. Thirty student volunteers were divided into two groups of fifteen each. Group I was given training in savitri pranayam that involves slow, rhythmic, and deep breathing. Group II was given training in bhastrika pranayam, which is bellows-type rapid and deep breathing. Parameters were measured before and after three week training period. Savitri pranayam produced a significant increase in
respiratory pressures and respiratory endurance. In both the groups, there was an appreciable but statistically insignificant shortening of reaction time. Heart rate, rate-pressure product and double product decreased in savitri pranayam group but increased significantly in bhashrika group. It is concluded that different types of pranayams produce different physiological responses in normal young volunteers.

Mohan, M. et.al.(2004) studied the effect of inspiratory and expiratory phases of normal quiet breathing, deep breathing and savitri pranayam type breathing on heart rate and mean ventricular QRS axis was investigated in young, healthy untrained subjects. Pranayam type breathing produced significant cardioacceleration and increase in QRS axis during the inspiratory phase as compared to eupnea. On the other hand, expiratory effort during pranayam type breathing did not produce any significant change in heart rate or QRS axis. The changes in heart rate and QRS axis during the inspiratory and expiratory phases of pranayam type breathing were similar to the changes observed during the corresponding phases of deep breathing.

Joshi, et.al. (1996) selected thirty three normal male and forty two normal female subjects, of average age of 18.5 years, underwent six weeks course in 'Pranayam' and their ventilatory lung functions were studied before and after this practice. They had improved ventilatory functions in the form of lowered respiratory rate (RR), and increases in the forced vital capacity (FVC), forced expiratory volume at the end of 1st second (FEV1%), maximum voluntary
ventilation (MVV), peak expiratory flow rate (PEFR-lit/sec), and prolongation of breath holding time.

Makwana et.al. (1988) selected 25 normal male volunteers undergoing a ten weeks course in the practice of yoga have been studied by some parameters of ventilatory functions tests. The observations recorded at the end of ten weeks of the course have shown improved ventilatory functions in the form of lowered respiratory rate, increased forced vital capacity, FEV1, maximum breathing capacity and breath holding time, while tidal volume and %FEV1, did not reveal any significant change. Thus, a combined practice of yoga seems to be beneficial on respiratory efficiency.

Chaya et.al (2006), investigated the net change in the basal metabolic rate (BMR) of individuals actively engaging in a combination of yoga practices (asana or yogic postures, meditation and pranayama or breathing exercises) for a minimum period of six months, at a residential yoga education and research center at Bangalore. The measured BMR of individuals practicing yoga through a combination of practices was compared with that of control subjects who did not practice yoga but led similar lifestyles. This study shows that there is a significantly reduced BMR, probably linked to reduced arousal, with the long term practice of yoga using a combination of stimulatory and inhibitory yogic practices.
Satyanarayana (1992) Santhi Kriya is a mixture of combined yogic practices of breathing and relaxation. Preliminary attempts were made to determine the effect of Santhi Kriya on certain psycho physiological parameters. Eight healthy male volunteers of the age group 25.9 +/- 3 (SD) years were subjected to Santhi Kriya practice daily for 50 minutes for 30 days. The volunteer's body weight, blood pressure, oral temperature, pulse rate, respiration, ECG and EEG were recorded before and after the practice on the 1st day and subsequently on 10th, 20th and 30th day of their practice. They were also given a perceptual acuity test to know their cognitive level on the 1st day and also at the end of the study i.e., on the 30th day. Results indicate a gradual and significant decrease in the body weight from 1st to 30th day (P less than 0.001) and an increase in alpha activity of the brain (P less than 0.001) during the course of 30 days of Santhi Kriya practice. Increase of alpha activity both in occipital and pre-frontal areas of both the hemispheres of the brain denotes an increase of calmness. This study also revealed that Santhi Kriya practice increases oral temperature by 3 degrees F and decreases respiratory rate significantly (P less than 0.05) on all practice days. Other parameters were not found to be altered significantly. It is concluded that the Santhi Kriya practice for 30 days reduces body weight and increases calmness.

Murugesan et al. (2000) selected thirty three (N = 33) hypertensives, aged 35-65 years, from Govt. General Hospital, Pondicherry, were examined with
four variables viz, systolic and diastolic blood pressure, pulse rate and body weight. The subjects were randomly assigned into three groups. The exp. group-I underwent selected yoga practices, exp. group-II received medical treatment by the physician of the said hospital and the control group did not participate in any of the treatment stimuli. Yoga imparted in the morning and in the evening with 1 hr/session. day-1 for a total period of 11-weeks. Medical treatment comprised drug intake every day for the whole experimental period. The result of pre-post test with ANCOVA revealed that both the treatment stimuli (i.e., yoga and drug) were effective in controlling the variables of hypertension.

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 (r1 systolic = 0.631 and r1 diastolic = 0.610) as well as in the control group (r2 systolic = 0.981 and r2 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). Our results indicate that yoga reduces the age related deterioration in cardiovascular functions.

Stancak, et.al. (1991) studied cardiovascular and respiratory changes during yogic breathing exercise kapalabhati (KB) in 17 advanced yoga practitioners. The exercise consisted in fast shallow abdominal respiratory movements at about 2 Hz frequency. Blood pressure, ECG and respiration were recorded continuously during three 5 min periods of KB and during pre- and post-KB resting periods. The beat-to-beat series of systolic blood pressure (SBP) and diastolic blood pressure (DBP), R-R intervals and respiration were analysed by spectral analysis of time series. The mean absolute power was calculated in three frequency bands--band of spontaneous respiration, band of 0.1 Hz rhythm and the low-frequency band greater than 15 s in all spectra. The mean modulus calculated between SBP and R-R intervals was used as a parameter of baroreceptor-cardiac reflex sensitivity (BRS). Heart rate increased by 9 beats per min during KB. SBP and DBP increased during KB by 15 and 6 mmHg respectively. All frequency bands of R-R interval variability were reduced in KB. Also the BRS parameter was reduced in KB. The amplitude of the high-frequency oscillations in SBP and DBP increased during KB. The low-frequency blood pressure oscillations were increased after KB. The results point to decreased cardiac vagal tone during KB.
which was due to changes in respiratory pattern and due to decreased sensitivity of arterial baroreflex. Decreased respiratory rate and increased SBP and low-frequency blood pressure oscillations after KB suggest a differentiated pattern of vegetative activation and inhibition associated with KB exercise.

The purpose of Virtanen et.al. (2003) study was to determine whether psychological factors are associated with heart rate variability (HRV), blood pressure variability (BPV), and baroreflex sensitivity (BRS) among healthy middle-aged men and women. A population-based sample of 71 men and 79 women (35-64 years of age) was studied. Five-minute supine recordings of ECG and beat-to-beat photoplethysmographic finger systolic arterial pressure and diastolic arterial pressure were obtained during paced breathing. Power spectra were computed using a fast Fourier transform for low-frequency (0.04-0.15 Hz) and high-frequency (0.15-0.40 Hz) powers. BRS was calculated by cross-spectral analysis of R-R interval and systolic arterial pressure variability's. Psychological factors were evaluated by three self-report questionnaires: the Brief Symptom Inventory, the shortened version of the Spielberger State-Trait Anger Expression Inventory, and the Toronto Alexithymia Scale. It was found anxiety and hostility are related to reduced BRS and increased low-frequency power of BPV. Reduced BRS reflects decreased parasympathetic outflow to the heart and may increase BPV through an increased sympathetic predominance.
Raghuraj et al. (1998) studied on the heart rate variability (HRV) is an indicator of the cardiac autonomic control. Two spectral components are usually recorded, viz. high frequency (0.15-0.50 Hz), which is due to vagal efferent activity and a low frequency component (0.05-0.15 Hz), due to sympathetic activity. The present study was conducted to study the HRV in two yoga practices which have been previously reported to have opposite effects, viz, sympathetic stimulation (kapalabhati, breathing at high frequency, i.e., 2.0 Hz) and reduced sympathetic activity (nadisuddhi, alternate nostril breathing). Twelve male volunteers (age range, 21 to 33 years) were assessed before and after each practice on separate days. The electrocardiogram (lead I) was digitized on-line and off-line analysis was done. The results showed a significant increase in low frequency (LF) power and LF/HF ratio while high frequency (HF) power was significantly lower following kapalabhati. There were no significant changes following nadisuddhi. The results suggest that kapalabhati modifies the autonomic status by increasing sympathetic activity with reduced vagal activity. The study also suggests that HRV is a more useful psycho physiological measure than heart rate alone.

Brown and Gerbarg (2005) found Yogic breathing is a unique method for balancing the autonomic nervous system and influencing psychological and stress-related disorders. Part I of this series presented a neurophysiologic theory of the effects of Sudarshan Kriya Yoga (SKY). Part II will review clinical studies,
our own clinical observations, and guidelines for the safe and effective use of yoga breath techniques in a wide range of clinical conditions. Although more clinical studies are needed to document the benefits of programs that combine pranayama (yogic breathing) asanas (yoga postures), and meditation, there is sufficient evidence to consider Sudarshan Kriya Yoga to be a beneficial, low-risk, low-cost adjunct to the treatment of stress, anxiety, post-traumatic stress disorder (PTSD), depression, stress-related medical illnesses, substance abuse, and rehabilitation of criminal offenders. SKY has been used as a public health intervention to alleviate PTSD in survivors of mass disasters. Yoga techniques enhance well-being, mood, attention, mental focus, and stress tolerance. Proper training by a skilled teacher and a 30-minute practice every day will maximize the benefits. Health care providers play a crucial role in encouraging patients to maintain their yoga practices.

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

Schell, et.al. (1994) conducted a study on physiological and psychological effects of Hatha – Yoga exercise in healthy women. They measured heart rate, blood pressure, the hormones cortisol, prolactin and growth hormone and certain psychological parameters in a yoga practicing group and a control group of young female volunteers prior and after the experimental period. There were no substantial differences between the groups concerning endocrine parameters and blood pressure. The heart rate was significantly different in yoga group having a significant decrease in heart rate during the yoga practice. In the personality inventory the yoga group showed markedly higher scores in life satisfaction and lower scores in excitability, aggressiveness, openness, emotionality and somatic complaints. Significant differences could also be observed concerning coping with stress and mood at the end of the experiment. The yoga group had significant higher scores in high spirits and extravertedness.

Berger and David (1988) experimented stress reduction and mood enhancement in four exercise modes, swimming, body conditioning, hatha yoga and fencing. Students voluntarily enrolled in co-educational fencing, body conditioning, swimming and yoga administered the POMS, a measure of mood states and the state anxiety subscale of the STM before and after class on three different days, students were significantly more fatigued than before. In body
conditioning, the interaction between pre and post means was significant. Yoga participants felt significantly better after exercising on four POMS subscales.

**Berger, et.al. (1993)** determined the exercise and mental health literature and then examined the influence of rational difference on the acute mood benefits of swimming on women college students (N=70) from Czechoslovakia and the United States. They completed the POMS before and after class on three occasions. The United States swimming classes met for 50 minutes twice a week throughout a 14 weeks semester Czechoslovakian swimming classes met for 90 minutes once a week throughout a biweek semester in comparison with their respective controls. Czechoslovakian swimmers reported greater mood changes than the United States swimmers. The Czechoslovakian and United States swimmers reported mood improvement on tension, depression, anger, vigor and confusion.

### 2.5 STUDIES ON PHYSIOLOGICAL VARIABLES

**Hubert Dhanaraj (1974)** studied the effects of yoga and 5Bx fitness plan on selected physiological parameters. The results indicated increase in basal metabolic rate, tidal volume in basal state. T-4 thyroxin, hemoglobin, Hemtocried blood cell PWC 130, vital capacity, chest expansion, breath holding time and flexibility after yoga training decreases in heart rate in barrel state and respiratory rate in barrel state were also observed. When yogic training was discontinued for
six weeks, following the six weeks treatment, a significant declination in values of PWC130, flexibility and breath holding time were noticed.

* Aand et.al. (2003) examined the fifteen day cessation of training on selected physiological and performance variables. Fifteen middle distances, competitive female runners were divided into a cessation training group and maintenance training group for the duration of 15 weeks study. The cessation training group completely ceased. Their training while the maintenance groups maintained their current training program. No changes were noted in Vo2 max, after five days of cessation of training. However at the completion of the 15days study the cessation training group was 4%. Slower on the 2400 meter time trial and has a 7.8% decrease in VO2 max when compared to the maintenance training group. The study point out that female middle distance runner can undertake short periods of no training without negative effects on their performance. This may be useful for rehabilitation travel and bouts of minor illness. However by 10 days without training physiological adaptations begins occur and performance may suffer.

* Ivin Jabakumar (2007) conducted a study on comparison of selected physical and physiological parameters between moderate altitude and sea level inhabitants. For the purpose, twenty-five sea level inhabitants from Chennai and twenty five moderate altitude inhabitants from kodaikanal were selected as
subjects. Their age ranged from 18-25 years. The physical fitness variables (speed, agility, endurance) were selected and tested using 50mts dash, shuttle run cooper is 12 minutes run/walk respectively physiological variables such as breathe holding tune, pulse rate, blood pressure were selected and tested. The results of the study were there was significant difference in agility and breathe holding time and there was no significant between sea level and moderate altitude inhabitants on other selected variables.

Jayaraman (1998) conducted a study on comparative analysis of selected physiological and psychological variables between individual and team sports of different zones of all India Inter University participants. For the purpose one hundred and twenty men university players from individual sports in various zones like north, south, east, and west zones and one hundred and twenty men university players from team sports in various zones like north, south, east, and west zones were selected as subjects randomly.

Their age ranged from 18-25 years. Data was collected using standardized questionnaire like sports competition anxiety, smith’s aggression questionnaire for aggression and sports achievements, motivation questionnaire for achievement motivation etc. In addition, standardized physiological test were used separately for selected physiological variables like resting pulse rate and breath holding time two factorial ANOVA was used to find out whether and significant different
existed. The result the study shows that there was no significant difference in competition anxiety and interaction among team sports players and no significant difference in competition anxiety aggressive behaviors, achievements, motivation, resting pulse rate among universities of different zones participants and the individual sports players had more breath holding time than the team sports players. South zone Inter university participants had more breath holding time than the north, east and west zones Inter university participants.

Luttrell M., and Polteiger J., (2004) examined a study on effects of short-term training using power cranks on cardiovascular fitness and cycling efficiency. The study examines the effect of training by using power cranks or normal cranks on maximal oxygen consumption (VO2 max) and anaerobic threshold during a graded exercise test, and heart rate, oxygen consumption, respiratory exchange ratio and gross efficiency during a sub maximal one hour ride. The subjects were trained for an hour a day, Three day a week for 6 weeks no differences were observed between off within groups for VO2 max (or) anaerobic threshold, however the power cranks group hand significantly higher gross efficiency, lower heart rate and VO2 at various time during the 1 hour ride post training thus the training affairs to result in a decrease in energy expenditure and enhance physiological adaptations at a given workload, which may ultimately enable cyclist to increase speed more readily during competition and then by improves performance.
Makwana et al. (1988) selected 25 normal male volunteers undergoing a ten course in the practice of yoga have been studied by some parameters of ventilator functions tests. The observations recorded at the end of ten weeks of the course have shows improved ventilator function in the form of lowered respiratory rate, increased forced vital capacity, FEVI, maximum breathing capacity and breath holding time, while tidal volume and %FEVI, did not reveal any significant change. Thus, a combined practice of yoga seems to be beneficial on respiratory efficiency.

Lowson (1979), found out that, maximum oxygen uptake, maximum oxygen deficit and margarita Kalman index were the parameters most highly related to 440 yard running performance, two mile running performance were found to be dependent upon aerobic capacity of the subjects. Percentage of slow twitch fibers, percentage of body fat vital capacity also showed a significant relationship to two mile running performance.

Maria et al. (2005) reported that rehabilitation including physiotherapy is an important part of the treatment used to help improve the quality of life of patients with cystic fibrosis (CF). The aim of this study was to determine the value of the breath-hold time as an index of exercise tolerance in patients with CF. Eighteen patients in different states of CF were included. The breath-hold time was measured in all patients. The fitness level was assessed by means of a
progressive exercise test on a cycle-ergometer. During the test, oxygen uptake (VO2) and carbon dioxide elimination (VCO2) were measured breath by breath. The VO2 and working capacity (WC) were computed at the anaerobic threshold (AT) and at peak. Duration of breath-hold was 24.7±2.87 (mean ± SEM) seconds, varying between 10 and 58. The breath-hold time (BHT) displayed a significant correlation with VO2 (r=0.898), WC (r=0.899) at the AT, and the peak VO2 (r=0.895). Regression equations were: VO2 at the AT (ml/kg)=5.53+0.42×BHT and WC at the AT (watt/kg)=0.56+0.38×BHT. Our results suggest that the voluntary breath-hold time might be a useful index for prediction of the exercise tolerance of CF patients.

Pullen et al. (2009). Found number of African-American (AA) patients living with heart failure (HF) has been increasing, especially among the economically disadvantaged. Yoga therapy has been found to improve physical and psychological parameters among healthy individuals but its effect in patients with HF remains unknown. The purpose of this study was to examine the effects of yoga therapy on cardiovascular endurance (VO2peak), flexibility, quality of life (QoL) and inflammatory markers on medically stable HF patients.

METHODS: Forty patients (38 AA, 1 Asian, 1 Caucasian) with systolic or diastolic HF were randomized to the yoga group (YG, N=21) or the control group (CG, N=19). All patients were asked to follow a home walk program. Pre- and post-measurements included a treadmill stress test to peak exertion, flexibility,
interleukin-6 (IL-6), C-reactive protein (CRP), and extra cellular-super oxide dismutase (EC-SOD). QoL was assessed by the Minnesota Living with Heart Failure Questionnaire (MLwHFQ) The statistical analyses (assessed by ANOVA and T-tests) were significant for favorable changes in the YG, as compared to the CG, for flexibility (P=0.012), treadmill time (P=0.002), VO2peak (P=0.003), and the biomarkers (IL-6, P=0.004; CRP, P=0.016 and EC-SOD, P=0.012). Within the YG, pre- to post-test scores for the total (P=0.02) and physical sub-scales (P<0.001) of the MLwHFQ were improved. CONCLUSION:: Yoga therapy offered additional benefits to the standard medical care of predominantly AA HF patients by improving cardiovascular endurance, QoL, inflammatory markers and flexibility.

2.6 STUDIES ON PSYCHOLOGICAL VARIABLES

Callen and Cullen (1984) found that the mean number of penalties assessed to college hockey teams that were winning in a game was significantly bigger than the mean number assessed to teams that were losing. A closer examination revealed that the running teams were more aggressive either when the score was close or when it was extremely desperate.

Raynes and Lorant (2004) conducted a study on Competitive martial arts and aggressiveness: a 2-yr.Longitudinal study among young boys. This study is a follow-up study of Reynes and Lorant’s studies assessing the effect of one year of
judo and karate training on aggressiveness scores among young boys. The data reported here were obtained after a second year of practice, 14 judoka, 9 karateka, and 20 control participants who filled out the Buss-Perry Aggression Questionnaire three times, 1 year apart. At the first assessment, all participants, born the same year, were 8 yr. old and at the third they were 10 yr. old. Analysis indicated that after two years of practice, karate training seemed to have neither seemed to have a negative effect on anger scores. However, the results suggested the importance of kata or mediation in training sessions on self-control acquisition for such young boys.

Jones et al. (2002) conducted a study on the impact of a team’s aggressive reputation on the decisions of association football referees. It has been suggested that individuals may use heuristic methods of reasoning and rely on schemata when a quick decision is necessary. Accordingly, it is possible that decisions made be influenced by prior knowledge they have about teams they are officiating. The aim of the present study was to determine whether sport officials are more likely to penalize individuals who participate in a team with an aggressive reputation. In a balanced design, 38 football referees were randomly assigned to either an experimental or control group and were presented with same 50 video clips of incidents from football games, all involving a team in a blue strip (‘blue team’). The incidents were categorized before the study by five experienced referees into fouls committed both by, and against, the blue team,
where all participants agreed that a foul had been committed (certain incidents), disagreed it was a foul (certain incidents), disagreed it was a foul (uncertain incidents) or agreed that there was no foul (innocuous incidents). Both groups received written instructions before the task; in addition, the experimental group was informed that the blue team present in all of the clips had a reputation for foul and aggressive play. For each incident, the participants were required to indicate what action they would engage in if refereeing the game. Although there was no difference in the number of decisions made, the experimental group awarded significantly more red and yellow cards against the blue team both overall and for the ‘certain’ incidents. It is suggested that prior knowledge may impact referees’ behavior in a laboratory setting, although future research should explore whether a similar effect is observed in the behavior of referees during football matches.

Perry et.al. (2003) conducted a study on Measures of aggression and mood changes in male weightlifters with and without androgenic anabolic steroid use. Supra physiologic doses of testosterone are associated with increased aggression that is hypothesized to be a function of testosterone serum concentrations, mood, and personality. The study attempted to characterize this relationship among weightlifters who were users (n=10) and nonusers (n=18) of anabolic steroids. Participants were interviewed using the Modified Mania Rating Scale and Hamilton Rating Scale for Depression to assess mood, the Buss-Durkee
Hostility Inventory (BDHI) and Point Subtraction Aggression Paradigm (PSAP) to assess aggression, and the Personality Disorder Questionnaire (PDQ-R) to assess personality. Blood samples were obtained for the determination of total, free, and weekly bound testosterone. Comparisons of continuous variables between testosterone users and non-users were performed with a parametric (unpaired t-test) or non-parametric (Mann-Whitney) test where appropriate. Correlations with testosterone were examined separately for testosterone users and non-users, using Spearman rank correlation. The subjective (BDHI) and objective (PSAP) assessments of aggression found that supra normal testosterone concentrations were associated with increased aggression. However, the PDQ-R results suggest that this finding was confounded by the personality disorder profile the steroid users, because steroid users demonstrated Cluster B personality disorder traits for antisocial, borderline, and histrionic personality disorder.

Robertson (2003) in his paper presents a critical exploration of the relationship between masculinity, sport and health by reporting findings from a wider qualitative study on lay men’s and health professionals’ beliefs about masculinity and preventative health care. Recent years have seen a surge of interest in relation to ‘men’s health’. In particular, the Department of Health has highlighted how men’s connection to sport, fitness and competitiveness can be used in health promotion initiatives to introduce facets of health. In contrast, work in the sociological and feminist literature has raised issues of concern about the
relationship between men, masculinity and sport, particularly the links to aggression, misogyny and homophobia. It would appear then that a straightforward ‘men + sport = health’ relationship cannot be assumed. Focus groups and interviews with health professional and men, including gay and disabled men, were undertaken to facilitate examination of the socially integrative meanings of sport and masculinity, and their relationship to health. Socializing, ‘macho’ culture and the body emerged as three main themes, and the implications of these empirical findings for health promotion are discussed.

**Brown (1982)** conducted a study on the interrelationship of androgyny, self esteem and achievement motivation of female athletics. Subjects were 75 female athletes from 8 varsity teams at LSU and 72 non-athletes selected from English class on the basis of scores on two personality inventories. The mehrabian test for achieving tendency for females and the short form of PRI ANDRO scale the IDI. Subjects were categorized in to four sex and three achievement group. The self esteem score was also recorded for each subject. Regression, ANOVA and chi-square were used in the analysis of data female athletes were found to be make androgymus than the non athletes. The non athletes consisted largely of feminine sex gypped individuals. Subjects scored significantly lower on self esteem. There was no significant correlation between self esteem and achievement motivation.
Taylor (2008) this study evaluated the effects of a behavioral stress management program on anxiety mood, self-esteem, and T-cell counts below 400. The program consisted of biweekly sessions of progressive muscle relaxation and electromyography briefed back – assisted relaxation training meditation, and hypothesis. Ten subjects were randomly assigned to either a treatment group or a no-treatment control group and the 2 groups were compared on pre to post treatment changes in the dependent measures. Analysis showed that, compared with the no-treatment group, the treatment group showed significance improvement on all the dependent measures, which was maintained at a 1-month, follow up. Since stress is known to compromise. The immune system, these results suggest that stress management to reduce arousal of the nervous system and anxiety would be an appropriate component of a treatment regimen for HIV infection.

Nearly 600 nursery school children were observed by Vanek and Cratty (1970), who reported that boys exceed girls in all forms of aggressive behavior except verbal dominance this was further supported by shifting, who observed children between the ages of 3 and 6 in 6 different cultures and reported that the male children displayed significantly more physical aggressiveness in every culture observed.
2.7 SUMMARY OF RELATED LITERATURE

In this chapter, related studies on juvenile delinquency, the rehabilitation pattern, the influence of yogic exercises on motor fitness variables, physiological variables, psychological variables, benefits of yogasanas were detailed. This proved that there was further scope for research to find out the effect of different packages of yogic practices on juvenile delinquents in Tamil Nadu. Based on the experience gained through review of the studies, the investigator formulated suitable methodology to be followed in this research, which is presented in Chapter III.