Literature means writings and a body of literature refers to all the published writings in a particular style on a particular subject. In research, a body of literature is a collection of published information and data relevant to a research question. A literature review is a body of text that aims to review the critical points of current knowledge including substantive findings as well as theoretical and methodological contributions to a particular topic. A literature review is an account of what has been published on a topic by accredited scholars and researchers. Typically, the literature review forms an important chapter in the thesis, where its purpose is to provide the background to and justification for the research undertaken (Bruce, 1994). A literature review can be defined as the selection of available documents (both published and unpublished) on the topic, which contain information, ideas, data and evidence written from a particular standpoint to fulfill certain aims or express certain views on the nature of the topic and how it is to be investigated, and the effective evaluation of these documents in relation to the research being proposed (Hart, 1998). A literature review can be a precursor in the introduction of a research paper, or it can be an entire paper in itself, often the first stage of large research projects, allowing the supervisor to ascertain that the student is on the correct path. A literature review is a critical and in depth evaluation of previous research. It is a summary and synopsis of a particular area of research, allowing anybody reading the paper to establish why you are pursuing this particular research program. A good literature review expands upon the reasons behind selecting a particular research question.

The literature in any field forms the foundation upon which all future work will be built. If we fail to build upon the foundation of knowledge provided by the review of literature, the researcher might miss some work already done on the same topic.

Sincere efforts have been made by the research scholar to locate literature related to this study. Those relevant studies selected from various sources, which the researcher had come across and which are of direct relevance to the present study, are cited below.

Singh (2021) conducted, “A study of anthropometric, physical and physiological parameter as predictors of volleyball performance.” He took a sample of 100 players from a population of all the volleyball players who participated at university level. In

this study the coefficient of correlation between selected variables of age, weigh, length of arm and leg, width of shoulder, elbow, hip and knee, circumferences of chest, upper arm, arm and calf were 0.106, 0.227, 0.510, 0.337, 0.257, 0.276, 0.259, 0.092, -0.174, 0.002, -.079, 0.152, 0.129, 0.276 fore respectively. The researcher concluded, "Only standing height (0.510) and sitting height (0.337) showed a positively significant correlation with volleyball playing ability as assessed by a panel of experts."

Ghosh (2020) carried out, "A comparative study of the physical fitness among state level footballers and volleyball players." 60 men performers of state level were selected. Out of them, 30 were footballers and 30 volleyball players with age ranging from 17-19 years. The sample was selected by random sampling technique from Howrah district of West Bengal. These respondents were tested twice with the help of "AAPHER physical fitness test." The best performance from both groups was noticed. T-test was the statistical technique adopted by the researcher. The researcher concluded, "The t-test was significant at 0.05 level of confidence among footballers and volleyball players in 50 yard dash, 600 meters run and walk, standing broad jump, shuttle run and medicine ball through but no significant difference was found in sit-up among footballers and volleyball players at 0.05 level of confidence. Conclusions: Footballers was superior to volleyball players in 50 yard dash, 600meters run and walk and shuttle run and volleyball players were superior to footballers in standing board jump and medicine ball throw but no superiority was observed among footballersand volleyball players in sit-ups test."

Mahmoud, Elnaggar, & Ahmed (2017) Studied "Influence of Isometric Exercise Training on Quadriceps Muscle Architecture and Strength in Obese Subjects with Knee Osteoarthritis" and observed that basic intention behind such research becomes the consequences evaluation. They examined how the exercise influence the stamina and structure of human muscle in the subject of obese having osteoarthritis in knee. "Methods: Forty-four obese male subjects aged 40-65 years diagnosed with knee osteoarthritis were randomly assigned into group A (n=32) and group B (n=12). Group A subjects performed a 12-week isometric exercise program. Group B subjects did not participate in any exercise program and maintained their ordinary activities for the same period. Both groups received the same conventional physical therapy

program including hot packs and therapeutic ultrasonic. Muscle thickness, pennation angles and fascicle length of the vastus lateralis (VL) muscle of the affected knee were measured at rest by B-mode ultrasonography. Maximal voluntary isometric knee extension torque (MVIC) of the affected knee was measured using an isokinetic dynamometer. Knee pain and function were evaluated using visual analogue pain scale (VAS) and Western Ontario and McMaster Universities Arthritis Index (WOMAC). All variables were evaluated before and the end of the intervention period for both groups. Results: at the end of the program, group A subjects showed significant improvements compared with group B subjects regarding MVIC and muscle architecture parameters ($p<0.05$). Also there was significant improvement in post-test VAS and WOMAC scores in group A subjects compared to group B subjects ($p<0.05$). Conclusion: A 12-week quadriceps isometric training program improves knee pain and quadriceps muscle strength and architecture in obese subjects with knee OA". And with the help of these outcomes we can suggest isometric training as proper exercise for the obsess patients having knee OA.

Dallas et al., (2017) "The Effect of Physical Exercise Training on Maximal Isometric Strength in Young Artistic Gymnasts" Different methods have been developed for In order to examine the resistance of arms and legs muscle in various sport activities various methods are already developed. Basic intention behind such research was the study of optimal and intentional aerobic resistance in fifty seven adolescent athelete and seventy four non-athletes. Their aerobic resistance were examined in situation s where arms and legs extension at the timed period of five seconds maximal voluntary isometric strength for the right and left side respectively. It has been shown by results that there was a noteworthy diversity in the middle of athletes and non-athlete. In addition to this, important communication disclosed: a) for right side with respect to the force flexion at the elbow and shoulder joints; b) for the left side with respect to the force flexion for the elbow, shoulder and hip joint. It becomes possible for trainers to assume the consequences which were described above for improving the gymnast's resistance and their entire exercising standard.

Spence D. W.18 (2017) developed a descriptive profile on 15 members of the United States women national volleyball team, who were highly skilled. The data were obtained from anthropometric, strong physiological and motor performance domains

consisting of jump and reach, triple hop, agility run, and 20 meter dash within group comparisons were made between the six women who were selected for the pan American team and the nine who were not selected. The pan American selected players were taller and heavier and demonstrated better motor ability than the non – selected players. Strength measurements do not indicate consistent differences between the two sub-groups. The non - selected had greater vo2 max than those selected, between group comparisons on selected variables were made between the team player and other women volleyball players. The training team subjects were taller heavier the comparative groups. The training team group demonstrated a lower heart rate Max (180 beats/min) than their VO2 Max (43.2 m1/ kg/min) was within the range of comparative groups.

Singh (2015) assessed and compare the "Physical Fitness between Forward and Defender Football Players." The sample comprised of eighty boys football players (forty forward players and forty defender) ranging in age 15-17. These respondents were taken from a Sr. Sec. School from Raipur city by adopting purposive sampling technique. Upper body strength was determined by conducting the pull up test. Strength and endurance were determined by sit up test whereas speed and agility were determined by shuttle run test. In addition to these tests, the explosive power of legs was determined by employing broad jump/standing long jump. The acceleration, speed and quickness between the defender and the forward players were determined by administering forty yard dash. The statistical technique employed here is t-test at 0.05 level of confidence. There found no significant differences in Pull ups, Sit ups, Shuttle run, Standing long jump and 40 yards dash between the Forward Players and Defender Players in context with the given Physical Fitness variables. No any significance differences were found in this study, it's may be the cause of no any special training was given to the players according to their playing position (Forward & Defender). Further studies are needed on the above variables with physiological, biomechanical, and psychological variables for the assessment and finding for relationship between Forward Players and Defender Players with their performance. This study provides information about Forward Players and Defender Players of Football game.

Malik, Singh and Rajesh (2015) studied, "The degree of physical fitness and compare the differences of physical fitness components among Football players." The investigators adopted random sampling technique in order to select eighty respondents twenty from each district. They have participated at districts or college level. These respondents were selected from Rohtak, Bhiwani, Mohindergarh and Rewari districts of Haryana state. The physical fitness variables were determined by adopting "AAPHER Youth Fitness Test (1976)." Their mean scores were calculated in order to compare the performances of the players belonging to different districts. The data was analyzed at 0.05 levels of significance. "F-value, Least Significant Difference (LSD) tests" were administered to test the significance between the selected groups. The study gave evidences that football players of Rohtak were found better than the players of other districts on the bases of almost physical fitness variables.

Yadav & Sardar, (2016) Studied "Comparative Effect of Isometric And Isotonic Exercises on the Performance of Selected Field Events" and observed that we can explain the term „fitness" as a adaptation that is successful to the stressor of life style of someone which is condition desirable by human and also it has its base on the training program i.e. scientific and systematic in nature. It was already highlighted from the recent scientific development of gymnastics and sports, that contribution of stamina in human physical capacity is significant and the stamina is developed by human beings in a best possible manner when they do weightlifting exercise in a structured manner. It has been clearly represented by mathematical proofs that when weight lifting exercises are done in an appropriate manner then stamina, muscular resistance and power becomes better. For a gymnast all these things are very important. Exercise which improves the resistance like exercise in which movement of joints is required and the exercise in which movement of points is not required improve the efficiency of those athlete which are related to sports like shotput, long jump and running".

Selder (2015) conducted a study on anthropometric cardiovascular and motor performance characteristics of physique, motor and university ice hockey players. Characteristics of physique, motor and cardio-vascular fitness were reported 14 varsity hockey players, some of them had represented Canada in 1964 Winter

Olympic. Most of the players were dominant mesomorphs with low adipose measurements. It was found that the majority were above average in dips and in dynamometrical strength but average or below in other tests of motorfitness.

Ramirez Campillo et al. (2015) compared the effects of progressive volume-based overload with constant volume-based overload on muscle explosive and endurance performance adaptations during a biweekly short-term (i.e., 6 weeks) plyometric training intervention in young soccer players. Three groups of young soccer players (age 13.0 ± 2.3 years) were divided into: control (CG; n = 8) and plyometric training with 122 (PPT; n = 8) and without (NPPT; n = 8) a progressive increase in volume (i.e., 16 jumps per leg per week, with an initial volume of 80 jumps per leg each session). Bilateral and unilateral horizontal and vertical countermovement jump with arms (CMJA), 20-cm drop jump reactive strength index (RSI20), maximal kicking velocity (MKV), 10-m sprint, change of direction speed (CODS), and Yo-Yo intermittent recovery level 1 test (Yo-Yo IR1) were measured. Although both experimental groups significantly increased CMJA, RSI20, CODS, and endurance performance, only PPT showed a significant improvement in MKV and 10-m sprint time. In addition, only PPT showed a significantly higher performance improvement in jumping, MKV, and Yo-Yo IR1 compared with CG. Also, PPT showed higher meaningful improvement compared with NPPT in all (except 1) jump performance measures. Furthermore, although PPT involved a higher total volume compared with NPPT, training efficiency (i.e., percentage change in performance/total jump volume) was similar between groups. Their results showed that PPT and NPPT ensured significant improvement in muscle explosive and endurance performance measures. However, a progressive increase in plyometric training volume seems more advantageous to induce soccer-specific performance improvements.

Pavlos Myrianthefs and George Baltopoulos (2013), we investigated whether professional athletes may require higher tidal volume during mechanical ventilation hypothesizing that they have significantly higher “normal” lung volumes compared to what was predicted and to non-athletes. Measured and predicted spirometric values were recorded in both athletes and non-athletes using a Spirovit SP-1 spirometer (Schiller, Switzerland). Normal (6 mL/kg of predicted body weight) was calculated as a percentage of measured and predicted forced vital capacity (FVC) and the

difference was used to calculate the additional required using the equation: New . Professional athletes had significantly higher FVC compared to what was predicted (by 9% in females and 10% in males) and to non- athletes. They may also require of 6.6 mL/kg for males and 6.5 mL/kg for females during mechanical ventilation. Non-athletes may require of 5.8 ± 0.1 mL/kg and 6.3 ± 0.1 mL/kg for males and females, respectively. Our findings show that athletes may require additional of 10% (0.6/6 mL/kg) for males and 8.3% (0.5/6 mL/kg) for females during general anesthesia and critical care which needs to be further investigated and tested.

Leili Zeiaadini et.al (2013), Exercise-induced bronchospasm is more evident in the athletes of endurance sports and other sports which need minute ventilation. Seeing the lack of researches in this arena within Iran, we decided to conduct a study on the frequency of exercise-induced asthma in Kerman professional endurance runners in order to develop the background necessary to later studies. To do so, 25 professional endurance runners (22.6 ± 5.5 years) were chosen intentionally and voluntarily, 25 non- athletes were also chosen randomly and homogeneously along the runners group. All subjects first filled the standard questionnaire of exercise asthma, then the pulmonary function test was done on both groups before, immediately after, and 10 minutes after the Cooper test in order to investigate the lung volumes. The obtained data were then analyzed using SPSS 19 through independent T-test. Results showed that the rate of exercise asthma was 20 % in the athletes group and 16 % in the non-athletes one. The results of the exercise challenge, which is a 15 % or more decrease in forced expiratory volume in 1 second (FEV1), indicated that 16 % of the runners and 12 % of the non- athletes were suffering from exercise asthma. The lung volumes FEV1 and FVC (forced vital capacity) decreased in both groups. The decrease was more evident in runners when compared before and after the exercise, this decrease was not significant, however.

Abhishek Singh (2014), the aim of the study was to compare the selected physiological variables among handball, Volleyball and Hockey players. For the purpose of the study, 90 athletes (30 from each group) of age 21±3 years were chosen from Lakshmibai National institute of Physical Education, Gwalior (M.P). The variables which had been tested were vital capacity (VC), Peak expiratory flow rate (PEFR), resting pulse rate (RPR) and resting respiratory rate (RRR). The dry Spiro-

meter and the methods selected for the collection of the data are highly valid and reliable. As a statistical tool, one way ANOVA was employed. After the data analysis, ANOVA was found insignificant in case of VC, RPR and RRR but in case of PEFR, it was found significant. Post Hoc test on PEFR reveals that the Volleyball players have low PEFR in comparison with the Hockey and handball players.

Mr. Kalidas Karak and Dr. Susanta Jana (2013), the purpose of the study was to compare the level of Vital Capacity and Peak flow rate of active and inactive middle aged male. Total 52 subjects were taken for the study. They were Active & Inactive Groups. Twenty-six (26) active and Twenty-six (26) in active middle aged male (40-50 years) were randomly selected for the study. All the parameter i. e. Vital Capacity and Peak flow rate were measured by a reputed physician. For statistical analysis and interpretation of data„t"-test w a s conducted. It was observed that there was significant difference in Vital Capacity and Peak flow rate. Result showed Active men have higher level of Vital Capacity and Peak flow rate.

Pradeep Kumar et.al (2013), the purpose of the study was Comparative Analyze the Physiological Variables of All India Intervarsity Level Batsmen"s, Pace Bowlers, Spin Bowlers, Wicketkeepers, and All-Rounders men cricketers of India. For the purpose of this study, one hundred and fourteen cricket players which consists 22 batsmen, 40 bowlers (i.e. 25 medium pace and 15 spin bowlers) 14 wicket keepers, and 38 all-rounder"s were selected. The following physiological variables were considered to be the major factors contributing to the performance in the cricket-Resting pulse rate, Resting blood pressure, Hb content, Vital capacity, Anaerobic power, and Aerobic capacity. To prepare profiles of All India Intervarsity Level cricket Men players of India, descriptive analysis i.e. mean and S.D. was done. For the comparison of the physiological variables analysis of variance (ANOVA) and test Schafee,s post hoc test was applied. The mean of Hemoglobin of batsmen"s, pace bowlers, spin bowlers, wicketkeepers, and all-rounders were 13.79 mm/Hg, 13.32 mm/Hg, 13.16 mm/Hg, 13.13 mm/Hg., and 13.66 mm/Hg, Resting Pulse rate were 69.68 bt/min., 70.12 bt/min., 70 bt./min., 70.64 bt./min., and 70.34 bt./min., systolic blood pressure were 115.81, 116.28, 116.9, 116.64, and 117.2, diastolic blood pressure were 92.00, 93.24, 92.80, 89.21, and 92.97, the mean of Vital Capacity were 3.16 ltr, 3.1 ltr 2.99 ltr, 2.52 ltr., and 2.95 ltr, Anaerobic Power were 724.57 Watt,

703.59 Watt, 706.2 watt, 704.93 Watt., 687.690 Watt, Aerobic Power were 35.13 Watt, 35.66 Watt, 35.88 Watt, 39.19 and 38.66 Watt. On comparatively analysis it was found that only Vital Capacity among All India Intervarsity level Cricket Batsmen‟s & wicketkeepers was significant and no other physiological variable were not found significantly different among Batsmen‟s, Pace Bowlers, Spin Bowlers, Wicketkeepers, and All-Rounders men cricketers of India at .05 level of significance.

Parvinder Singh (2013), Anthropometry and physiology play an important role in deciding the particular build of the body with various measurements of the segments of the body it has also its importance in the field of Kabaddi and Kho-Kho game. Somewhat or altogether the body height length of various level and measurements of the varies body segments, pulse rate blood pressure Haemoglobin, vital capacity and body composition have definite effects on the performance of these game players. The investigator in the present study made an effort to test this hunch to compare the difference between the various physiological and Anthropometrical measurements of Kabaddi and Kho-Kho players. The present comparative study is related Kho-Kho and Kabaddi players in relation to anthropometry and physiological variables. In the present investigation, Kho-Kho and Kabaddi players were the field of study. In the present study, 120 male Kabaddi and 120 male Kho-Kho players of Haryana who participated in Haryana Olympic Games and Haryana State Kho-Kho and Kabaddi Championships. The players who remained in last ten teams were selected during the State Championship. To know the difference between Kho-Kho and Kabaddi players in relation to anthropometry and physiological variables t test was applied. From the results, it may be concluded that there is a significant difference in weight of Kho-Kho and Kabaddi players. The weight of Kabaddi players is much higher in comparison to weight of Kho-Kho players. It was also concluded that there is a significant difference in linear measurements such as, height, lower leg length, foot length, foot width, total arm length, forearm length, sitting height in comparison to Kho-Kho players. Kabaddi players are found more in weight, weight, height, lower leg length, foot length, foot width, total arm length, forearm length, sitting height in comparison to Kho-Kho players. But no significant difference was found in total leg length, thigh length, upper arm length, hand length, trunk length. Regarding body circumferences, there is a significant difference in shoulder, chest, hip, thigh, calf between Kabaddi and Kho-Kho players.

Rameshkannan S. And B. Chittibabu (2014) conducted a study on the purpose of the study was to determine whether eight weeks of plyometric training can improve male handball players agility. To achieve the purpose thirty (30) male handball players were selected randomly from Department of Physical Education and Sports Sciences, Chidambaram, Tamilnadu. These players were divided into two groups namely, plyometric training group (15) and control group (15). The plyometric training group performed 2 days per week for eight weeks of plyometric training program and the control group did not perform any plyometric training. Agility of these players was measured by specific agility test T-test. The data was collected before and after training in both the groups. The collected data was analysed using analysis of covariance (ANCOVA). The result of the study showed that adjusted post-test mean showed significant ($F = 17.96$, $p < 0.000$) difference among the groups on agility. It elicited that 0.61sec (4.91%) improvement was noticed in plyometric training group. It is concluded that plyometric training is an effective training technique to improve male handball player's agility.

Karthi and Krishnakanthan (2014) studied "Selected physical variables among Basketball, football and Hockey players of Sri Subramaniya Swamy Govt. Arts College, Thiruttani, Tamilnadu." Fifteen players belonged to basketball game, fifteen soccer players whereas fifteen players belonged to the game of Hockey. Speed and cardio respiratory endurance were selected as the criterion variables. Speed is considered as physical variable which was measured with 50 m dash. 12 min run or walk test was conducted to assess the cardio respiratory endurances. One way ANOVA was employed. The data was analyzed at the 0.05 level of significance. Scheffe's Post Hoc Test can be used if the calculated value of f test is found significant. The findings showed that the performances of the basketball player were better in terms of speed in comparison to the hockey and football players. In addition to it, it was confirmed football players were better in terms of cardio respiratory endurance when compared to the players of hockey and football.

Tulin Atan et.al, (2012), the purpose of this study was to research pulmonary functions of sedentary males and athletes in different team sports branches in the same age group. This study was conducted on male athletes in 15-16 age group who

participate in matches with license in Samsun. 50 athletes from each of the team sports of football, volleyball, basketball and handball players and 50 sedentary males participated as well; being in total 250 athletes. Among respiratory functions tests; vital capacity (VC), forced vital capacity (FVC) and maximum voluntary ventilation (MVV) values were measured. As a result of the measurements VC values of sedentary males were lower than football and handball players ($p<0.01$). It was determined that VC values of handball players was higher than football, volleyball, basketball players and sedentary males ($p<0.05$ and $p<0.01$). When FVC values were analyzed, first of all it was determined that handball, football and basketball players have significantly higher values compared to sedentary males ($p<0.01$). In the comparison between branches FVC values of volleyball players were significantly lower than football and handball players ($p<0.01$). FEV1 values were significantly higher among football and handball players compared to volleyball players and sedentary males ($p<0.01$). When MVV values were analyzed, it was observed that football players have higher values compared to volleyball and sedentary males ($p<0.01$). MVV results of handball players were significantly higher than sedentary males ($p<0.05$). When the respiratory rates (RR) were analyzed, it was determined that values were not significantly different between subjects ($p>0.05$). As a conclusion, it was determined that respiratory functions were higher among individuals who do exercise compared to those who do not. That the respiratory parameters of athletes doing exercise are higher than those who do not shows the positive effect of training on respiratory system. In addition to this, the difference of respiratory functions between branches shows that the sport branch influences the respiratory capacity.

Vatan Kavak et.al (2005), what can be done to reach the Olympic records and high efficiency level? Can our players be Olympic champions? The aim of this study is to reveal the properties of proper persons, suitable to the branch of sports. This study is a body result of 16 male players, take active roles in the hand ball team of the university. Variables are; age, height, weight, measurements of body fat percentages, 30m.sprint speed measurement, heart beat measurement during rest, systolic-diastolic blood pressure, vital capacity, maximum V02 (Cooper test). Measurements; taken from 0,5

kg intervaled balance with shorts on and without shoes. In this study age average, as 21.81 m 2.34; height average, as 176.12 m 6.21 cm; weight average,as.74.81 m 8.85 kg. ; Qindex average, as 420.42 m 47.28 weight kg/hwight cm.1000; body fat percentage average, as 10.10 m 2.58mm; 30m sprint (sn)average, as 4.55 m 0.15 m/sn; Vertical jump average as 58.75m6.43 cm; pulse average, as 82.00+5.25(pulse/minute); systolic tension average, as 121.87m11.67mm/hg; diastolic tension average, as 76.56mmm/hg; Vital capacity average, as 4.74 m 0.45ml; Maximum V02, as 44.32 m 5.02(ml/kg.min) were determined. Correlationand regression statistical methodswere used to evaluate the data.

Kohli, Singh, Singh and Sharma (2014) compared, "The physical fitness of Volleyball and Football players of Khalsa Public School, Amritsar, Punjab, INDIA." In order to get the data, fifteen football players and fifteen volleyball players with the age ranging from 16 to 17 years were selected. "Physical fitness variables i.e. strength, endurance, agility, speed, flexibility" were selected in this study. In order to measure these variables, various test like "pull ups, sit ups, shuttle run, 50 m dash and 600 m run" were conducted. For analyzing the data, they adopted t-test technique at 0.05 level of confidence. They revealed, "There was no significant difference in pull ups, sit ups, 50 m dash, and 600 m run, but there was a significant difference between the two groups on the basis of shuttle run performed by them."

Srivastava and Tripathi (2013) conducted a study on the topic "A comparative study of selected physical & physiological variables of school level footballers and swimmers". Total 50 (20 footballers & 30 Swimmers) subjects from different CBSE schools were selected. All the subjects were belonged to the age group of 14-18 years. All the physical variables (speed, strength, endurance and flexibility) and physiological (pulse rate, vital capacity and peak flow rate). T-test was the research technique employed by the researcher. The level of confidence was fixed at 0.05. The study found a significant difference between the mean scores of physical variables (speed, endurance and flexibility) and non- significant difference was noticed between the mean scores of physical (strength) and physiological (pulse rate, vital capacity and peak flow rate of footballers and swimmers.

Bloomfield, et al., (2013) compared the effectiveness of 2 methodologies for speed and agility conditioning for random, intermittent, and dynamic activity sports (e.g., soccer, tennis, hockey, basketball, rugby, and netball) and the necessity for specialized coaching equipment. Two groups were delivered either a programmed method (PC) or a random method (RC) of conditioning with a third group receiving no conditioning (NC). PC participants used the speed, agility, quickness (SAQ) conditioning method, and RC participants played supervised small-sided soccer games. PC was also subdivided into 2 groups where participants either used specialized SAQ equipment or no equipment. A total of 46 (25 males and 21 females) untrained participants received (mean +/- SD) 12.2+/- 2.1 hours of physical conditioning over 6 weeks between a battery of speed and agility parameter field tests. Two-way analysis of variance results indicated that both conditioning groups showed a significant decrease in body mass and body mass index, although PC achieved significantly greater improvements on acceleration, deceleration, leg power, dynamic balance, and the overall summation of % increases when compared to RC and NC ($p < 0.05$). PC in the form of SAQ exercises appears to be a superior method for improving speed and agility parameters; however, this study found that specialized SAQ equipment was not a requirement to observe significant improvements.

Paramanik (2001) predicted, "An equation of physical and physiological variables of playing ability of badminton players out of 22 variables." For this purpose twenty five badminton players were selected. All these players belonged to Maharashtra State. In order to find out the regression, forward regression was adopted by the researcher which was consisted to four items. These items were time of reaction, height, length and endurance. The study confirmed that endurance contributed 87% while55% was contributed by time of reaction alone.

Neeralet. al. (2008) assessed "Motor ability variables as predictors of performance in Kabaddi." They concluded, (i) "significant correlation was found between the selected motor ability variables of muscular strength of arms; muscular endurance of abdomen; explosive power of arms; explosive power of legs; running speed; stretch ability of legs ability; with performance rating in kabaddi; (ii) Significant

correlation was not found between the selected motor ability variables of cardiovascular endurance and extent flexibility of trunk and shoulder; with performance rating in Kabaddi; (iii) For better performance in kabaddi, all the selected motor ability variables are essential and must be considered, for better performance; (iv) Muscular endurance of arms, and explosive power of legs and arms, are the dominant predictor of performance in junior national kabaddi players can be predictor by using the equation."

Fahiminezhad (2010) evaluated, "The study of anthropometric sizes and physical fitness factors of boy students aged 12–14 in Shahrood city." The current investigation intended to measure factors related to physical fitness and anthropometric sizes of these students. 368 boytook part as sample in this research work by applying random sampling technique. "Height, weight, sitting height, arms span, body mass index (BMI), waist circumference (WC), waist to hip ratio (WHR), and percentage body fat (BF%)" were included in anthropometric test. "Cardiorespiratory fitness (20-m shuttle run test), general strength (dynamometer back and leg), leg power (vertical jump test), flexibility (sit and reach test) and agility (Illinois test)" were the components in physical fitness. The investigator included, "The mean of height (cm), weight (kg), sitting height (cm), arms span (cm), BMI (h/w2), WC (cm), WHR and BF% subjects were 154.1, 43.4, 77.1, 155, 18, 67.6, 84 and 22, respectively. The mean of VO2max (ml/kg/min), general strength (kg), leg power (kg/m), flexibility (cm) and agility (s) were 49.6, 92.1, 56.9, 30.5 and 18.97, respectively. There was significant negative correlation between VO2max and anthropometric measurements, agility with height, flexibility and leg power, while a significant positive correlation was found between general strength and leg power with anthropometric measurements subjects. Survey results showed that 12 –14-year-old boy students in Shahrood were of thought height, weight, BMI, general strength and leg power lower from adolescents of other countries and height, weight, BMI almost equal and general strength and leg power higher from adolescents of our country. Also 12–14-year-old adolescent boys in Shahrood on base BMI 30.5%, BF% 26.9%, WHR 16.8% and VO2max 10% may provide insight into the prediction of future risk chronic disease."

Gill, Deol and Kaur (2010) evaluated, "A comparative Study of Physical Fitness Components (speed, strength, endurance, agility and flexibility) of Rural and Urban Female Students of Punjabi University." The respondents for the current investigation were one hundred female students. Out of these fifty belonged to rural areas whereas the rest of the students belonged to urban area. Jumping, running, stepping and flexibility test along with measuring their height and weight were carried out to collect the data. Mean, SD., SEM, and t-test were the statistical techniques adopted in order to compare and analyze the data. They confirmed, "Rural female students were found to be superior in strength, endurance, speed and agility. Urban female students on the other hand, were found to be heavier and superior in tasks like flexibility."

Pilli (2010) tried to assess the, "Comparison of anthropometric and physical variables (speed, endurance, explosive strength, muscular endurance, height, weight, sitting height, body fat and somatotype) among kho-kho and handball players of Andhra Pradesh School Games teams." In order to collect the data for current investigation, forty male Kho-Kho and Handball players were selected. These players belonged to the school games team from Andhra Pradesh and participated in national level games. The research showed, "Hand ball players were better in six variables such as explosive strength, muscular endurance, height, weight, body fat, somatotype, further the study indicates that kho-kho players were better in speed and endurance."

Kraemer et.al. (2001) determined the effects of resistance training programs on strength, power, and military occupational task performances in women were examined. Untrained women aged were matched and randomly placed in total or upper-body resistance training, field, or aerobic training groups. Two periodized resistance training programs (with supplemental aerobic training) emphasized explosive exercise movements using 3- to 8-RM training loads (TP, UP), whereas the other two emphasized slower exercise movements using 8- to 12-RM loads (TH, UH). The FLD group performed plyometric and partner exercises. Subjects were tested for body composition, strength, power, endurance, maximal and repetitive box lift, 2-mile loaded run, and U.S. It was concluded that, Strength training improved physical performances of women over 6 months and adaptations in strength, power, and endurance were specific to the subtle differences in the resistance training programs

(strength/power vs strength/hypertrophy). Upper- and total-body resistance training resulted in similar improvements in occupational task performances, especially in tasks thatinvolved upper-body musculature.

Reddy and Reddy (2010), compared the effect of Plyometric Training, Circuit Training and Combined Training on selected fitness components among secondary students. Four different untrained school Boys of Ekashila High School Warangal in the age group of 14-15 years those who have not participated intensively in games and sports or any special coaching program were used for the purpose of the study. However they were allowed to attend the regular physical education classes in school. So, 40 students were selected randomly by lot from the total population of 300 subjects after eliminating physically handicapped students. Then they were randomly divided into four equal groups consisting of 10 subjects in each group. The groups were named by lot as Plyometric Training group, Circuit Training group, Combined training group and Control group and their performances were measured before and after 12-weeks of Training. In Plyometric Training eight exercises and (four for Upper body and four for lower body) in circuit Training eight exercises were used. The combined Training group subjects were asked to join with the Plyometric Training group on Tuesday, Thursday ,Saturday & Monday, Wednesday and Friday with Circuit Training group. The control group did not participate in any Training programme except their routine activities. The 't' test and Anacova were used to find out the training effect and to compare the Training effect respectively. Circuit Training group showed better performance than other groups.

Maity (1983) conducted a study, "To compare physiological and physical fitness variables between tribal and non- tribal High school students of Murekatha Nehru Bidya Bhawan shown in Midnapur district of West Bengal." The respondents chosen for the study were between the age of 14- 17 years. It was observed that tribal students were significantly superior in peak respiratory flow rate and speed endurance and anaerobic lower than non tribals.

Langford, McCurdy, Ernest, Doscher & Walters (2007) compared the effects of 10 weeks of resistance training with an isotonic bench press machine and 2 types of free-weight bench press exercises on several measures bench press strength. Specificity

was investigated by comparing the ability to transfer strength gained from a type of training that differed from the mode of testing. Forty-nine men participated in the study. The subjects completed a pretest on the machine (MB), barbell (BB), isokinetic (IB), and log (LB) bench press to determine baseline strength and completed 10 weeks of training on the MB, BB, or LB. The 3 groups were tested to see whether differential training effects occurred from pre- to posttest scores on the BB, MB, LB, and peak force on the IB. By multivariate analysis, the trial-by-group interaction was not statistically significant. The findings of this study showed that all 3 training groups significantly improved in strength during short-term training on the MB, BB, and LB. These data lend evidence that improved strength after training on the MB, BB, and LB equally transfers to strength gains on any of the 4 modes of testing. These results should be considered when including similar exercises varying in stability into the training program to improve strength.

Singh (1990) conducted a study to compare some selected physiological variables and body composition among Badminton, Table- tennis and lawn-tennis players. Total 45 male badminton, Table-tennis and Lawn-tennis (15 from each) players were taken by applying random sampling method from the state, universities and intercollegiate participants. Selected physiological variables (Hemoglobin Content, blood pressure, vital capacity, pulse rate when resting etc.) and body composition (four site skin fold) were recorded, and f-test was employed in order to get the mean differences among the selected groups. It was concluded that Badminton players had significant higher Hemoglobin content and pulse rate than that of the Table-tennis and lawn-tennis players, whereas Lawn-tennis players were significantly superior in vital capacity in comparison to their opponents. There found insignificant differences among the group mean concerning with blood pressure and composition.

Vaz (1994) analyzed, “An investigation on some of the selected anthropometric characteristics and physical fitness components of predictors of performance in Judo.” The researcher found that performance in different categories in Judo was related with many “anthropometric variables namely, height, weight, calf girth, arm girth index.” On the other hand, “length, thigh girth and rural ratio” were not found positively connected with performancein Judo.

Choudhary (1995) conducted a research on selected physiological variable on eighty inter-college level judokas with the purpose to sketch the profile and to compare them in different weight categories. The variables selected for the investigation were "resting heart-rate, vital capacity, negative breath holding capacity, positive breath holding capacity and anaerobic activity." In the present study, mean and standard deviation (SD) of all the weight categories were derived from the data. ANOVA was the other statistical technique adopted by the researcher in order to get the significant difference in their mean scores. The study revealed: (i) The training age does not depend upon the weight category; (ii) The training programme for the judokas should be according to the body weight category; (iii) The training programme for low and middle weight categories should be more strenuous than Heavy Weight Categories; (iv) In relation to positive break holding capacity, there noticed no significant difference in various weight categories; (v) There found no significant difference in various weight categories in relation to the resting heart rate, vital capacity.

Kala (1999) made an attempt to study on, "Kabaddi and Kho-Kho players of Kurukshetra University." The investigation was carried out to compare their physical fitness, physiological and coordinative ability. "The physical fitness variables such as agility, speed, power and endurance strength" of Kabaddi players were noticed positively on the bases of strength components in comparison with Kho-Kho players. Interestingly, these Kho-Kho players were found better on the bases of physical fitness in comparison of Kabaddi players. They were noticed to possess better rhythmic ability in the coordinative ability in comparison to their opponents. However, in the other coordinative ability like "Balance, flexibility, differentiation ability and lateral jumping ability", there found no significant difference in kabaddi and kho-kho players. In addition to it, Kabaddi players were found positively better than their opponents on physiological determinants like peak expiratory flow rate. On the other hand, kho-kho players were found better in comparison to the kabbadi players on the basesof the pulse rate.

Golden and Paul (1984) investigated on untrained male college students (18 to 24 years) the effect of intensity of endurance training on AT. VO2 max, PWC, HR rest and HR max. 18 subjects composed 3 groups. The two were experimental groups

whereas one was control group. The experimental groups trained or thirty minutes, two experimental and one control. The experimental groups trained for thirty minutes, three times per week for eight weeks on bicycle ergo meters. The low intensity group trained at the AT and the high intensity group train at a point halfway between at VO2 max. All subjects underwent an incremental bicycle exercise test before and after the training programme to identify any changes in AT, VO2 max, PWC, HR rest and HR max. The AT was determined by gas exchange method. The pretest revealed a mean AT for all groups between 65 and 66% VO2 max. The results indicated no significant changes in AT for any groups. A significant increase in PWC was found. No significant differences were noticed among any groups for any other variables. The results seem to indicate that a continuous cycle training programme, at either of the two intensities will produce an increase in PWC, however will not increase AT for a group of college age males with moderate initial AT levels.

Siridhar (1984) made an attempt to analyzed, "The relationship between agility, Flexibility, Muscular endurance and playing ability in volleyball." For the present study forty college volleyball players were selected. Many tests were conducted including "the sergeant Jump, side step, trunk flexion, full ups, sit ups and one minute lateral jumps etc." the researcher confirmed, "Motor fitness components of power muscular endurance, cardio, respiratory endurance, as well as flexibility contributed to the game of volleyball. The significant relationship between power and performance was found."

Chin, et al. (1985) There is a scarcity of descriptive data on the performance capacity of elite Badminton players, whose fitness requirements are quite specific. The purpose of this paper is to investigate the physiological response of elite Badminton players in a sport-specific fitness test. Twelve Hong Kong national Badminton team players performed a field test on a Badminton court. Six light bulbs were connected to a programming device causing individual bulbs to 48 light up in a given sequence. The players were instructed to react to the flashes by running towards them, and striking shuttles mounted in the vicinity of the bulbs. Exercise intensity was controlled by altering the interval between successive lighting. A low correlation ($r = 0.65$) was found between the results of the field test and the rank-order list of subjects, based on

an objective on-field physiological assessment and subjective ranking. This may be explained by the requirements of other factors besides physical fitness which contribute to success in elite level Badminton competition. These factors may include, for example, technical skill, mental power, and aesthetic judgments on the court. Maximum mean (s. d.) heart rate data [187(8) beats. min-1] and blood lactate values [10.4 (1.9) mmol.1-1] in this study showed that players were under maximal load during the field test. From the testing data, it seems reasonable to speculate that, the intensity of level 3 (20 light pulses. min-1; 3.0 s.pulse-1) and level 4 (22 light pulses.min-1; 2.7 s.pulse-1) simulates the requirement of actual games energy expenditure of the Hong Kong Badminton players exercising at close to their anaerobic threshold. The results also show that an estimate of fitness can be derived from measurements involving exercise closely resembling that which is specific for the sports activity in question. Improved training advice and guidance may result from such studies.

Clarke (1957) made an attempt to analyse, "The relationship of Strength and Anthropometric measurements with physical Performance of 53 unselected non-disabled male students At the University of organ, involving the trunk and legs." He Concluded, "Correlation among some of the Anthropometric variables were especially high i.e., between standing height and leg length (0.91) between foot-length and leg length (0.88), between body weight and both hip width and thigh girth (0.87), between height –strength test and trunk flexion and extension (0.65). Multiple correlations were found significant for leg left (0.74) with body weight, ankle dorsal flexion strength and trunk Flexion strength ;back lift (0.71)with knee extension strength, Hip width , trunk flexion strength and knee flexion strength, and for standing broad jump (0.66)with adipose tissue over the abdomen (negative)and hips extension strength (positive)."

Budet (1989) studied, "The comparison of Physiological parameters involved in oxygen transport in men women similar aerobic capacities as assessed by maximum oxygen uptake." In order to find out the differences perhaps existing due to fitness level and sex, determinants of cardiac output divided by "body weight, hemoglobin concentration and body fat" were measured. The researcher concluded, "Cardiac output increased with fitness level and was greater in men; cardiac output divided by

body weight, increased with increases in fitness level but showed no differences due to rest. Hemoglobin concentration gas greater in men but did not vary due to fitness level. Percent body fat was greater in women and decreased with increased fitness level."

Bhatnagar (1980) analyzed, "A study on 23 rural sportsman (Athletics' 8, Kabaddi 7 and volleyball 8) of Madhya Pradesh (India) pertaining to their weight, height and sub coetaneous tissue fold at biceps, triceps, supraliea and sub-scapular region." These rural athletics were noticed as "lighter, shorter with less amount of fat" when compared to normal and urban Punjabis. Differences in term of physiology were analyzed belonging to different sports activities. In addition to this, kabaddi players of Madhya Pradesh were found as heaviest and fattest among other rural sportsmen.

Pollock and Pate (1980), made an attempt, "To evaluate and quantity physiological difference among groups of distance runners." The respondents were twenty elite distance runners. Eight of them were marathon, twelve middle-long distance eight good runners. Maximal and sub-maximal treadmill test and hydrostatic weighting machine measuring body composition were adopted by the researchers to check the working capacity and cardio-respiratory functions. They confirmed, "The variables studied were maximum oxygen uptake, VO-2 sub-maximal, lactic acid, sub maximum lean body ($P < 0.5$) weight, fat weight, ANOVA showed that the good runners differed from elite runner ($P < 0.1$) and the distance runners ($P < 0.5$). Discriminate analysis showed that the both functions were significant. The first was general physiological efficiency factor that separated the good and elite runners. The second separated the elite marathon and middle long distance groups. The second function showed that the marathon runners had lower lactic acid sub maximum value. The middle-long distance runners had higher VO-2 maximum values."