CHAPTER 2

REVIEW OF RELATED LITERATURE

The review of related literature is the important part of the research work, this part helps the research worker to avoid the risk of duplicating of the work which was already done.

Good, et al. (1941) told that the review of literature serves very significant purposes which can help the research work to solve the problem. This gives an idea about evidence already available to solve the problems adequately. Further this helps investigation to avoid the risk of doubling. This provides model theories, explanation or hypothesis valuable in formulating the problem, appropriate methods of research. This part also helps to establish comparative data which can be useful in interpretation of results.

Razzok, (1979) tested the effects of a standard weight training program and a dynamic weight lifting program on the development of muscular strength as measured by 1 RM on the bench press test, muscular power as measured by the vertical jump test, and the muscular endurance as measured by the greatest number of repetitions in the full squat test which could be done with fifty percent of the subjects body weight. The standard weight training program consisted of five exercises which were the jumping squat, wide bench press, dumb bell press, full squat and two arm curl. The dynamic weight lifting program was comprised of the same exercises that were used in the standard weight training program with one extra exercise referred to two arm clean and jerk.

Jones, et. al. (1999) compared maximum strength and power increases over a fourteen week intervention period with college American football players. The participants were randomly allocated to the control or experimental condition. Both groups performed the same training regime for the bench press with the exception that those in the control condition performed each repetition at a sub-maximum velocity while those in the experimental
condition performed each repetition as fast as possible. Both training groups improved their 1RM bench press and seated medicine ball throw, with significantly greater improvements obtained by those in the experimental condition (+9.9 kg vs. +5.0 kg, and +0.7 m vs. +0.3 m, respectively). The results demonstrate that performing ERT with traditional resistance exercises can improve performance related tests of strength and muscular power in well trained athletes, and may also produce superior results to standard resistance training practices. The findings of Jones et al. (1999) seemingly contradict the position of many researchers that traditional resistance exercises are not suitable for ERT. However, the research was restricted to the bench press, which is an exercise that may have limited transfer to most sporting movements. In addition, the study does not address whether better results may have been obtained if the training was performed with ballistic or weightlifting movements as is recommended.

Mcbride, et.al. (1999) proved that significant differences exist between power lifters, Olympic lifters, sprinters, in strength, power, and related physical performance measurements. The OL group was stronger in strength to the PL group, as determined by vertical jump height. Similarly leg strength is equally important between the OL and PL groups due to demand of events. It is also noted that In addition, the weight lifter group had significantly higher velocities, power outputs, and vertical jump in comparison to the Power Lifter group. The peak force produced by the OL group was again higher than the PL at various loads. One of the most important findings was that peak power was significantly higher in the OL group then the PL, in the 30% load condition. OL group produced higher peak velocities, higher peak forces, higher peak power outputs, and higher jump heights in comparison to the PL group. The OL group was able use maximal strength with high velocities and produce the highest power outputs. This is highlighted significantly that higher power output produced by the weight lifter group in comparison to the power lifting group at the 30% jump squat load.
Kanehisa, et.al.(1999) tried to determine velocity specific isokinetic forces and cross sectional areas of reciprocal muscle groups in Olympic weight lifters. In this study thirty four college weight lifters who had Olympic weight lifting at regional or intercollegiate level in the preceding year, and won first, second, or third position at their highest level of competition with mean (SE) age 19.8 (0.3) years, mean (SE) height 166.2 (1.2) cm, mean (SE) body mass 70.8 (2.0) kg) and 31 untrained men (20.2 (0.2) years, 171.1 (1.2) cm, 64.1 (1.9) kg) a B-mode ultrasonic apparatus was used to find the cross sectional area of the flexor or extensor muscles of the elbow or knee joint, on an isokinetic dynamometer at 60, 180, and 300°/s. The cross sectional area was recorded 31–65% more higher, the force was 19–62% more in weight lifters as compared to the same age untrained subjects. The ratio of force to cross sectional area was the same in both groups. The weight lifters result showed lower velocity decrease in force than untrained subjects in the elbow and knee flexors but not in the extensors.

Walsakom, (2000) conducted a study on “Response of various Asana on physical fitness (Balance, Flexibility, Muscular Endurance and Reaction Time,) of untrained school boys age ranged from 10 to 15 years. The total students were selected from Kalapet in Pondicherry and divided in two equal groups (control and experimental group). The experimental group practiced various selected asana for one hour daily for ten weeks in the morning, then all were tested (pre- test and post- test) for the above said physical fitness components which were tested with the help of standardized tests, the balance fitness component was measured with the help of stoke stand apparatus and flexibility fitness components was measured with the help of sit and reach box. The endurance of abdomen muscles was measured by sit ups with bent knee and nelson hand stick was used to measure the reaction time. In statistical technique the (ANCOVA) was used to compare pre- test and post- test collected data of both groups. There was significant improvement in the fitness variables balance, flexibility, muscular endurance after practice of selected asana.
Hoffmann et. al. (2002) conducted a study on “Effect of parental socio-economic status and their vocational aspirations on 600 students randomly selected from 20 senior secondary universities in Niger State by using one-way analysis of variance to test the only hypothesis formulated to guide the study. Result indicates that significant differences exist "between the socio-economic origin of students and their vocational aspirations. The students from middle and upper socio-economic "backgrounds had more preferences for vocations which have to do with computational, scientific and mechanical work whereas those from lower socioeconomic "background had preferences for persuasive, social and clerical work.

Fry et.al.(2003) explained in their study Muscle Fiber Characteristics and Performance of Male Olympic-Style highly trained national-caliber Olympic style Weightlifters, they compared physical, physiological, and performance characteristics of weightlifting and untrained control subjects. Anthropometric estimation of body composition was assessed for all subjects using Harpenden skinfold calipers. Muscle biopsies (50–100 mg) were extracted from the vastus lateralis and routine muscle myofibrillar adenosine triphosphatase (m- ATPase) histochemical analysis was performed. In this study weightlifters exhibited performance characteristics typical of national-level athletes as indicated by the 1 repetition maximum (1RM) for the snatch and the clean and jerk. The percentage of fiber types observed for the WL in the present study were similar to what has been previously reported for other resistance-trained athletes including power lifters. The large percentage of IIA fibers in the vastus lateralis m. is also similar to what has been reported for other types of strength training the characteristics of power lifters and weight lifters were similar were similar to all highly strength-trained individuals but when compared with competitive power lifters, the WL possess slightly larger fiber areas for all the major fiber types. The fiber cross-sectional areas of the WL were slightly greater for IIA fibers and less for I fibers. Compared with power lifters. The greater area for IIA fibers for the WL may be due to the greater power requirements for WL.
FRY et al. (2003) Tried to examine skeletal muscle adaptations of power lifters

They selected five national-caliber male power lifters (PL). They were actively competing in the American Drug Free Power lifting Association (ADFPA) and the United States Power lifting Federation (USPF) during their study time. They were asked to do the vertical jump, and that height was measured. The muscle biopsies (80–160 mg) of these power lifters were extracted from their vastus lateralis muscle and Isokinetic squat peak force and peak power were determined using an Ariel 5000 Multifunction Dynamometer. It was seen that the PL were highly trained as indicated by their lifting performances, and their jumping and isokinetic squat performances. Compared with the control group, the PL group performed significantly greater vertical jump height and power. Isokinetic squat peak relative force and peak relative power were also greater for PL at all bar velocities. It was also be noted that peak power for the PL subjects had not begun to decrease at the fastest bar velocity. The PL subjects exhibited a greater percentage of IIA fibers and a lower percentage of IIB fibers compared with the control group subjects. In the present study, a primary difference between the PL and CON was the considerable difference in the relative area occupied by each major fiber type.

Hoffman, et al. (2004) did the study on Comparison of Olympic versus traditional power lifting training programs. For this purpose twenty football players of National Collegiate Athletic Association Division III collegiate football team were assigned to either an Olympic lifting training or power lifting training. Each group was matched by their position and trained for 15 weeks. They were tested with the help of field tests to evaluate strength (1RM squat and bench press), 40-yard sprint, agility, vertical jump height (VJ), and vertical jump power (VJP). Only significant improvements were seen in 1RM squat in both the OL and PL groups. After long training of these training to both groups, OL show better improvement in 40-yard sprint. The results of this study suggest that OL can provide a significant advantage over PL in vertical jump performance changes.
Volbekiene, et.al. (2007) The aim of this study was to analyze the differences in health-related fitness among 12-, 14-, and 16-year-old Lithuanian boys and girls from 1992 to 2002. The height and weight of the children were measured, and the Eurofit test battery was used to analyze the children's fitness. In 1992, the test group comprised 830 subjects (395 boys and 435 girls). The age-gender groups were as follows: 256 12-year-old (125 boys and 131 girls), 312 14-year-old (158 boys and 154 girls), and 262 16-year-old subjects (112 boys and 150 girls). The age of the subjects was determined on the day of the research with an accuracy of half a year. In 2002, the study comprised 1,179 subjects (577 boys and 602 girls). The age-gender groups were as follows: 441 12-year-olds (215 boys and 226 girls), 421 14-year-olds (189 boys and 232 girls), and 317 16-year-olds (173 boys and 144 girls). Boys and girls of all three age groups performed better in the sit and reach test and in the 20 m shuttle run test but did fewer sit-ups in 1992 compared with the results in 2002. The girls' performance was better in the long broad jump test in 1992 than in 2002. These differences were not significantly influenced by weight, body mass index (BMI), and "height-t-BMI". There was a marked decrease in aerobic fitness and flexibility and a slight increase in abdominal muscle endurance among Lithuanian schoolchildren. Leg muscular power decreased slightly in girls but remained unchanged in boys.

Mahipal, (2007) conducted study on comparison of physical fitness between successful and unsuccessful inter-collegiate level athletes to check difference in various physical fitness components like power, speed, endurance, flexibility and agility of athletic players of age range 19-25 years, who had represented their college in inter collegiate athletic competition in 2006-2007 session. For this 60 male subjects (30 successful and 30 unsuccessful) from inter collegiate athletic competition were randomly selected. These selected subjects were tested for power, speed, endurance, flexibility and agility by standardized test of respective fitness variables i.e. explosive power by standing broad jump test, speed by 50 yards dash test, agility by zig-zag test and flexibility was tested by sit and reach test. In the statistical technique SD
and t’test were applied to find out the significant difference in above said physical fitness variables and the level of significance was set at 0.05 level. In the result the significant difference was found. The successful athletes were found better in speed, explosive power and agility as compared to unsuccessful athletes, but there was no significant difference was found between both groups athletes in flexibility fitness component.

**TOMAR, (2009)** carried study on body composition and found that Body composition is important factor of physical fitness, which is very necessary for athletic performance. The author wanted to prepare the estimates for the body fat for college youth and to compare body composition of adult men in comparison to their socio economic status. For this study five thousand adult males of various colleges of Delhi State were selected randomly their age ranging from 18-25years. Three groups were made On the basis of their family income namely: low income group, middle income group and high income group. The following variables were selected: Body Density, Body Fat Percentage, Body Mass Index, Fat Mass and Skin folds thickness (Chest, Triceps, Sub scapular and Sum of three skin folds), Height, Weight and Activity. He found that Body Composition is influenced by a number of factors such as age, sex, diet, and exercise. Height is genetically determined but its growth is also affected by the nutritional status, economic conditions and lifestyle of family. Height ,weight and fat is more in high-income group and low in low income group. Both motor fitness variables sit-up, sit & reach and activity level was also showed decreasing trend in high income group and highest in low-income group. Lack of exercise is the prime cause of obesity in all age groups.

**Gill, et. al. (2010)** conducted study on comparison of physical fitness components namely speed, strength, endurance, agility and flexibility between 100 female students belonging to rural and urban set-ups (50 rural and 50 urban) of Punjabi University, Patiala. The measurements of height and weight were noted and tests like jumping, stepping, running, flexibility test etc, were administered. The data was analyzed and compared with the help of statistical
procedures in which arithmetic mean, standard deviation (S.D.), standard error of mean (SEM), t-test were employed. In the result 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. This result shows that regular energetic activity produces physical fitness improvements because Village life style is tougher activity in nature than the life in urban areas.

**Bal, et. al. (June, 2010)** carried the study to compare the relative strength among the different weight categories of power lifters. For this purpose fifty four (total 54 by selecting best six (6) from each weight categories) male Power lifters were selected from All India Inter University Power Lifting Championship held at Lakshmibai National Institute of Physical Education, Gwalior, Madhya Pradesh (India). These all Power lifters were divided into three groups of Eighteen each. The total score of their all three best lifts with their own respective body weight were presented to compare the relative strength among the different weight categories of various weight categories Power lifters. The relative strength of selected power lifters can be calculated by dividing his best total of all three lifts in the said competition with his own body weight. In statistical technique the analysis of variance “F-ratio” was applied at.05 level of significance, to see the significant difference of relative strength among the different weight categories of power lifters. For further analysis “Post-Hoc Test” (LSD Test) was applied. In the analysis of data obtained value of “F-ratio” (37.974) was greater than the tabulated value (3.18). So result reveals that there is a significant difference in the entire three groups in their relative strength, however group I had shown highest relative strength as its mean value is highest among all groups.

**Erdmann, et .al.(2010)**, did the longitudinally study for examination of sex-specific relationships between field measures of body composition and health-related physical fitness in school children. AAHPERD health-related physical fitness test were mainly used.
Data from these children were retained list wise for each of four additional health-related physical fitness test variables, including: 1-mile run/walk ($n = 256$ for boys and $255$ for girls), 1-min bent-knee sit ups ($n = 333$ for boys and $331$ for girls), pronated grip pull-ups ($n = 267$ for boys and $260$ for girls), and double-leg sit-and-reach ($n = 224$ for boys and $210$ for girls).

Anthropometric measurements Height was measured standing against a wall by placing a board on the head at a right angle. Height was recorded to the nearest one-half inch and converted to cm. Body mass was measured using a calibrated balance-type scale and recorded to the nearest one half pound and converted to kg. Body mass index (kg/m²) was subsequently calculated. Inverse relations were found between skin folds (SSK, triceps + calf) and 1-mile run/walk at all grades for both genders, pronated-grip pull-up at all grades for both genders, 1-min bent-knee sit-up at all grades except kindergarten for both genders, and double-leg sit-and-reach at three grades for girls but none for boys. Significant inverse relations were found between BMI and 1-mile run/walk at all grades for both genders, pronated-grip pull-up at all grades for girls and four grades for boys, 1-min bent-knee sit-up at all grades for girls and three grades for boys, but not for double-leg sit-and-reach (SR), at any grade for either gender. Relational strengths of adiposity measures to MR and pronated-grip pull-up performances generally increased from weak in early childhood to moderate in the upper elementary grades for both boys and girls.

Ahamed, et.al. (2010) conducted Study on Six hundred 18 years old boys of four district they were studying in First Year Degree at University of Mysore. The physical fitness variables Speed, explosive strength, agility and endurance were selected for this study as physical fitness variables. The speed was measured by 30m sprint, explosive strength by Standing Broad jump, agility by 6 x 10 m. Shuttle run and endurance by 1500m run. One Way of Analysis of Variance (ANOVA) was used to compare the play, fitness variables. The level of significance was set at $.05$, on the basis of this the boys from Mysore district were found better in explosive strength and endurance
then Hassan district boys stood at the second place in fitness, the Chamaraja
nagar district students were found inferior in fitness to all the other three
district boys. There can be so many reasons like, their life style, lack of
physical activity and food habits etc.

Kumar, et. al. (2011) conducted study to compare physical fitness
components namely speed, strength, endurance, agility and flexibility on 100
female students, 50 rural and 50 urban of various teaching departments of Delhi
University, Delhi. The data was collected by use of measurements of height and
weight as well as by application of tests like jumping, stepping, running,
flexibility test, etc. The data was analyzed and compared with the help of
statistical procedures in which arithmetic mean, standard deviation (S.D.),
standard error of mean (SEM), t-test were employed. 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. This is because of their food habits and nature of work at
home. The rural background students have routine physical work which
produces physical fitness improvements as compared to urban students.

Thakur, et.al. (2011) did the study for comparison of physical fitness
components which include explosive strength, speed, endurance, agility,
flexibility. The table tennis and badminton male players of various institutes of
Maharishi Markendeshwar University, Mullana, N= 50 male players, 25 from
table tennis and 25 from badminton. They collected data by using the
measurements of age, height, weight, standing broad jump test, 50 yards dash,
600 yard run/walk, shuttle run and sit ups. The data was analyzed and
compared with the help of statistical procedures in which arithmetic Mean,
Standard deviation, Standard error deviation (SED) and t-test were employed.
The results found that badminton and Table tennis players were found almost
same level of physical fitness in case of Explosive Strength, Endurance and
Flexibility components. Physical fitness of badminton players were found
superior then Table tennis players in speed and agility components because of
nature of activity and difference of court dimensions. There was no difference
to their explosive strength, endurance and flexibility components. On the basis of above study we can say the physical fitness is totally depends upon the nature of activity done.

Jadhav, (May 2012) conducted the study on Power lifting and weight lifting players, the aim of this study was to find out the Socio-economic difference of these games players. For this present study, total 150 players (75 Power lifting and 75 Weight lifting players) as a subject were randomly selected, who had participated in inter collegiate Power lifting and weight lifting tournament held at Vaidyanath College, Parli in the year 2011. For data collection Kapoor and Kocher (1994) socio-economic status scale was used. In statistical technique, t-ratio has been used to compare the socio-economic status difference between Power lifting and weight lifting players. In the result of this study Socio-economic status difference were found between Power lifting and weight lifting players in favour of Weight lifting players, this was due to the nature of game.

Naso, et.al. (2012) explained about cross-section area of strength sports athletes after comparison of thigh muscle cross-sectional area and back squat strength among national class player of weight lifter, power lifter and body builder. The authors assumed that the Body builders have big thigh muscle cross-sectional area and having less back squat while other two groups have more back squat with smaller thigh muscle cross sectional area. There was highest overall correlation ($r = .94$) between the back squat of the PL group; because squat is the one part of the event. PL and OL,, had greater cross sectional areas of fast twitch type fibers It was concluded that thigh cross-sectional area(size of thigh muscles ) not directly related to back squat strength for the OL and PL groups, the training schedule of weight lifters power lifter is totally significantly different from each other as per the demand of event.

Malik (2012) did the study on physical fitness components and performance of women wrestlers of Sports Authority of India coaching centers in relation to their socio economic status this study included the various physical fitness components, explosive strength, speed, endurance, agility,
flexibility. She had taken 167 women wrestlers of different weight categories (62 light weight, 60 middle weight 45 heavy weight) of various SAI centers. She collected data, weight of individual wrestler and 8lbs shot put test to measure strength, standing broad jump test to measure Power, 60 mts dash to measure the speed, 9 minutes run/walk test for endurance, shuttle run 9x4 mts for agility test. For socio economic status SES questionnaire was used. The data was analyzed and compared with the help of statistical procedures in which two way analysis of variances (ANOVA) and critical ratio (t-ratio) were calculated to analyze the data. The results found that the weight category showed significant difference in strength, speed, agility, power and endurance components of physical fitness. She also found that high the level of performance is directly related to physical fitness. The high SES wrestlers were better in performance.

Carlos, et. al. (2013) carried this study to determine the effects of a power training cycle on maximum strength, maximum power, vertical jump height and acceleration. They were trained twice a week for ten weeks, between February and April 2011, during the European under-23 athletics championship season. They were given 1 repetition maximum (1RM) in the half squat (kg), maximum power in the jump squat (W), flight time in the squat jump (ms), flight time in the countermovement jump (ms), and 30-m sprint. In every training session they were given five sets of eight jump-squats on such load at which each athlete produced his maximum power and maximum load given in the half squat position (RM), they used maximum power in the jump-squat (W), a squat jump (SJ), countermovement jump (CSJ), and a 30-meter sprint.

They were measured before and after the training program using an accelerometer, an infra-red platform and photocells. The results indicated the following statistically significant improvements: a 7.9% increase in RM a 2.3% improvement in SJ a 1.43% decrease in the 30-meter sprint and, where maximum power was produced, a change in the RM percentage from 56 to 62%. As such, they concluded that strength training with a maximum power
load is an effective means of increasing strength and acceleration in high-level hurdlers.

**Chen, et.al. (2013)** conducted the study to examine the relationship among health related fitness components, of middle school students. Two hundred fifty-five middle school students of grades 6, 7, and 8 of K-2 school children were examined on their health-related fitness components using President’s Physical Fitness Test Battery (PFTB). In this they compared the effects of a year-long program of physical education. The same children who were in the original study were in middle school and were assessed on the same fitness and selected motor skill performance, self-reported PA level, as well as cognitive knowledge test. The sample included 255 students; boys (n=136) and girls (n=119) from 12 classes. Measures of fitness, motor skill, self-reported PA, and the cognitive test of fitness and skill were collected. The participants’ motor skill form and outcome were measured using The Test of Gross Motor Development (TGMD). About half of boys’ cardiovascular fitness level was within Healthy Fitness Zone, while more than 60% of the girls did not reach Healthy Fitness Zone standard in grades seven and eight. There was Weak correlation between fitness components and skill form, and moderate relationships between fitness components and skill outcome. Jumping ability was moderately to highly correlate to fitness components. The study revealed that skill form and outcome were weakly related to PA level. There were no correlations found between cognitive knowledge test scores and skill form and outcome, except for dribbling.

**Gulshan, et.al. (2013)** done a study on weight lifters of Haryana state for comparison of the Physical Fitness components of State level Medalist & Non-medalist weight lifters. In this 48 state level medalist & non-medalist weight lifters were selected (24 Medalist, 24 Non-medalist) and Physical fitness of the weight lifters was studied in terms of Endurance, Strength, Power, Speed, Agility and Flexibility. The six components of Physical fitness were studied with the help of Standardized tests. In statistical technique, the mean SD, SEM, t-ratio was calculated for this comparison between the groups.
In the statistical calculations significance differences (P<.01) are found on speed & agility test, power test, strength test, flexibility test and endurance test of medalist and non-medalist weight lifters. The medalist weight lifters were found more physical fit as compare to non-medalist weight lifter.

**SWINTON, (2013)** conducted the study on power lifting training on the athletic performance of general athletes of other games and sports by using questionnaires and interviews of elite power lifters. For this purpose total subject taken Thirty well-trained non-professional male rugby union players (age: 24.2 ± 3.9yr; height: 182.4 ± 6.7 cm; body weight: 94.1 ± 12.3 kg; training experience: 7.3 ± 2.1 yr) and top fifteen ranked male Scottish power lifters and seventeen additional international competitors invited to the 2007 Four Nations Championship held in Livingston, Scotland. Twelve male strongman athletes participated in the study (age: 27.4 ± 4.5 yr; height: 182.5 ± 3.3 cm; body weight: 112.1 ± 19.2 kg; training experience: 11.7 ± 4.4 yr). Scottish strongman competitions Twenty three experienced resistance trained athletes (15 power lifters and 8 rugby union players) volunteered to participate in this study (age: 26.8 ± 5.9 yr; height: 180.5 ± 4.2 cm; body weight: 107.5 ± 21.0 kg; dead lift 1RM: 227.1 ± 49.3kg; training experience: 10.7 ± 4.1 yr). He found that elite power lifters used different training schedule to increase their performance. In his second study a regression-based approach was used to check maximum force production, power, velocity and rate of force development (RFD) in performing different tasks like sprinting, jumping and changing direction (adjusted R2 ranged from 0.43 to 0.86). These all variables were measured in a series to find the effect of power lifting practices to improve the athlete’s performance. He did three experimental studies,

1) The traditional resistance exercises at maximum velocity.
2) The effects of manipulating the external resistance by use of unconventional barbell (the hexagonal barbell).
3) The effects of various types of squats.

In the results he found that every type of practice are use full to increase the sports performance. The training with traditional resistance
exercises at maximum velocity increased significantly (p<0.05) all variables as compared with the standard practice schedule with a sub-maximum velocity. The position change in the hexagonal barbell training also enhance significantly (p<0.05) the ability to generate high force, power, velocity and RFD values in comparison with traditional straight barbell training, but by addition of chain resistance training force values were increased and velocity, power and RFD values substantially decreased. In the final experimental he investigated that the effects of altering the movement strategy in the back squat exercise had a significant effect on a range of kinematic and kinetic variables. The high load squat play very important role in the power lifting, because in the event of Dead lift and squat lower back muscles are required.

Biswabandhu, et. al. (2013) conducted this study to investigate the difference on selected physical fitness components between the Sainik School students and Ramakrishna Mission Vidyapith students. 50 male Sainik School students and 50 male Ramakrishna Mission Vidyapith students of two differnt schools from Purulia district, of West Bengal were selected as the subjects for the study. The age of the subjects was 11–14 years. Speed, Agility, Explosive leg strength, Abdominal strength and Endurance were consider as physical fitness components for the study. To compare the study Student t’ test was applied to calculate the collected data at 0.05 level of significance. . The result showed that there was no significant difference found between the Sainik School and Ramakrishna Mission Vidyapith students of Speed, Agility, Explosive leg strength, abdominal strength and endurance. The result shows that both the schools have better physical fitness but the difference is not significant.

Majid (2014) done survey based study his aim was to investigate Motor ability factors among male students, a sample of 1852 male students of age ranged between 13 to 18 years studying in Chandigarh government high schools were selected by employing random technique. These students were tested in selected Motor Fitness factors namely: speed, agility, flexibility, leg power, strength and cardiovascular endurance. In statistical technique one way
analysis of variance was used. The results showed that the male students significantly differed at level $P<0.05$ in motor fitness factors performed. Superiors were determined with age increase, so the elderly male students were better than their junior counterparts.

Kumar (2014) conducted the study to compare physical fitness variables of Kho-Kho and Kabaddi male players. For this study total 30 male subjects (two groups of 15 subjects each) of different colleges of M.D.U, (Rohtak) aged between 20 – 26 years were selected. They were tested for reaction time, balance, agility, speed and power with help of standardized tests. In statistical technique the't' test was applied to find out the significant differences between Kho-Kho and Kabaddi male players, the level of significance was set at 0.05. The significant difference was found in comparison of above said physical fitness component of both game players. The kho-kho players was found better in speed, agility, and endurance and in the explosive strength kabaddi players was better than kho-kho players.

Kumar, (2015) conducted study on teen agers boys on Physical Fitness Components. In this study there was the compression of Physical Fitness Components between Rural and Physical Education Boys Students. For this study N=40 (20 rural and 20 physical education boys”) students of age between 14-19 years of different schools of district Sirsa (Haryana) . AAHPHERD youth physical fitness test was administered for measurement of various test items, Pull –ups for boys, sit-up test, shuttle run, standing broad jump, 50 meters dash, and 600 yards run-walk. In the result rural and physical education boys students were not found significant difference in physical fitness components.

Kumari, et.al. (2015) did the study to compare the physical fitness components of kho-kho and Kabaddi girls’ players of Haryana. Total subject (N= 100) 50 from (Kho-Kho) and 50 from (Kabaddi) game of different districts. The age was ranged between 10 to 15 years. Only speed, explosive power of arms and agility were used to measure the physical fitness components. The 30 meter run dash Test- To measure speed ability and
Medicine ball Test- To measure explosive power of arms and Zig Zag Run Test- To measure agility were administered. The mean was calculated district wise then computed for comparison of players of different districts. To assess the significance of differences between the means t test was applied. The level of significance was 0.05. This study revealed that there were difference in all of the Physical fitness components, i.e. Speed, Explosive power of arm and Agility between Kho-Kho and Kabaddi girls players of Haryana of all districts.

Rajkumar Sharma, (2015) showed the study to find the significant effect of socio-economic status on the performance of junior national level weightlifters of rural and urban area of India. Total subject taken 200 (Rural =100, Urban =100) this competition was held at Manipur (Imphal). Aghase and Helode (2002) Socio economic status questionnaire was used for the purpose of data collection. In statistical technique means, standard deviations and t-ratios were computed. The Results of the study revealed that there was significant positive effect of socioeconomic status was found on the performance of junior national level male weightlifters and significance difference was also found in sport performance between rural and urban junior national level male weightlifters.

Haga, et.al. (2015) highlighted the childhood fitness, in this study 194 participants were selected to get the relationship between motor competence and physical fitness from childhood through early adolescence. from 4 to 16 years old were divided into three groups; 4–6 yr. (n = 42 ), 11–12 yr. (n = 58), and 15–16 yr. (n = 94). For assessment of motor competence, each child completed the Movement Assessment Battery for Children (MABC),and for measure of physical fitness, three tasks (strength, speed, and endurance) were selected from the Test of Physical Fitness (TPF). To analyze the significance of the difference between the correlation coefficient in the three above said age groups, Fischer r -to- z transformation was used. The correlation (Pearson's) between motor competence and physical fitness in the age groups was statistically higher for the youngest age groups (4–6 and 11–12 yr.) and the adolescent group (age 15–16). The differences between the two youngest age
groups were not statistically significant. The results demonstrate that the correlation between motor competence and physical fitness decreases with age. Motor competence has a greater effect on executions of fitness tasks at a younger age. Adolescents typically were good in developmental stage in running. With one exception, older children and adolescents were good on all physical fitness tests items than the younger children.

**Wolska, et.al. (2016)** studied Somatic composition which is the requirements of a particular sport discipline; Somatic composition is one of the components of physical fitness and plays an important role in shaping the motoric structure. The purpose of this work was to determine the correlation between the indexes of general and special physical preparedness with the age-somatic parameters of 16-18-year-old Fifteen Poland female judo competitors (stage of directed training) during preparation to the competitive period. To determine somatic features - body mass and body components: FAT (kg), FAT (%), FFM (kg), FFM (%), TBW (kg), TBW(%) the Body Composition Analyser was used. To assess general physical preparedness the standard IPFT test was used. The level of athletes’ special physical preparedness was assessed by Sterkowicz test (SJFT) and Igumienow test. The female judo competitors with lower body weight, smaller absolute and percentage values of the fatty component perform better in all running tests of IPFT. Of the power performance test, the IPFT index showed a statistically significant correlation with their somatic characteristics. In this case female athletes who had a smaller body height and a lower BMI showed the best results.

**Mahipal, (2016)** conducted a study to compare the selected physical fitness variables of Panipat District state level athletes and football players. For this 40 male subjects in which 20 players from athletics discipline from coaching centre Shiva ji stadium Panipat and 20 players from football discipline from Football Training Centre Govt Sr. Sec. School Siwah of age group 17-19 years Which were randomly selected. These selected subjects were tested for speed, power, agility, muscular strength by standardized test of respective fitness variables i.e. speed by 50 yards dash test, explosive power by
standing broad jump test, agility by 6x10 meter shuttle run test and muscular strength was tested by sit ups test. In the statistical technique t’ test was applied to find out the significant difference in above said physical fitness variables and the level of significance was set at 0.05 level. In the result the significant difference was found. The athletes were found better in speed, explosive power and agility as compared to football players, but there was no significant difference was found between both discipline players for the muscular strength variables.

Furtado, et. al. (2016) conducted this study to determine the passing rates on health-related physical fitness tests of visually impaired young 40 (20 mail+20 female) with mean age 17.3 year Brazilian goal ball players. The Brockport Physical Fitness Test, was employed to evaluate percentage of body fat, shoulder stretch, back-saver sit and reach, trunk lift, curl-ups, push-ups, and the one-mile run or walk. The data was checked with the Lilliefors test. Regarding gender, we compared age by using the t-test and visual impairment classification by using the chi-square test. A significant difference was found in the fitness qualify test of one-mile run or walk between male and female. More than 50% of the participants were able to pass in at least four out of the seven tests. No significant differences were found between groups regarding the proportion of athletes who reached the protocol standards. Irrespective of gender or visual impairment classification, the participants of this study had high passing rates on most tests.

Davis, et.al.(2016) elaborates in this study about the school physical education curriculum is the primary source of physical activity and fitness instruction for adolescents. Little is known about the physical fitness, obesity, and physical activity levels of high school students of racial and gender groups, 413 students(216 females,197 males, 14.8 ± .84 years) of six schools. They were examined for three fitness measures Curl-Ups, and the Back-Saver Sit and Reach, as well as BMI, body fat percentage, and PA data, were obtained. Fitness, body fat, and PA data were significantly better for males than for females other than back-saver sit and reach, for which females performed
higher. Simultaneously there were no gender differences in BMI. White students were better than Black students on fitness, body fat, PA, and BMI except back-saver sit and reach right side.

Singh, (2016) conduct the study to compare physical fitness components of ball and racket games players. For this purpose total 200 subjects were randomly selected (100 from ball players i.e. basketball and football, 100 from racket players i.e. badminton and tennis players) of age 16 and above. The two selected physical fitness components i.e. strength and flexibility were measured with respective tests. Mean and Standard deviation of each component were calculated. To find significance of difference between means Independent t-test was applied. Level of confidence was fixed at 0.05. It was concluded that no significant difference was observed in strength but, a significant difference was found only in flexibility component between ball and racket games players of inter-university level. It was clear that flexibility of ball games players was more as compared to racket games players.

Ingrid, (2016) said in this study which was based on cross-sectional investigation of all students from the first to the fourth grades from 5 primary schools of region of the East Slovakia. The aim of the study was to identify and analyze differences in physical fitness and somatic parameters of primary school-aged children according to level of their gross motor coordination. A total of 447 children, their participation was voluntary. However, a total of 436 children (boys: n = 214; girls: n = 222) between 7 and 10 years of age. The level of motor coordination was assessed using the test battery Körper koordination-Test-für-Kinder (KTK). The anthropometric data (body mass, body height, sum of five skin folds) were measured. In statistical analysis one-way ANOVA was used. The study reveals that group of children with low motor coordination had an inferior fitness level compared with the group of children with normal or high motor coordination level in almost all test items. Further this study pointed to the higher prevalence of overweight and obesity, and more fat in children have lower level of motor coordination. Children with low motor coordination are likely to have poorer physical fitness compared to
Yadav, (2016) conducted this study to compare the physical fitness variable of 30 (15 each from rural and urban) foot ball player of 14-20 years of Bilaspur district in relation to their age. Only Explosive leg strength was measured by Standing Broad Jump test and Speed was measured by 50 Yards Dash to measures the selected physical fitness variables of above subjects. For the present study, the mean value, standard deviation and independent ‘t’test were applied to analyze the data. On the basis of the analysis of data the rural football players were found better than the urban male players in both fitness variables .It can be due to different life style and food habits.

Abdullah, et. al.(2016) conducted study on various sports to study the levels of physical fitness (e.g., muscle strength/ power and endurance). They told that these components to achieve high level performance. The current study comprised of 223 male adolescent athletes (17.38 ± 1.92 years). The participants were recruited from different interstate championship of different types of sports from Terengganu state in Malaysia. In this study Standard anthropometric testing was also conducted for height and weight. In statistical technique principal factor analysis (PFA), were used to study the relative performance variations of the most significant performance quality variables and to determine the origin of relative performance components .The result of the current study reveals that flexibility, muscular strength, core body strength, cardio vascular endurance were significantly related with high level performance.

Brusseau, et.al. (2016) examined 1390 (mean age = 8.4 ±1.8 years) school-aged children recruited from 3low-income elementary schools to study the effect of a Comprehensive School Physical Activity Program on physical activity and health-related fitness. These all children were from low-income families. All were given the Physical activity program for 6 weeks and 12 weeks. The health related fitness was measured. There were significant but moderate increases in Aerobic Cardiovascular Endurance Run laps with
baseline. In comparison 12 weeks program was very effective then 6 week’s program.

Belka, et.al.(2016) conducted study to assess various aspects of motor testing in handball talented players of ten years of age, the main aim was to analyze the fitness level of top handball junior players. Total no of participants players were177 including 11 younger (16–17 years old) and 166 of (18–19 years old). These all players were tested two times in each year, (in summer and winter). The following six fitness tests (running 2 x 15m, dribbling 30m, five jump, medicine ball (1kg) throw, running 10 x 20m and 12 minute The Cooper 12 minute run test). In statistical technique, the one-way ANOVA analysis was used for two repeated testing assessments. In the result younger Handball players significantly differ in the summer and winter testing in five tests except Cooper 12 minute run test. Both age groups deteriorated in the Cooper 12 minute run test. In the comparison of the fitness level of top players with low performance players

Top players showed significant difference (p = .01).