Chapter -II

REVIEW OF LITERATURE

The researcher had undergone a vast survey of related literature. He had appraised various journals, books, periodicals etc. Related with various aspects of this study. The important studies having specific relevance with the undertaken study are cited below.

Vila, Manchado, Rodriguez, Abraldes, Alcaraz, and Ferragut, (2012) conducted study on Women's handball, which had seen a prominent growth over the last 10 years. The purpose of their study was twofold: first to describe the anthropometric characteristics throwing velocity hand grip and muscular power of the lower limbs in female handball players and second to identify the possible differences in these parameters in terms of individual playing positions (center, back, wing, pivot, and goalkeeper). A total of one hundred thirty (130) elite female Spanish handball players were selected in the study (age 25.74 ± 4.84 years; playing experience 14.92 ± 4.88 years). Anthropometric measurement was taken for all the subjects according to the International Society for the Advancement of Kinanthropometry protocols. Thereafter, all the samples performed a upright jump test (squat jump and counteraction jump). Hand grip and throwing velocity in many conditions were also measured. One way analysis of variance (ANOVA) and a Tukey post hoc test were used to study the significant differences among playing positions. The wings were less heavy shorter and showed a smaller arm span than did goalkeepers backs and pivots (p ≤ 0.001). Furthermore, pivots were heavier than centers. Backs and pivots exhibited greater muscle mass than wings. Players' somatotype was mesomorphy (3.89), endomorphy (4.28) and ectomorphy (2.29). Center players found greater throwing velocity levels than did wings in 9-m throws from just after the line, with a goalkeeper. Backs exhibited greater hand-grip
values than did wings. Statistical differences have been observed between wings and other playing positions especially with pivot and backs. The coaches may use this knowledge to select players for the various specific positions.

Rathore, Narwaria and Mukherjee (2012) conduct a study with the aim of comparing anthropometric measurements between handball and female Handball players at college level. A total of thirty (N=30) subjects were selected from St. Joseph College of Physical Education Moolamattom. Each group Fifteen subjects were selected from female Handball and handball group. The subjects ranged from 17 to 25 years. For this study, the variables body weight, standing height and chest circumference were selected. Data was obtained with the help of electronic weighing machine, stadiometer and non-stretchable measurement tape. The researcher used Standard procedures for collection of data. For the analysis of data, independent ‘t’ test was employed with level of significance 0.05. The result of the study shown insignificant differences in body weight and chest circumference. However, in case of standing height, significant differences were observed between Handball’s male and female players.

Gould, Horn, and Spreeman (1983) conducted a study on 446 junior elite wrestlers participating in a National tournament in the United States. They found major differences in the degree of competitive stress reported by the wrestlers. In comparison to the high trait anxiety of wrestlers the low trait anxiety of wrestlers were also superior in terms of: (1) Their perception of personal ability. (2) Their pre-tournament confidence, (3) The percentage of all matches in which they did not Worry, and (4) The trouble (lack of difficulty) they had in sleeping.

Orlick (1986) says that, when consulted with coaches, he found that the first concern to be discussed was, almost always, the psychological preparation for the competition. He often had the feeling that, the was the most critical issue because;
it was one that confronted coaches and athletes almost daily in the training, outside training, while traveling and in competitive.

**Singer (1980)** examined that relationship between anxiety and learning. He described this relationship as an inverted U hypothesis, which states that performance improves with the increasing level of anxiety to an optimum point, where upon further increase in anxiety causes performance impairment.

**Marten (1982)** study conducted on four sample of Female Handball team found subjects scoring high on Achievement Motivation (Mehrabian Scale) are low in anxiety and high in achievement motivation. Same way subjects scoring low on Achievement Motivation Scale were found high in anxiety. The study further concluded that there was insignificant correlation-ship between competition anxiety and achievement motivation.

In a study conducted by **Boon (1977)** the relationship of arousal and anxiety with performance of gymnastic was investigated. The pulse rate and palmer sweating were utilized as symptoms of arousal. Anxiety was assessed by means of the State-Trait Anxiety Inventory. The Ithaca college women’s varsity gymnastic team (N=18) was tested during the1973-74 Season. Inter-correlation matrix of all variables, pulse rate, palmer sweating state anxiety trait anxiety and gymnastic performance revealed limited relationships between gymnastic performance and arousal/anxiety measures.

**Singh et al. (1986)** studied the level of anxiety between men and women handball players of intervarsity level. Seventy three (36 male and 37female) subjects comprising six teams were investigated. The subjects were members of first three position holders respectively. Marten’s sports competition anxiety test (SCAT) for adults was administered to the sample selected for the study. ‘t’- test was applied to find out intra group differences. Analysis of variance was applied to find out the difference among the different position holder of male and female
teams. The difference of competitive anxiety between male and female came out to be statistically significant at .05 level though over all level is moderate in both cases.

Purpose of the study conducted by Sandhu et al. (1986) was to adapt the competitive anxiety level scale for female basketball players. 32 female basketball players were taken as subjects from the basketball teams of colleges officiated to Punjab University. The data were statistically analyzed by using the statistical operation including co-efficient or correlation to determine the validity. Factor analysis was also used for the adaptation of test. The result of the study revealed that the test is valid and can be used on female basketball players at college level in Indian conditions.

Ingebrigtsen and Jeffreys (2012) conducted study on the relationship between strength (squat and bench press), squat (SJ) jump, jumping ability in countermovement (CMJ), 10 m and 30 m sprint time and 6x30m shuttle run (repeated sprint ability) among a group of twenty nine male elite handball players mean aged 16.5±0.8 years, with height of 184.3±4.8 cm and body weight of 77.0±9.4, who all were voluntarily participate. Pearson’s product-moment correlation revealed significant relationship Firstly, with the sprint time results and a jumping height in complete terms over 0–10 meter and 0–30 meter (p<0.01). When uttered relative to body weight, the 0–10 meter sprinting time was found to have a significant relationship with all measures of jump height and peak power (p<0.01) in both CMJ and SJ. The 0–30 m sprint time correlated significantly (p<0.01) with all jump measures (except jump height assessed by CMJ) relative to body mass. Secondly, repeated sprint ability (shuttle run) over 0–10 meter correlated to all jumping (p<0.01) and strength (p<0.05) measures (in absolute terms) except for reactive strength, while 0–30 m RSA only correlated (p<0.05) to CMJ and SJ
performance. Expressed virtual to body weight, the bench press \((p=0.01)\), CMJ peak power \((p=0.01)\), SJ \((p=0.05)\) and SJ peak power \((p=0.01)\) significantly correlated to 0–10 meter repeated sprint ability. No other significant results were found. Data suggest that since raw jump scores are reasonably easy to collect, they could supply coaches at all levels with important information with which to determine speed and overall athletic performance. As power and strength scores only co-related to speed scores when expressed regarding to body weight, it seems significant that physical preparation coaches make sure that their force and strength improvement programs are suitably adjusted for body weight.

Chuhan & Tanwar (2012) determine the characteristics of kinthropometric and their relation with handball skills. Accuracy and also to know how accuracy can be developed among the university level handball players. A handball player like other sports also requires of right type of physique and mental make up the player of handball must be good tall and having average height from 5.8’ to 6’. In the light of fast growing realization of the imaginations of handball game and its contribution to wellbeing and fitness of human in general the study was helpful to know required and immediate. Kinthropometry variables or traits related for the development of fundamental skill like accuracy. It is in the height of spirits to take up the study. Concerning relation with playing ability and kinthropometry variables and accuracy. It is very clear from the results their these measurements have significant contribution to the accuracy performance of players of handball.

Raut (2012) showed that fitness component and technical skill are inter-related. The purpose of this research was to find out relationship between selected motor fitness variables and skill performance of tribal women handball players. The thirty women handball players were randomly selected as subject for present study from the training camps at Pt. Ravi Shankar Sukla University, Raipur, G.G.
Singh & Sarkar (2010) analyze the relationship of Emotional intelligence and Coping skills to Playing ability in Handball players at International and National level and to determine the Handball playing ability on the basis of Emotional intelligence and Coping skills at International and National level both. The subjects selected for this research work were 100 in which 50 International Level Handball players (Men) and 50 National Level Handball players (Men) from different States of India. Emotional Intelligence was assessed by Emotional Intelligence Scale (EIS) constructed and standardized by Anuket Hyde, Dr. Sanjyot Pethe and Dr. Upinder Dhar (2002). Score was the sum total of the response. Second, Athletic Coping Skills Inventory developed by Smith, Schutz, Smoll and Ptacek (1995) was used for the purpose of the present study. Score was the sum total of the response. The Handball playing ability of the subjects was assessed by the help of three competent handball coaches used Handball Rating Scale (HRS). Pearson product moment correlation was used. In order to predict handball playing ability on the basis of Emotional intelligence and Coping Skills of National and International level Handball player, regression equation was applied. In order to compare International and National level handball player in relation emotional intelligence and coping skills variables independent t-test was used. The level of significance for all above test was set at 0.05 levels. The data was analysed by using SPSS version 16. Findings revealed that the Emotional Intelligence, and Coping Skills was positively related with the International players handball playing ability. Secondly, Emotional Intelligence and Coping Skills was positively related with the national players playing ability.
performance. Whereas, no significant difference was found in case of emotional intelligence and coping skills. This reveals that the coping skill and emotional intelligence at national and international level was more or less similar in nature.

Singh S.P. and Malhottra P. (1986) conducted a study on Indian national cyclists. Anthropometric measurements were taken on 34 male and 9 female Indian cyclists who were attending a national coaching camp at Patiala with a view to evaluate their body composition, morphology and somatotype. The measurements were taken in the mornings to avoid any possible effects of fatigue on height and other body dimensions. Body fat was calculated from skin folds using the formulae devised by Durnin and Womersley (1974) and somatotype were assessed by using the Heath and Carter (1967) method. The male and female cyclists were significantly heavier and possessed greater limb girths and skeletal diameters than their control counterparts. The percentage of body fat was similar in female cyclists and controls. The cyclists showed a greater development of musculo-skeletal tissue of the lower extremity relative to height than controls. The somatotypes of male and female cyclists were 2.76-3.90-3.21 and 5.17-3.22-2.56, respectively. Compared to the control groups, the cyclists of both sexes were more mesomorphic and stocky. Since the maximum share of the power transfer to the pedals is that of the lower extremities, therefore, highly developed muscles of calf, thigh, buttocks and hips of the cyclist seem to have a definite advantage.

Pavicic L. (1986) defined the degree of physical activity in sports events on the three samples of subjects. The sample with normal activity with moderate and versatile physical activity and the third group consist of elite athletes in water polo and rowing. Subjects were measured with a set of 18 anthropometric measures. The Hypothesis predicted significant difference between the given groups. The principal component analysis is used to analyse the differences on the talent
structure. Studying the results of multivariate analysis of variance and
discriminative analysis on the measure and on the scores of subjects on principal
components, statistically significant difference between given groups can be stated.
Difference in groups can be explained by recession and by the influence of training
process.

**Puhl et al.(1982)** conducted a study to examine the absolute and relative
physical and physiological characteristics of elite men and women female
Handball players. They tested eight members of U.S. men national team and 14
members of women university world game female Handball team. The Parameter
measured indicated percent body fat, $\text{Vo}_2\text{ Max}$, post exercise blood Lactic acid
measures of vertical jumping ability and peak isokinetic torque for knee flexion
and extension shoulder extension and planter flexion at 80, 180, 240, and 300
degree per second and they established following findings (1) As expected, the
men were taller, heavier had a higher body density and lean body weight and lower
body fat, (2) For gross measures of jumping ability the men achieved greater
absolute height for the standing reach.

**Monyeki M. et al. (1988)** designed a study to describe and compare the
somatotype characteristics of first division college basketball players of South
Africa with their counter parts in other parts of the world. College basketball
players of Nigeria were reported to be mesomorphic, while Sam Diego state
university players were reported to be ectomorphic. The rationale of the study was
that regular participation brings somatotype similar to top basketball player in the
world.

**Mokha and Sidhu (1988)** took anthropometric measurements of Indian
female female Handball players having International level of participation. They
found that the female Handballers were taller and heavier than the controls. The
taller stature of female Handball players was mainly due to the longer lower extremity because the mean values of the sitting height in both the groups were almost comparable. Upper extremities were also longer for female Handball players and they also possessed broader shoulders, wider knees and wrist.

Rogulj N, Srhoj V, Nazor M, Srhoj L, Cavala M. (2005) studied on comparison in motor and psychological characteristics related to playing positions were analyzed on subjects of fifty three elite female members of junior and senior national teams. Motor status included eight variables for determining the explosive strength of landing and throwing, speed strength, agility, movement frequency, and flexibility. Psychological status was analyzed through four extents according to Eysenck: psychotic behavior, extroversion, neurotic behavior, and lie. The anthropological features showed statistically significant differences. Considering motor abilities differences were found in the attributes for assessment of speed, agility, strength and leg movement frequency where wings predominated. Whereas goalkeepers found prevalence in flexibility. In psychological standing, differences were found in the variable for assessment of extroversion, which was most prominent in wings, whereas psychological actions were more prominent in those at pivot position. The differences were primarily significant to the selection of players of a specific anthropologic characteristic for particular playing positions. The hypothesis of the effect of kinesiologic point of view a particular playing position on the formation of players' anthropologic profile should be scientifically approved. Study results may observed application in training and contest practice, especially in forming anthropologic models for particular positions during the process of player selection.
Y, Shima., K, Kitaoka., J, Nakase., K, Goshima., R, Takahashi., S, Tsukagoshi., Y, Yoneda., S, Moriyama., Y, Ogawa., H, Tsuchiya. (2011) studied on the influence of psychological factors of injuries in female handball and basketball players for non-contact anterior cruciate ligament (ACL) injuries. A three-year prospective cohort study has been done in Japanese young female handball and basketball players to determine risk factors for non-contact ACL injuries. At baseline, 99 out of 104 young female players (handball: thirty (n=30) players, basketball: sixty nine(n=69) players, age ranged from 15 to 16 years) were directed to complete a specific questionnaire regarding previous injuries, player history, KOOS, personality and psychological-competitive ability through the Y-G personality questionnaire and questionnaire for diagnostic inventory of psychological-competitive ability score (DIPCA-3). Findings of the study showed that there were no correlation between KOOS and DIPCA-3, and insignificant differences were observed between handball and basketball players. There were also insignificant differences between non-injured players and previously injured in the score of KOOS and DIPCA-3. The players evaluated as D (director) type by the Y-G personality questionnaire scored better result in DIPCA-3 than the A (average), B (burst), E (engineer) type (p=0.0128, p=0.001, p<0.001, respectively). Conclusively superficial mastery environment has been reported as an important predictor for new injuries, the players having high psychological-competitive ability determined as D type may be the injury-prone athletes. Prospective follow-up is essential to expose whether high psychological-competitive ability is a risk factor for ACL injury or new injury.

George, T. and Ravindran, G. (2012) determine the psychological variable on playing ability among handball teams at different levels. The researcher had selected 167 male handball players as subjects from different levels such as
University, College, State level and District who participated in various competitions like University, Inter University, State, Inter-State (South Zone) during the session 2010-11. The players include 26 subjects from College level, 29 subjects from District level, 60 subjects from University level and 52 subjects were selected from State level. The competitions were held at different places in different times. Self esteem was the psychological variable of this study. Analysis of variance was used to analyse the gathered data. The findings of the study revealed significant difference ($p \leq 0.05$) on self esteem among the four levels of handball teams.

**Malhotra et al. (1972)** studied functional capacity and body composition of the throwers, jumpers, sprinters and the middle and long distance runners. The jumpers were found to have a higher lean body mass with less fat content than the throwers who were tall and heavily built. The middle and long distance runners had highest and the throwers, the lowest maximum $O_2$ intake capacity values in terms of body weight and lean body mass. Similarly, the trackmen had lower maximum heart rate than the other groups of athletes. The jumpers and throwers had stronger muscle power however; the later were strong in arm and shoulder muscle strength too.

**Cureton (1954)** tested 55 middle age athletic champions and compared them with 400 middle-aged men and with normal young men. The founder champions were more mesomorphic (3-5-4), more linear-in glutial-and abdominal girths. They also had stronger dynamometric strengths and better cardiovascular tests.

**Telka and his associates (1951)** Studied 245 finish top ranking track and field athletes and wrestlers. They did not find any appreciable differences in respect of constitution among the athletes of different branches, except in certain extreme groups. However they found them different from the control sample. They
stated that the material body build of a definite type did not appear to be a necessary prerequisite to the achievement of good athletic results. However during 1954, the same workers related the top-ranking track and field athletes’s various body measurements to their performance. Throwers were tallest in this material and they seemed also to benefit most from their height. The correlation between the relative shoulder breadth (with stature) and performance was significant in throwers and long distance runners. The correlation between the relative shoulder breadth (with stature) and performance was positive and highly significant in the case of the throwers. The correlation between the relative chest circumference (with stature) and performance was negative and highly significant in the case of sprinters and positive and significant in case of throwers.

Vujovic D. and Lozovina V. (1999) examined the differences between two groups of elite athlete’s anthropometrics measurements. The groups were from sports of water polo and rowing. Subjects were measured with set of 18 anthropometric measurements. Multivariate analyses on manifested measurements as well as on scores on latent dimensions were employed to analyse the differences between the groups. Differences were based on differences in measurements that can be attributed to muscle tissue and fat tissue, which were both in favors of water polo players. There were no differences in measurements of skeleton except for the measurements of bicristal width and leg length. Different training procedures and different surroundings in which activities were taking place cause the differences. No differences in skeleton measurements were the consequence of the selection process.

Mokha R. and Sidhu L.S. from Punjabi university Patiala examined the six-skin fold measurements (biceps, triceps, forearm, Sub-scapular, suprailiac and calf) were made on 157 track and field athletes (42-throwers, 35- jumpers and 80-
runners). The range of ability (Highest level) from states through intervarsity to district (lowest-level), 81 subjects acted as controls. The throwers possessed significantly more fat at all six measurements sites than the jumpers and runners. The jumpers and runners did not differ much from each other. With the increasing levels of competition a trend of an increase in fat was observed in throwers and a decrease in jumpers and runners.

**Stepnica J. (1965)** studied the relationship between somatotype and motor manifestation. The relationship between somatotype components and motor performance in adult is expressed by means of correction analysis. Youths were categorized into zones with regard to motor performance. The most physically efficient were in fourth zone with whom was recorded the best body posture and the high motor activity. There were more motor-talented individuals among them. Most of the children attending training in top sports centers are included in the fourth zone. The pupils included in the first (endomorphs) and the second (ectomorphs) zones score the lowest physical performance and appear to have poor body posture. It was concluded that somatotype is a morphological predisposition of motor and sports efficiency, as well as body posture.

**Heath B.H. et. al. (1967)** carried out a study to compare the genotypic and phenotypic photoscopic somatotype ratings of 54 young adults (23 males and 31 Females) aged 14-22 yrs. (Tanner and Whitehouse, 1982). Genotype rating was made by Tanner (T) criteria of Sheldon (1954). Phenotype ratings were made by heath (H) using the Heath and Carter (1967) method. Means for males were; age = 19.1yr; Somatotype (T) = 2.9 - 4.2 - 3.6; SAM. (T) = 1.9; Somatotype between somatotype means, somatotype by category. The r’s were 0.91 (endomorphy), 0.78 (mesomorph) and 0.86 (ectomorphy). Means for female were; age = 18.2 yrs; Somatotype (T) = 4.7 - 2.8 - 3.7; SAM. (T) = 1.5; Somatotype (H) = 4.6 - 3.6 - 2.7;
SAM. (H) = 1.6. There were difference between Somatotype means, Somatotype by category and H rating were higher than T rating. Component means were 0.80 (endomorphy), 0.46 (mesomophy), and 0.84 (ectomorphy). It is concluded that there are greater differences between methods for young females than males.

*Cureton (1941)* stated that in general people with long legs and long arms and relatively short and small trunks were physically weak types in long-sustained heavy work, but they might show great speed and endurance at high levels of athletic activity. Long third-class levers are noted for speed and range of action as well as their efficiency for force.

In another study by *Sodhi et al. (1987)* 97 Indian volleyball players were divided into four groups-National men (N = 12), State (N = 21), National University (N = 27) and District (N = 25) groups. The volleyballers in each group were compared with control group (N = 25), as well as the champion reported elsewhere. Each subject was examined with 12 anthropometric measurements and 10 tests of performance. The results of the study revealed the three groups of volleyball players and the controls, with a persistent decreasing gradient in most of the variables, in the order as mentioned.

In Somatotype the volleyballers on the whole possessed less rating of endomorphic component than the controls. Among volleyballers only district level players had shown significantly higher value of endomorphic component than that of the state. In the mesomorphic component the control sample showed rather higher rating than the volleyballers of each group. In the ectomorphic component volleyball players were observed to be more lean and thin than the controls. Contrarily among the different groups of volleyballers the ectomorphic component showed non-significant results with the sole exception of national volleyballers
who scored more on ectomorphic scale than the state. However, on average the
volleyballers in each group were meso-ectomorphic in their somatotype.

In all the physical performance tests, except 2.4 km run the national players
were the best, followed by the state, the university, the district players, and the
controls with a descending gradient of performance. Overall the national level
players were the best among the volleyball players and volleyballers as a whole
were better than the controls in this regard. The information provided there in can
be used as a criterion for evaluating the performance status of different levels of
volleyballers in India.

Mohamed (2012) studied anthropometry measurements, which represent the
basic dimensions of the body in both sports, volleyball and handball, from
Egyptian juniors in the age from 15 to 18 years, by moving from diversity and
abundance which are represented in the original anthropometric included in the
study to the few that are in clusters or common factors derived from the study for
each sports the same search every individual and determine the number of
anthropometry measurements under search - included in the analysis - to a smaller
number depends on the amount of factors saturates joint derived from the analysis,
which may provide researchers and trainers time and effort when trying to apply
these anthropometry measurements for the selection of juniors and identifying the
anthropometric factors associated with each sport, volleyball and handball,
separately and the name of these factors and hypotheses of the research building
factorial analysis of forty-four anthropometric measurements and identify the most
important standard anthropometric factors in both volleyball and handball and find
the statistical differences the function in the most important measurements
anthropometric between volleyball and handball for volleyball. The investigator
used the descriptive manner, the survey, as an appropriate method to find the
objectives of the study, as the factorial analysis was used by researcher as a picture approach, descriptive. The subjects included sixty one (n=61) juniors, divided into 25 of volleyball and 36 of handball players. Random sampling method select some Egyptian juniors in volleyball and handball those were registered in Egyptian sports federations of the two sports. The investigator applied the forty four anthropometry measurements under on a pilot study, on the number of 30 juniors were selected from junior and outside the sample basic research and that was at fifteen juniors of volleyball, fifteen juniors of handball and be credited to the validity and reliability of the measurements of anthropometric, has made transactions stability elevated limited between 1 to 0.934, and all statistically significant at 0.01 level, which indicates the stability of measurements. The findings of recycling factorial orthogonal for a class volleyball revealed the admission of 5 main factors, 3 factors expatriates, that the findings of recycling factorial orthogonal to the category of handball revealed on the acceptance of 3key factors, 5factors other than pure, that the results of recycling factorial orthogonal to the category of volleyball revealed for the admission of five key factors are: along the lower limb lengths and offers some parts of the body, circumference of upper limb, obesity of the upper part, of the lower limb and three factors expatriates, that the results of recycling factorial orthogonal to the category of Handball revealed on the acceptance of three key factors are the breadth, obesity and circumferences and five factors other than pure, there are significant differences in the abstract level 0.01 between both volleyball and handball from the results of anthropometric measurements, the values of "t" calculated ranged from -0.77 to -22.17, in light of the purpose of the research and the limits of the sample and on the basis to refer to the findings and conclusions, the investigator recommends that the anthropometric measurements, resulted from the current study, are among the most important
foundations which take into account when choosing players of volleyball and handball.