CHAPTER – II

REVIEW OF RELATED LITERATURE

A study of relevant literature is an essential step to get a full picture of what has been done.

Agarwal\textsuperscript{1} quotes, “The literature in field forms the foundation upon which all future works will be built”

In order to support the presentation and analysis of the study, the research scholar collected reference materials from different sources and research works like dissertations, theses, journals, relevant studies and books on physical education, sports sciences and psychology and the same were presented in this chapter.

Nature of the Game

Kabaddi is an indigenous game of India. A combative sport, Kabaddi, though has been existence since ancient times, research studies about this game were conspicuously absent. In the absence of critical literature, the author was obliged to rely on allied literature which would not only shed height on the present study but also help in designing the study, analyse and interpret the data and draw appropriate conclusions.

2.1 Studies on Kabaddi Game

George Joseph\textsuperscript{2} undertook a study to investigate the relationship of selected physical, Anthropometrical variables as determinants to the Kabaddi performance. The subjects were 35 school Kabaddi players in boys section who


had participated in the inter district Kabaddi tournament during the year 1996-1997 at Thiruvallur district, Tamilnadu state. Motor physical abilities selected for this study were speed, agility, endurance and flexibility. Speed was measured by 50 meters dash, in seconds, agility was measured by 6x10 meters shuttle run in seconds, endurance was measured by 1500 meters run in seconds, flexibility was measured by sit and reach test in centimeters, height was measured with the help of stadiometer, arm length, leg length, trunk length, were measured with the help of metal tape. Kabaddi playing ability was determined by taking the average of subjective grading by three experts who gave their judgement on a 10 point rating scale. The data were analysed using the product moment correlation coefficient and multiple correlation and the following conclusions were drawn.

1. Speed is significantly related to performance in Kabaddi (r-0.394)
2. Endurance showed insignificant relationship with the performance in Kabaddi.
3. Flexibility also showed insignificant relationship with the performance in Kabaddi playing ability. Height and arm length showed significant relationship with performance in Kabaddi.
4. Trunk length did not have any significant relationship with performance in Kabaddi.

Balaji K. Rao, 3 Conducted a study to determine the relationship of sports competition anxiety, aggression and self-confidence, to performance in Kabaddi. Twenty Tamilnadu State Male Kabaddi players who were participants in senior National Kabaddi Championship held at Tirpur, Tamilnadu State. Were selected as subjects for this study. Questionnaire technique was adopted

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to gather the data. The collected questionnaires were assessed through the scoring system relevant to the concerned questionnaire. Sports competition anxiety test questionnaire (SCAT) developed by Martins (1977) was administered to find out the anxiety level, Aggression questionnaire developed by Premshankar Sukla (1989) Self confidence questionnaire developed by Rekha Agnihotri (1987), were administered to the subjects and performance was measured through subjective rating by three expert coaches on a 10 point rating scale. Analysis of data was done by multiple correlations, stepwise regression were carried out and the following conclusions were drawn.

1. Aggression and self-confidence were significantly related to the Kabaddi performance.
2. Anxiety did not show significant relationship with the Kabaddi performance.

Kaur and Associates\(^4\) conducted a study on Anthropometrical and fitness profile of Asian gold medalist Indian male Kabaddi players. The data on forty five National male Kabaddi players were collected from 1997 to 1998 during a National camp held at Netaji Subhas National Institute of Sports, Patiala. The subjects were the age group of 20 to 34 years and were in preparation for the Asian games 1998. Anthropometrical variables selected were Height, estimated by using Stadiomenter and recorded in Centimeters, Body Weight, estimated by using weighing scaled and recorded in Kilograms, Sitting Height, Arm Length and Leg Length, measured by using measuring tape in centimeters, Diameters such as baronial, wrist and ankle; circumferences of chest, upper arm, thigh girth and calf girth, skin folds at various sites.

like biceps and triceps, fore arm subscapular, suprailliac, supraspinale, measured by using skin fold calipers along with the physical variables, speed which was measured by 30meters run in seconds, agility which was measured by 6x10 meters shuttle run in seconds, leg power a measured by standing broad jump in meters, Arm strength endurance was measured by pull ups in numbers. Endurance was measured by administering 2.4kms run performance recorder in seconds. Variable statistical techniques were used to analyse for the data. Anthropometrical measurements were analysed as suggested by Weiner and Louries (1969), percentage of body fat was estimated by applying the formula of Brozek. et. al., (1963) body density obtained was by adopting the formula given by during and Womersley (1974). Bone and Muscle masses were calculated by using Matieiga's method (1921). Somatotyping was done by using the equation of carter. Mean standard deviation, coefficient of correlation and regression were computed. The following conclusions were drawn.

1. Among Anthropometric variables arm length and leg length were the most importance factors in Kabaddi performance.
2. Height-weight ratio indicated significant relationship with the Kabaddi performance at higher level.
3. Significant improvement has been noticed in pull-ups, 2.4 Kilometer run and 6x10 shuttle run at the end of the training camp.

Subramaniyan\textsuperscript{5}, Conducted a study on Regression Analysis of Kabaddi playing ability from selected physical, anthropometrical and physiological variables to performance in Kabaddi for Inter-District Kabaddi players of Kerala State.

\textsuperscript{5} T.S.Subramaniyan, “Regression analysis of Kabaddi playing ability from selected physical, anthropometrical and physiological variables for inter district Kabaddi players of Kerala state”, (Un-published Master’s Thesis Department of Physical Education and Health Sciences, Alagappa University, Karaikudi, 1994), p. 196.
Fifty male inter district Kabaddi players were selected as subjects, whose speed has measured by 30 Mts. flying start, agility was measured by 6 x 10 Mts. shuttle run, flexibility was measured by sit and reach test, endurance was measured by 1000 Mts. run, weight, height, arm length and leg length, were the anthropometrical variables and breadth holding time, resting plus rate and vital capacity were the physiological variables. Playing ability was determined by taking the average of subjective grading by three expert coaches in the field. The data were analysed through Pearson product moment correlation coefficient and multiple step wise regression which were computed within the limitations of the study. The following conclusions were drawn.

1) Physical variables such as speed, agility and endurance were significantly related to the Kabaddi performance.

2) Anthropometrical variables weight, height and leg length showed significant relationship with the Kabaddi performance.

3) Leg length showed no significant relationship with the Kabaddi playing ability.

4) Vital capacity, resting pulse rate and breadth holding time were significantly correlated to the Kabaddi playing performance.

Venkatareddy J.\(^6\) conducted an analytical study of Kabaddi playing ability from selected physical, anthropometrical and physiological variables among state level male Kabaddi players of Andhra Pradesh. For this study Seventy five male Kabaddi players in the age group of 18 and 25 years from the different districts of Andhra Pradesh were selected as subjects. The physical variables selected were speed, agility and endurance.

\(^6\) J.Venkatareddy “An analytical study of Kabaddi playing ability from selected physical, anthropometrical and physiological variables among state level male Kabaddi players”, (Unpublished Master’s Thesis, Department of Physical Education and Health Science, Alagappa University, Karaikudi, July 1999), p.190.
Speed was measured by 50 Meters dash in seconds, agility was measured by 6 x 10 meters shuttle run in seconds and endurance was measured by 1500 Meters run in seconds. The Anthropometrical variables, height, arm length and leg length were measured in centimetres. Physiological variables such as vital capacity, resting pulse rate and breath holding time were selected, and the performance ability of the subjects was determined by a subjective rating of three expert coaches in the game of Kabaddi. The analysis of data was done by multiple correlation and step wise regression were carried out and the following conclusions were drawn.

1. Among the physical variables agility has shown significant relationship to the Kabaddi performance of State level Kabaddi players. The Anthropometrical variables namely arm length, leg length were significantly related to the Kabaddi performance.

2. The physiological variable, breath holding time was significantly related to the Kabaddi performance of State level male kabaddi players.

Chandrashekhar\textsuperscript{7} undertook a study to determine the relationship of power, agility, flexibility, muscular endurance and circulo respiratory endurance to playing ability in Kabaddi. Thirty male Kabaddi players of the Lakshmibai National College of Physical Education, Gwalior, were selected as subjects for this study. Power was measured by sergeant jump test and agility by Side step test, flexibility by trunk flexion test, muscular endurance by pull-ups and bent knee sit-ups and Circulo respiratory endurance by one minute lateral jump test. The playing ability was determined by the subjective rating of a panel of three experts for each subject. Product moment correlation was computed to statistically analyse the data. On the basis of the findings of the study the following conclusions were drawn.

\textsuperscript{7} T. Chandrashekhar, “Relationship of selected motor fitness, Components to playing ability of Kabaddi players”, (Unpublished Master’s Thesis, Jivaji University, Gwalior, 1984), p.213.
1. Leg power was the most significant motor fitness component underlying performance in the game of Kabaddi.

2. Muscular endurance, circulo-respiratory endurance and flexibility also contributed to the Kabaddi playing ability.

3. Agility and pull-ups did not show significant relationship to playing ability in Kabaddi.

Chauhan\(^8\) conducted a study on relationship of selected motor fitness components to playing ability of Kabaddi players. Four components viz., speed, agility, explosive strength and endurance were related as variables. The tests were administered to forty male (N=40) state level Kabaddi players. The data were analysed using Pearson’s product moment correlation for assessing the relationship of criterion with each of the test items of motor fitness. The analysis of data disclosed significant relationship between three independent variables and the criterion.

The multiple correlations were used to know the combined contribution of all the test items to Kabaddi performance. The results of the study showed that sit-ups, standing broad jump and shuttle run have contributed significantly to playing ability.

S.K. Dey, G.L Khanna and M. Batra\(^9\) conducted a study of morphological and physiological studies on 25 National Kabaddi players, who won the gold medal in the 1990 Asiad at Bijing. The study was conducted 2 weeks before the competition. Chronological age of subjects was recorded. The physical characteristics of the subjects, height (in Centimetres), weight in (Kgs.) body fat (%) and lean body mass (lbm) were measured. The data were


analysed by using Mean, Standard Deviation, and multiple correlation coefficients and regression equation of various morphological and physiological parameters were computed. The following conclusions were drawn:

1. Physiological characteristics height, weight of the subjects were found to be significantly related to Kabaddi playing performance.
2. Body fat and lean body mass were not related to the Kabaddi playing performance.

Rangaraju\textsuperscript{10} conducted a study of selected physical, Anthropometrical, variables as determinants in the performance of Kabaddi. For this study 50 male kabaddi players were selected from different colleges which have participated in for inter-zonal Kabaddi championship of Madurai Kamaraj University, Tamilnadu (2001-2002). The subjects were in the age group of 18 and 25 years. In physical variables speed was measured by 30 mts flying start in sec, agility was measured by 6X10 mts shuttle run in seconds, endurance was measured by Cooper’s 12 minute run and walk test in sec, flexibility was measured by sit and reach test in cms, leg explosive power was measured by standing broad jump in mts, Arm strength endurance was measured by pull-ups by counts in nos. In Anthropometrical variables, height was measured by using stadio meter in centimeters, weight in kgs, Arm length, leg length, thigh girth were measured by using steel measuring tape in cms. The Kabaddi playing ability served as the criterion and was measured by the ratings of three experienced Kabaddi coaches based on selected 10 points ratings scale. The analysis of data was done by correlation and multiple correlation method and the following conclusions were drawn:

1. Speed, Agility and power (leg explosive) showed significant correlation to the Kabaddi playing performance.
2. Flexibility and pull-ups were not significantly related to the Kabaddi playing performance.
3. Anthropometrical variables Height, Weight and Arm length were significantly related to the Kabaddi playing performance.
4. No significant relationship were observed in the case of Leg length, Thigh girth, Trunk length with the Kabaddi playing performance.

Rameshan\textsuperscript{11} undertook a study to analyse physical and anthropometrical variables with Kabaddi players. Forty male University Kabaddi players of Tamilnadu State were selected, who had participated in the inter University south-zone Kabaddi Tournament at subrahmanya (1999-2000) in Karanataka State in the age group of 18 to 25 years as subjects. In the physical variables, speed was measured by 50mts dash in sec, Agility was measured by 4 x 10 mts shuttle run in sec, Arm power was measured by pull-ups by counts in numbers, Leg explosive power was measured by standing broad jump in mts and endurance was measured by 1000 mts run in sec. In Anthropometric variables, height was measured in cms, weight in kgs, Arm length, Leg length, Trunk length was measured by steel tape in cms. The performance ability of the subjects was measured by a subjective rating of three expert coaches of the game. Analysis of the data was done by multiple correlation and step wise regression were Carried out and the following conclusions were drawn:

1. Among the physical variables - Speed, Agility, Leg explosive power, were significantly related to Kabaddi performance.
2. Among the Anthropometrical variables, Arm length and Leg length were the dominating factors in the Kabaddi playing performance.

\textsuperscript{11}T. Rameshan “An Analysis of selected physical, Anthropometrical variables to Kabaddi performance among male university Kabaddi players of Tamilnadu state”. (Unpublished Master’s Thesis, Department of Physical Education Alagappa University, Karaikudi, 2000), pp.198-199.
Satyam\textsuperscript{12} and V. Selvam Studied the Relationship of selected physical variables and skill performance of junior state Kabaddi players. Fifty Kabaddi players in junior section were selected as subjects who had represented the Tamil Nadu State in the junior National Championship held at Ranchi, Bihar. The age of the subjects ranged between 16 and 18 years. The physical variables such as speed, agility, leg explosive power, cardio respiratory endurance and flexibility were selected as dependent variables and Kabaddi game playing performance was measured through subjective rating by three expert coaches of the field. Speed was assessed by 50 mts. run, agility was measured by 6 x 10 Mts shuttle run, leg explosive power was assessed through standing broad jump, cardio respiratory endurance was assessed by conducting 12 Min run / Walk test and trunk flexibility was measured by bend and reach test. Pearson’s product moment correlation technique was used to find out the relationship between selected physical variables and skill performance of Kabaddi players. The level of significance was fixed at .05 level. Results indicated that,

1. There was a significant relationship between speed and Kabaddi playing ability.

2. The results of the study showed that Kabaddi playing performance was significantly related to agility, leg explosive power and endurance.

3. The results of the study also showed that there was a insignificant relationship between flexibility and Kabaddi playing performance.

\textsuperscript{12} R. Satyam and V. Selvam Raj “Relationship between selected physical variables, and skill performance for junior state Kabaddi players of Tamil Nadu”, (Unpublished Master’s Thesis, Department of Physical Education and Health Sciences, Alagappa University, Karaikudi, 1991), p.180.
2.2. Studies on Physical Variables

A study undertaken by Mathew\textsuperscript{13} to determine the relationship of selected Anthropometric Measurements (height, weight, arm length, and upper body length) to performance on Brady Volleyball Test. Pearson's product moment correlation (zero order correlation) was employed to study the relationship of volleyball playing ability to each of the selected Anthropometric measurements. For testing the hypothesis the level of significance was set at 0.05. The finding of the study indicated that the variables height, weight and arm length showed significantly higher relationship to performance on Brady Volleyball Test (height = 0.764, weight = 0.795, arm length = 0.792) as compared to the significant but low relationships of leg length and upper body length with performance on Brady Volleyball Test (leg length = 0.544, upper arm length = 0.641). All the above mentioned values were found significant at 0.05 level of confidence. Based on the findings of the study the following conclusions were drawn.

1. The height and weight of the players contributed to a much greater extent to the performance of Brady Volleyball test and to volleyball playing ability.
2. Arm length was also found to be an advantageous factor in the performance of Brady Volleyball Test.
3. Leg length and upper body length contributed to the performance on Brady Volleyball test.

Charles Suthanthira Bharathi\textsuperscript{14} made a comparative analysis of selected physical, Anthropometrical variables and psychological variables among


Tamilnadu, Andhra Pradesh and Kerala State University Men Kabaddi players comprising of thirty university players from each state, who had participated in the Inter-university South zone Kabaddi tournament. The subjects were in the age group of 18 to 25 years. Physical variables agility, was measured by 6x10mts shuttle run in sec, Arm strength was measured by pull-ups in numbers and leg power was measured by standing broad jump in mts. The anthropometrical body weight was measured in kgs, Arm length and Leg length were measured in cms; aggression (Smith 1979), anxiety (Rainer martins SCAT 1977) were measured through standardized questionnaire were the psychological variables. ANOVA was used to analyse the variables when the obtained ‘F’ ratio was significant Scheffe’s test was used as post hoc test to determine the significance among the paired means at .05 level of confidence. The researcher, concluded that Andhra university players had better agility than other university players, Kerala students were better in arm strength and body weight. Andhra pradesh university player had more leg length and power, where as in arm length there was no significant difference. Tamilnadu university players had more anxiety and aggressiveness and students of universities in Andhra Pradesh possessed more co-operative attitude.

“Amusa”15 conducted a study on "The Relationship between soccer playing ability and selected measures of structure and Physical Performance in College Men". Forty six well conditioned soccer players with at least two years of playing experience on the college level were included in the study. They were tested for Running Speed 30 mts standing start measured in sec, Leg Power measured by standing broad jump in mts, Agility, measured with 4x10 mts shuttle run in sec, Endurance was measured by 1000 mts run in sec and Flexibility was measured by sit and reach test in cms. In addition, eight

anthropometric measurements consisting of Height in cms, Weight in kgs, Arm length, leg length, trunk length, thigh girth, calf girth, circumference of the chest were measured in cms, soccer playing ability was estimated by the rating of three experienced soccer coaches based on selected skills and strategies. Analysis of the data was done by multiple regression of playing ability. The following conclusions were drawn. Weight and height were considered important factors in soccer performance. Flexibility, agility, strength, leg power were considered as valid indications of playing ability.

Hollard\textsuperscript{16} conducted a study on predictive values of selected variables in determining the ability to play basketball among small high school boys. Speed, agility, upper arm strength, power, ball handling ability, shooting ability, passing ability, weight and previous experience were included in the study in predicting ability to play high school basketball and also to determine which tests are most practical and useful to coaches predicting successful basketball players. Means, Standard Deviation, product moment correlation coefficient and Standard Scores were calculated. Multiple regression was computed with the coaches' ratings at the criterion. Beta co-efficient multiple correlation was computed and the following conclusions were made. Weight, height, experience, speed, power, ball handling ability, passing ability, and shooting ability were found to influence players' success in basketball. Experience, ball handling, passing, and shooting ability had the greatest influence on players' success in basketball. Prediction of successful basketball players from the basketball ability scores was 78\% accurate. The accuracy of the prediction of beginners was 68\% of second team 38\%. A coach can determine 76\% of his best players by using the following raw scores formula:

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X^1 = (1.54) / \text{Number of years of experience} \\
+ = (0.23) \text{ (Speed dribble test score)} + (0.26) \\
- = (\text{Wall test score}) + (0.15) \text{ Shooting test score} - 10.11
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“Sridhar Gonibdu”\(^\text{17}\) conducted a study to determine the Physical Anthropometrical variables as determinants in the performance in Kho Kho. For this study 30 male Kho Kho players in the age group of 19 to 25 years from different colleges of Mysore University were selected as subjects. In Physical variables, Speed was measured by administering 50 meters dash and performance was recorded in seconds, Agility was measured administering 4x10 mts shuttle run and Boomerang run consisting of left turn and right turn, and performance was recorded in seconds. Endurance was measured administering 600 Yard run/walk test in sec. In Anthropometrical variable, Height, Arm length and leg length, were measured with the help of a steel measuring tape in cms and the performance ability of the subjects were determined by a subjective rating of 3 expert coaches in the game who rated the players in skill, **Technique, Application, Playing Ability, Performance (both Past and Present), Achievement, Adaptability, his usefulness in the team, Fitness Level and Maneuverability.** Multiple Co-relation did analysis of the data and Step-wise Regression were carried out and the following conclusions were drawn.

1. Among the Physical variables Speed, Endurance, and Agility have been significantly related to the Kho Kho performance of University level players.

2. The Anthropometrical variables namely standing Height, Arm Length, Leg Length were significantly related to the Kho Kho performance.

3. The overall obtained values were positively significant, but highly correlated to Kho Kho performance.

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Simar Jeet Singh\textsuperscript{18}, Jasmil Singh and Hardayal Singh conducted a study to compare the Physical fitness between senior and junior group of Hockey Girls. The purpose of the study was to see the difference between fitness of senior and junior (Girls) Hockey player. The subjects for the study were 21 senior Women Hockey Players and 21 Junior Girls Hockey player attending National camp at Patiala. The Physical fitness tests administered as part of this study were (Speed,30 Mts. Run in sec) Leg Strength (Standing Broad Jump in mts). Overhead backward throw (throwing three Kg. Medicine Ball measured in Meters.) Semo test for Agility/coordinate Abilities measured in seconds, Endurance (\textbf{Five minute Run in sec}). The data were analysed by ‘t’ test method to compare the results of both the groups to find out the significant differences. It was found that there were no significant differences between senior and junior groups in 30 Mts run and standing board jump performance. The junior group was found to be significantly superior in Agility and Endurance ability. The senior group was found to be significantly better in shoulder strength.

Selvam and Raja\textsuperscript{19} studied the relationship of selected physical fitness components and skill performance of Basketball players. 25 Basketball players in Youth and Junior Boys section were selected as subjects who had represented the Tamil Nadu State in the Basketball National Championships. The age of the subjects ranged between 16 and 18 years. The following physical fitness variables such as Speed, Agility, Explosive power, Cardio-respiratory endurance and Flexibility were selected as dependent variables and skill performance like dribbling ability, passing ability and defensive ability were selected as independent


variables. Speed was assessed by 50 meters Run (in sec), Agility was measured by 6 x 10 Mts. Shuttle Run (in sec), Explosive power was assessed through standing broad Jump in mts, Cardio-respiratory endurance was assessed by conducting 12 Min. Run / Walk test (in sec) and Trunk Flexibility was measured by bend and reach test and performance recorded in cms. Dribbling ability, passing ability and defensive ability were assessed through controlled dribble test, passing test and defensive movement test respectively. Pearson product moment correlation was computed to find out the relationship between selected physical fitness variables and skill performance of Basketball players. The level of significance was fixed at 0.05. Results indicated that:

1) There was a significant relationship between speed with Dribbling ability and Defensive ability, and speed did not show significant relationship with passing ability.

2) The results of the study showed that there was a significant relationship between Agility and Explosive power with all skill abilities.

3) There was a significant relationship between cardio-respiratory endurance and Flexibility with passing ability and defensive ability and cardio-vascular endurance and flexibility were not significantly related to Dribbling ability.

Kalpana and Gurudayal conducted a study to determine the effect of 6 weeks intensive training on performance level of physical abilities and competition performance of Women Gymnasts. 22 Women Gymnasts who had attended national camp of 6 weeks duration in preparation for international competition were taken as subjects. A few tests measuring physical abilities i.e., chin-ups on uneven bars, sit ups (jack knife action) vertical jump, standing broad jump, trunk flexion, split sitting and 30 meters sprint were administered.

on each subject before the start and after the conclusion of the camp. Competition performance was also evaluated by applying the FIG 1993 code of points on both the occasions. Paired ‘t’ test was applied to determine the significance of differences in the pre-training and post training scores of various tests. It was observed that 6 weeks intensive training significantly increased the arms and shoulder strength, leg strength, abdominal strength, trunk and hip flexibility and competition performance. There was no significant relationship between 30mts. sprint and gymnastics performance.

Indu Mazumdar and M.Edwin\textsuperscript{21}, studied comparative relationship of selected physical fitness variables to playing ability in Basketball at different levels of performance. One hundred and Eighty male Basketball players in youth and junior category in Bombay region were selected as subjects for the study. Those players who had at least represented their district team in Maharastra State Basketball championship and were still playing competitive Basketball were selected as subjects for this study. Four variables namely; 1) Vertical Jump (Sargent Jump) for Leg power in centimeters, 2) 30 meters dash for running speed in sec 3) Semo agility run in secs. 4) Cooper’s 12 minutes run / walk test for cardio vascular endurance in sec were administered to the players. The Basketball playing ability was graded (out of 10 points) by a panel of three qualified judges during the competition and the overall of three grades was considered as the subject’s playing ability. The relationship of physical fitness variables and playing ability was established by computing Pearson’s product moment correlation coefficient. Comparison of the coefficient of correlation for mini youth, and junior player’s playing ability was done by using the ‘t’ test. It was concluded that, 1) There was positive relationship between 30 meter dash and under Basket shooting

for the junior group 2) Relationship between other physical fitness variables and Basketball playing ability for the three groups were not significant. 3) The mini group had a significantly higher relationship between playing ability and 30 meter dash than the youth group. The youth group had significantly higher relationship between playing ability and endurance than the mini group. 5) There were no differences among the three groups i.e., mini, youth and juniors as far as the relationship between physical fitness variables and Basketball playing ability variables was concerned, except for the above mentioned differences.

Malhotra’s and others studied the “Functional Capacity and Body Composition of Indian Athletes”. The strength factor in this study was considered in two ways. The total strength was the result of adding the scores for back and leg lift, chin, dip, right and left grip, push, pull and twenty tests used in the Martin technique. The PFI was computed from the scores of each individual in the tests included in the Roger’s battery omitting lung capacity. Power was measured by Sargent’s jump test. The track and field events included a sixty-yard dash, six pound shot-put, and standing broad jump. A scale for femininity of build was worked out.

Zero order correlation and multiple correlation were carried out and the following conclusions were drawn:

1. Power or the ability to contract the muscles under load at maximum speed and muscular strength were the two most important factors which influenced the Athletes performance. Even out of these two-power was considered as more important.

2. A masculine type of build was of relatively less influencing upon Athlete’s performance, though with this sampling what influence it does was favourable to the Athletes ability.

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3. The factor of motor educability was found to have a large influence upon Athletes ability, when combined with the Sargent jump to give a relatively high predictive correlation (R=.6099) the best obtained for any two test variables.

Reid\textsuperscript{23} examined the relationship of Flexibility, Strength and Anthropometric measurements of the lower limbs to the skating speed of hockey players. Seventeen university Hockey players were assessed for leg and grip strength using cable tension methods, lower limb flexibility using Leighton's flexometer, and skating speed under standing and flying start conditions with and without a stick over two distances namely 40 meters and 25 meters. The strength, flexibility and Anthropometric measures were the independent variables and the skating speed was the dependent variable.

The data were analysed using the Pearson Product Moment and stepwise R statistical method (P 0.05). The results indicated that flexibility was specific to each joint measured. There was a general strength factor and a general skating body type. The study revealed that flexibility and anthropometry were not related to skating speed. The regression analysis accounted for all of the variance in each dependent variable but the variables entered were different in order and in contributing weight in each analysis. Skating speed was indicated as being specific to the distance and conditions under which it was performed.

Joseph\textsuperscript{24} determined the relationship of power, agility, shoulder flexibility, arm length, and leg length to volleyball playing ability. Thirty male Volleyball players of the Lakshmi Bai National College of Physical Education, Gwalior were selected as subjects. Power was measured by Sargent Jump measured in centimeters, agility by 40 mts. Shuttle run in sec, Shoulder flexibility in cms, by graded stick, arm length and leg length by steel tape in cms. The playing ability was based on the average subjective judgment of three experts. Product moment correlation was used to statistically analyse the data and it was concluded that (1) Power was the most reliable single variable in prediction of playing ability of men Volleyball players. (2) Arm length and leg length were also reliable variables in prediction of playing ability of male Volleyball players and (3) The variables of agility and shoulder flexibility did not show significant relationship in prediction of playing ability of male volleyball players.

Ghai\textsuperscript{25} conducted a study to determine the relationship of selected physical characteristics and motor ability components to performance in gymnastics. Twenty university level male gymnasts were selected as subjects. The data were collected on gymnastics performance (average of three qualified judges), height, weight, chest girth, thigh girth, and upper arm girth (with the help of steel tape in cms); strength (push ups and pull ups in nos), standing broad jump in centimeters and sit-ups in counts); flexibility (Goniometer); agility (4x10 Mts. shuttle run in sec) and dynamic balance (Modified Bass Test). Rank difference method of correlation was used to compute coefficient


\textsuperscript{25} Guru Dutt Ghai, “Relationship of Selected Physique in Gymnastics” (Unpublished Master’s Thesis, Jiwaji University, Gwalior, 1984).
of correlation between gymnastic performance and each independent variable and it was concluded that 1) strength, agility, dynamic balance and flexibility were significantly related to performance in gymnastics and 2) the physical characteristics were not significantly related to the performance in gymnastics.

Kela\textsuperscript{26} undertook a study to find out the relationship between gymnastic performance and speed of movement of agility and flexibility. Speed of movement Nelson Method, agility measured with 4x10mts shuttle run in sec and spine and shoulder flexibility with flexometer in cms. Twenty-five Inter-university women gymnasts who took part in Inter-University Competitions at Amritsar in 1984 were selected as subjects. Rank-difference method of correlation was adopted in order to find out the relationship. It was concluded that: 1) Agility had a significant relationship with performance in gymnastics and 2) speed of movement and shoulder and spine flexibility did not contribute to performance in gymnastics.

Raman\textsuperscript{27} conducted tests on 30 male cricket players of graduate and undergraduate courses at Lakshmibai National College of Physical Education, Gwalior, to determine the relationship of grip strength, leg power, agility and hand and foot reaction times to performance in cricket. Data were collected on grip strength (grip dynamometer); leg power (Standing Broad Jump in mts); Agility (40 yard shuttle run in sec) and Hand and Foot Reaction Time (electronic reaction timer in sec) and performance in Cricket was the average of subjective rating of three experts during practice and match situations.


\textsuperscript{27} Gopinath Raman, “Relationship of grip Strength, Leg Power , agility and Hand and Foot Reaction Time to Performance in cricket”, (Unpublished Master’s Thesis, Jiwaji University, Gwalior, 1983), p. 190
Product Moment correlation was employed to statistically treat the data. It was concluded that: 1) hand and foot reaction time was the most important variable in the prediction of performance of a cricketer; 2) leg power was another important variable in the prediction of performance in cricket; 3) grip strength was also an important variable of prediction in cricket playing ability and 4) agility was not an important factor in the prediction of performance in cricket.

Sheela Sridhar\textsuperscript{28} conducted a study to determine the relationship of power, agility, flexibility, muscular endurance and circulo respiratory endurance to playing ability in volleyball. Thirty volleyball players of the Lakshmi Bai National college of physical education, Gwalior were selected as subjects. Power was measured by Sargent jump and agility by side step test, flexibility by trunk flexion test; muscular endurance by pull-ups and bent knee sit-ups and circulo respiratory endurance by one-minute run test. The playing ability was the subjective judgement of a panel of three experts for each subject. Product moment correlation was used to statistically analyse the data. On the basis of the findings of the study the following conclusions were drawn.

1. Power was the most significant motor fitness component underlying performance in the game of volleyball.
2. Muscular endurance, circulo-respiratory endurance and flexibility also contributed to the volleyball playing ability; and
3. Agility did not show significant relationship to playing ability in volleyball.

Bakker\textsuperscript{29} conducted a study on factors associated with success in volleyball. For this study 28 members of the women’s extramural volleyball teams at Illinois State University were selected as subjects. Two experienced volleyball coaches established the criterion by rating each player on her playing ability. The following variables were measured: height in cms, weight in kgs, leg extensor strength using the Multiple Angle Testing Unit, grip strength using an adjustable dynamometer, skin folds using the Lange Caliper, jumping ability using the jump and reach test in cms, and an apparatus constructed by the investigator to measure reaction and movement times. Through ‘t’ test and correlations it was found that jumping ability and reaction time were significantly related to success in volleyball. A multiple correlation of .718 was obtained between the nine variables and the criterion. An of .53 was obtained between the criterion and reaction time plus jumping ability, and one of .52 between the criterion and jumping ability plus weight. The regression equation computed in this study could be used to predict success in volleyball playing.

Chakravarthy\textsuperscript{30} selected eleven male national level gymnasts of Lakshmi Bai, National College of Physical Education, Gwalior and Members of Central Reserve Police Force Gymnastic Squad, as subjects. In order to find out the relationship between arm strength (monumeter, Rogers P.F.I.), Leg strength (By dynamometer) Grip strength (monometer), Agility (4 X 10 yards shuttle run in sec) Flexibilty (Flexometer) in cms and Balance (Modified bass test) to performance in gymnastics (Average of three experts Judgement). Data was statistically analysed by using rank difference method. So as to compute the correlation, it was concluded that;


\textsuperscript{30}Sushanth Kumar “Chakravarthy, Relationship of Arm strength, Leg Strength, Grip Strength, Agility, Flexibility and Balance to performance in gymnastics” (Un published Master’s Thesis, Jiwaji University, Gwalior, 1983).
1. Right grip strength and Agility were the most important variables in prediction of performance in gymnastics.

2. Arm strength, Leg strength, left grip strength and spine and shoulder flexibility and dynamic balance had insignificant relationship to gymnastic performance.

2.3 Studies on Anthropometrical Variables

Gupta\textsuperscript{31} made a study of selected physical and anthropometric variables which were determinants for the weight lifting performance. The purpose of the study was to find the variables determinant to the weight lifting performance namely 1) snatch performance (C1), 2) clean and jerk performance (C2) from the selected physical and anthropometric variables among the district level men 70 kg class category weight lifters. Thirty men weight lifters in 70kg class from various districts were selected as subjects. The dependent variables were 1) snatch performance (C1) and 2) clean and jerk performance (C2) of weight lifting. Ten variables were taken from two areas namely Physical variables and anthropometric variables. In physical variables speed, measured by 30mts standing start in sec, leg explosive power by standing broad jump in mts, flexibility (flexiometer) in cms, leg strength back strength and shoulder strength were selected and in anthropometric variables, Standing Height measured in cms, Weight in kgs, Arm Length, thigh girth in cms measured by steel tape were taken as independent variables for this study. For the statistical analysis, Pearson’s product moment correlation technique was adopted to find co-efficient of correlation between the criterion variables. Then the Wherry Dolittle method of multiple correlation was computed cumulatively after each variable was selected. Within the limitation of present study the following conclusions were drawn.

1. The determinant variables in their order were leg strength, back strength, thigh girth, explosive power for the snatch performance of the district level 70kg class category men weight lifters.

2. The determinant variables in their order were leg strength, back strength, thigh girth and flexibility for the clean and jerk performance of the district level 70kg class category men weight lifters.

Singaram\textsuperscript{32} The undertook a study to investigate the relationship of selected physical, Anthropometrical and fundamental skills to the hockey playing ability. The subjects were 35 high school hockey players in boys section who had participated in inter district tournament during the year 1996-97 at Thiruvallur district in Tamil Nadu State. The independent variables were skills (dribbling, dribble and shooting), motor abilities (speed and endurance in sec) and Anthropometric measurements (height and arm length in cms). Hockey playing ability was determined by taking the average of subjective grading by three experts who had given their judgment on a 10 point rating scale. Skills variables were measured as described in Henry Friedal field hockey dribble and shooting ability test. Among the motor abilities, speed was measured by 50 yards dash in sec, and endurance was measured by 12 minutes run and walk test in sec. Among the Anthropometric measurements standing height was measured by a height scale in cms, and arm length was measured by a steel tape in cms. The data were analysed using the Pearson's product moment correlation coefficient ‘r’ for assessing the relationship of hockey playing ability to each of the skills, motor ability, anthropometric variables and zero order correlation for predicting the hockey playing ability. Then the multiple correlation was computed cumulatively after each variable selected. Within the limitations of the present study the following conclusion were drawn.

1) Anthropometric variables such as standing height, arm length were significantly related to the hockey playing ability 2) Speed, and endurance played an important role in predicting the hockey playing ability. 3) the overall obtained value was positively correlated but not a high correlation for hockey playing ability as the table value at 0.05 level = 0.361 and obtained value = 0.374.

Amusa\textsuperscript{33} conducted a study on - The relationship between soccer playing ability and selected measures of structures and physical –physiological performance in college men. For this study, 46 subjects who were well conditioned soccer players with at least two years of playing experience on the college level were selected. They were tested for running speed, power, agility, max \( V_{O_2} \), strength, anaerobic capacity and flexibility. In addition, 11 Anthropometric measurements consisting of skin folds and body diameters were taken. Soccer playing ability served as the criterion and that was estimated the ratings of three experienced soccer coaches based on selected soccer skills and strategies. Analysis of data was by zero order correlations and multiple R analysis which lead to draw the following conclusions: Age (experience) was the best single predictor of playing ability; weight, Lower Body Weight (LBW) and height were considered good predictors of playing ability; max \( V_{O_2} \) and running speed were considered important factors in soccer performance. Flexibility, agility, lactate concentration, and leg power were not considered as valid indicators of playing ability.

Rajamony\textsuperscript{34} conducted a study to find out whether the Anthropometrical, Physical, and Physiological variables contribute to the swimming performance. Thirty men swimmers who had participated in Kerala university Inter Collegiate Competition during the year 1996 -97 were selected as subjects for the study. The 50 meters free style swimming performance was selected as the criterion variable and height measured in cms, arm length in cms, arm power push-ups in nos, breath holding time and body fat were selected as independent variables. For the statistical analysis zero order correlation was used to determine the relationship between swimming performance and height, arm length, arm power, breath holding time and body fat. To analyse the combined effect of these variables to the swimming performance, the performance was analysed through timings. Multiple correlation was calculated with the help of partial correlation. Within the limitations of the study the following conclusions were drawn.

1. It was found that the height had significant relationship with the 50 meters free style performance (-0.71).
2. It was also found that arm length had high correlation with 50 meters free style swimming performance (-0.82).
3. It was further noticed that arm power had high correlation with 50 meters free style swimming performance (-0.88).
4. It was further more found out that breath holding had a high significant correlation with 50 meters free style swimming performance (-0.87).
5. It was also found out that body fat had significant relation with 50 meters free style performance (-0.71).
6. Over and above combined effect of all the five variables (Height, Arm length, Arm power, Breath holding time and Body fat) had significant relation with the 50 meters free style swimming (R=0.95).

Dubey and Mall made a study on 50 male students of L.N.C.P.E. Gwalior, to find out the relationship of body composition and selected Anthropometric measurements on the performance of swimmers. The students were selected randomly to serve as subjects. Their age ranged between 18 and 25 years. The body composition of the subjects were computed by employing skin fold measurements taken at triceps, sub scapular and suprailiac regions, which were added up and compared to a ready reckoner prepared by Durmin and Rehaman to calculate percentage of body fat to obtain lean body mass. The amount of fat was subtracted from the total body weight for each subject. Anthropometric measurements were Height measured with the help of stadiometer in cms, Weight in kgs, Arm length and Leg length measured by steel tape in cms, Chest girth, Upper arm girth, Thigh girth and Calf girth measured by steel tape in cms were obtained by standard procedures, and swimming performance was taken by timings.

Statistical treatment of data included correlation analysis using zero-order correlation, multiple correlation (wherrydolittle method) and regression equation for prediction were employed. Negative correlation was obtained in swimming performance which was in terms of time. In terms of zero-order correlation only leg length was correlated significantly with swimming performance, where as the relationship between other variables with swimming performance was not significant. This may be due to the fact that swimming was the result of combined contribution of many variables and for that reason the body composition and the selected Anthropometric measurements except the leg length did not correlate significantly where it was considered separately.

By using correlation co-efficient (r) it was revealed that the variables of height, weight, arm length and leg length were significantly correlated with the swimming performance when combined effect of body composition and selected Anthropometric measurements were analysed by using “r”.

Alka Dubey N.N. Mall, “Relationship of body Compositon and selected Anthropometrics measurements of the performance of swimmers”,
A study was undertaken by Bandyopadhyay\textsuperscript{36} to find out the relationship of selected anthropometric measurements, physical fitness and motor ability to soccer skill performance. Thirty male soccer players studying in undergraduate classes of the Lakshmibai National College of Physical Education, Gwalior, were selected randomly as subjects. Subjects anthropometric measurements in selected items (chest girth, upper arm girth, thigh girth, calf girth, height measured in cms and weight in kgs), physical fitness (AAHPER Youth Fitness Test) and motor ability (Barrow’s Motor Ability Test) and soccer skill performance (Mc Donald Soccer Skill Test) were recorded. Zero order correlation was computed and it was concluded that: 1) there was high correlation between physical fitness and soccer skills performance and between motor ability and soccer skill performance; 2) thigh girth had a significant relationship with soccer skill performance and 3) the upper arm girth, chest girth, calf girth, height and weight had no significant relationship with soccer skills performance.

Backe’s\textsuperscript{37} undertook a study to determine. The relationship of Anthropometric and Physical performance measures and Performance in the running hop, step and jump. Three Anthropometric measurements (leg length, height measured in cms and weight in kgs) and physical performance measures (physical performance- standing hop-step and jump measured in mts, running broad jump in mts, standing broad jump in mts, 50 yard dash in sec, leg lift, Balance-beam measure, Scott obstacle race, and Wells and Dillon sit and reach in cms) were related by correlational methods to the performance


of 87 secondary school boys in the running hop, step and jump. All variables showed a significant relationship with the criterion beyond the 0.05 level of confidence. The criterion could be employed as a measure of motor ability since three of the highest single-variable correlations with the criterion measured were known predictors of motor ability: the Running Broad Jump ($r=.859$), 50 yard dash ($r=.815$) and standing Broad Jump ($r=.778$). Three selected combinations of measures yielded multiple correlations with the criterion, which were significant beyond the .01 level of confidence. A regression equation developed from the optimal set of variables that was considered to be feasible for administration in school system consisted of two items from the Youth Fitness Test Manual: the Standing Broad Jump and the 50 yard dash.

### 2.4. Studies on Psychological Variables

Smith\(^{38}\) conducted a study on the effect of anxiety in shooting proficiency among College Women Basketball players. Members of the 1977-78 South Dakota State University Women Basketball team (N=12) were measured on sport competition anxiety (SCAT) and on state anxiety inventory (SAI). The group one consisted of player who attempted over 122 field goals or less. Results of ANOVA indicated that significant difference was found between scores of the SAI and SCAT. Significant (p 0.05). Multiple regression equations to estimate field goal shooting proficiency from selected measure of anxiety produced multiple R’s ranging from 47 to 66 and accounted between 22 and 44 percent on the various performance. A multiple regression equation for predicting free throw was not significant (p 0.05).

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Parthiban\textsuperscript{39} conducted a study on selected psychological factors as determinants for the Basketball performance among the male college basketball players of Inter collegiate levels. Psychological variables such as motivation, anxiety, aggression and personality factors were studied. The questionnaire prepared by Kamlesh was used to measure level of motivation. Anxiety was measured through the sport competition anxiety test questionnaire (SCAT) developed by Rainer Martens. Aggression was assessed through a questionnaire to measure aggressiveness which contained four statements. It was administrated to find out the specific type of aggressive behavior in competitive games and sports. Personality was assessed through Eysenck’s personality inventory.

Zero order correlation was used to determine the relationship between psychological factors and basketball performance individually. Multiple correlation was used to find out the most valid variable related to basketball performance.

The result of this study showed that the psychological factors were significantly related to Basketball playing ability at inters collegiate level. Anxiety was more significantly correlated with the basketball performance.

G.S.Bawa\textsuperscript{40} and Kalpana Debnath, Conducted a study on concentration and anxiety level of Indian male gymnasts. In their study they concluded that, An optimum anxiety level and higher amount of concentration were the two psychological abilities which play an important role in achieving high performance in gymnastics. The investigation was conducted to find out if


there existed any significant difference in anxiety and concentration levels among the elite, mediocre and low performance groups in gymnastics. The study was conducted on 108 national level male gymnasts. Sports competition anxiety test (SCAT) developed by Martens (1997) was administrated to measure the sports competition anxiety and ‘d² test’ by Briken-Kamp (1962) was administered to measure the concentration level of the subjects. All the subjects were divided into three groups on the basis of their competition performance scores, i.e., high, mediocre and low performance groups. One way analysis of variance was applied to compute the significance of difference in these variables among three groups. The results of the study indicated that higher level performance group had moderate level of anxiety than the low performance group. It was also found that high performance group had better concentration ability than both the mediocre and low performance groups.

Sivaramakrishnan⁴¹ Nageshwaran and Kalidasan, undertook a study to compare the competitive Trait and State Anxiety levels among university women volleyball players. To achieve the purpose of the study, 168 Volleyball players who had participated in the south-west zone inter university tournament held at Manonmaniam Sundaranar university were selected as subjects and Sports Competition Anxiety test (SCAT) and competition State Anxiety Inventory (CSAI-2) were administered to them. The obtained data were analysed using Two way factorial design, with South and West zones as first factor and the six states with various universities as the second factor. The following conclusions were made:

1) There was no significant difference in somatic anxiety between south and west zone players and among players of universities of various states.

2) South and West zone players showed no significant difference in self confidence between them but there existed significant difference between universities of various states in self confidence.

3) The Analysis indicated significant difference in cognitive anxiety between players of South and West zone universities of various states.

4) There was no significant difference in state anxiety in the players prior to competition between South and West zone universities. There was significant difference in state anxiety between players of universities of Kerala and Universities of Karnataka, Gujarath and Maharastra.

James Joseph Lampman\(^42\) investigated the relationship of the psychological variable anxiety on the performance of competitive swimmers and to determine what differences, if any, could be found between swimmers of champion and non-champion caliber. Fifteen members of the University of Florida varsity swimming team served as subjects. An anxiety test was given to the swimmers before the season and approximately one hour before the competition. The general conclusions drawn were: an upward fluctuation in anxiety one hour before competition facilitated performance; there were no significant differences in anxiety patterns between the two experienced groups; swimmers performed better if their pre-meet anxiety level was relatively equal to or slightly above their pre-season anxiety level.

Finn\(^43\) probed if anxiety level of variety of women swimmers changed from non-competitive to pre-competitive situations and if such changes had an effect on performance times of the swimmers during practice and meet


conditions. The subjects of this study were 43 swimmers from four North–Eastern colleges. The IPAT 8-Parallel Form anxiety Battery was used to determine the anxiety level of each swimmer in both situations. Officials using stop watches, measured performance times twice, once during a dual meet and once during a routine practice. Anxiety scores were utilized to divide swimmers into two groups i) Subjects whose scores increased, and improved ii) subjects whose scores decreased from non-competitive to the pre-competitive situation. Swimming performance scores were also utilized to divide the subjects into two groups :1)subjects who had improved, and 2) subjects who were slower in performance from the practice to meet conditions. Results showed : i) no significant mean differences (0.05 level) between anxiety levels of the subjects in the non-competitive and pre-competitive situations and ii) no significant difference in increased or decreased performance time of the swimmers from the practice to the meet situations between the two anxiety groups. Within the limitation of this study it was concluded that anxiety level did not affect performance.

Gurudayal and Kalpana\textsuperscript{44} conducted a study with a purpose to determine relationships of concentration, sports competition anxiety, strength and flexibility to competition performance in gymnasts. Twenty two gymnasts who had participated in Senior National Gymnastics Championship were taken as subjects. A sample of twenty two gymnasts was divided into two groups. The elite group consisted of 11 subjects who were placed upto 15\textsuperscript{th} rank in competition I, and were selected for competition II. The low level performance group consisting of 11 subjects could not qualify for competition - II. Correlation co-efficient between competition performance on one side and

other independent variables were computed by applying Product Moment Correlation procedure in case of elite performance group students. ‘t’ test was administered to determine the significance of the differences between elite and low performance groups in age, height, weight, concentration ability, sports competition anxiety, arms strength, explosive legs strength, grip strength, trunk flexibility and competition performance.

The results of the study have revealed significant correlation coefficient between competition performance and pull ups on horizontal bar, competition performance and dips on parallel bar and between competition performance and trunk flexibility. Elite performance group was found to possess significantly greater concentration, lower sport competition anxiety, greater arms and legs strength and greater flexibility when compared to the lower performance group.

Hari Krishna⁴⁵ had conducted ‘A comparative study of sports competition anxiety and aggression of inter collegiate and inter university male Kabaddi players’. The subjects for the study were 50 players of inter collegiate level and 50 players of inter university level and their age ranged from 17 to 23 years. Sports competition anxiety questionnaire A form (SCAT) by Martens (1990) and sport aggression inventory by Anand kumar and Prem shankar shukla (1988) were administered to all subjects to collect the data and ‘t’ ratio test was applied to find the significance at .05 level of confidence.

The study revealed that there were significant differences in the competition anxiety and aggression at the level of inter collegiate and inter university competitions. Statistical analysis of data consisted of Pearson’s product movement correlation to find out the relationship between them.

It was concluded that there was significant positive relationship among inter university Kabaddi players in anxiety and aggression, and also high level anxiety and aggression among inter-collegiate players than inter-university players.

Mann and Bala46 examined pre competition anxiety in Footballers at various stages of competition. One hundred and Seventy-five football players belonging to eleven universities who had taken part in the north zone inter university football competition held at Punjab university, Chandigarh were selected as subjects for this study. Sports competition anxiety Test (SCAT) developed by Marten (1977) was administered about an hour before their match schedule in a bid to get genuine responses. ‘T’ test was used for statistical analysis of data. All the six teams which had registered average levels of competition anxiety at pre-competition period suggested that footballers had the tendency to work at higher level of anxiety in consonance with the demand of the game.

Raja Sadhashivam47 conducted a study to compare aggression and anxiety among blind and normal school Kabaddi players in Tamilnadu. The investigation had included 67 blind Kabaddi players and 81 normal school players.


Kabaddi players who were selected as subjects. The questionnaire developed by Smith, and Mortens were used to study aggression and anxiety respectively. The investigation used the ‘t’ test to determine the level of aggression and anxiety among blind and normal Kabaddi players. The mean scores of aggression of blind and normal Kabaddi players were computed to analyse the level of aggression and its differences. The mean score of anxiety of blind and normal Kabaddi players were computed to analyse the level of anxiety and its difference. 'T' test was used to determine the significance of aggression and anxiety level among blind and normal Kabaddi players. The result of this investigation revealed that the level of aggression of blind school Kabaddi players was greater than the normal school Kabaddi players and level of anxiety of blind school Kabaddi players was greater than the normal school Kabaddi players.

Tyagi and Subramanian conducted a study to find out the effect of competition and anxiety of college female hockey players. Forty four female hockey players who had participated in the Inter Collegiate Hockey Tournament were administered the translated version of Rainer Martens SCAT on three occasions that is, one month before the actual competition one hour before the actual competition and one month after the competition to determine whether forth coming competition increased the anxiety level of Inter Collegiate Hockey players. The result indicated that the forth coming competition increased the anxiety level of the players. Though not to a significant level inexperienced players possessed higher level of competition trait anxiety than the experienced players.

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Weunberg\(^{49}\) conducted an investigation to determine the relationship between competitive Trait Anxiety (CTA) and state anxiety and golf performance in a field setting. Ten low, moderate and high GTA collegiate golfers (10 percent) performed in a practice round on Day 1 and day 2 of a competitive tournament. State Anxiety results indicated a significant CTA main effect with low CTA subjects displaying lower state anxiety than moderate or high CTA subjects. The competitions main effect was also significant, with post hoc tests indicating higher levels of state anxiety during Day 1 and Day 2 than during the practice round. Performance results produced a significant CTA main effect with low CTA subjects displaying higher levels of performance, i.e. low score than moderate or high CTA subjects. The competition main effect was also significant and post hoc tests indicated that subjects performed at a higher level during practice and Day 1 of competition than during Day 2 of competition. Correlations between SCAT and State Anxiety indicated that SCAT was a good predictor of pre-competitive state anxiety.

Hasrani\(^{50}\) conducted a study on pre-competitive anxiety of Basketball and track and field sportspersons. A sample of twenty-five Basketballers and twenty-two athletes were administered with SCAT (Martens, 1977). Questionnaire, a day prior to their departure for the competition. Results did not show significant differences in anxiety level of Basketballers and track and field athletes. It was also revealed that Basketballers had better experience in coping with pre-competition anxiety than track and field athletes.


Crites\textsuperscript{51} conducted a study on “Relationship of selected physiological and psychological factors to the beginning swimmer’s ability to perform the crawl stroke. With 40 subjects from two beginning swimming classes. The beginning swimming classes met for 40 minutes twice a week. Prior to any swimming instruction, measurements were collected on shoulder rotation, shoulder extension strength, hip extension strength, body composition, swimming anxiety and swimming ability as measured by the Fox Power Test (revised). After five weeks of crawl stroke instruction, measurements were again collected on swimming anxiety and swimming ability. Pearson Product Moment correlation was used to analyse the data. It was found that: 1) Shoulder rotation, shoulder extension strength, hip extension strength and body composition were not significant factors in the performance of crawl stroke, and 2) a significant relationship was indicated between swimming anxiety and the ability to perform the crawl stroke.

Paramjith\textsuperscript{52} and Bhupender undertook an investigation to assess will to win and self confidence of the players who participated in the All India Women’s Hockey Tournament. The study was carried out on 112 players, out of which 64 players belonged to four teams which had participated but failed to achieve any position in the tournament and 48 players of three teams which had attained first three positions in the tournament. To collect the required information the will to win questionnaire of Kumar and Shukla (1988) and self confidence inventory (ASI) of Agnihotri (1987) were administered to measure

\textsuperscript{51}Jerry Keith Crites, “A Study of Selected Physiological and Psychological Factors to Determine Their Relationship to the Performance of the Crawl Stroke by Beginning Swimmers”, Dissertation Abstracts International 36 : 2084-A. (October 1975)

will to win and self confidence of women hockey players respectively. The ‘t’ test was applied to draw the results. The result of the study revealed that ‘Will to Win’ in the players of teams which attained the position in the tournament showed higher score than the players who had just participated in tournament but failed to achieve any position. On ‘Self confidence’ the players of the teams which attained the positions in the tournament showed higher level of self confidence and Vice a Versa than other players.

Balaji in his study Analysed the selected psychological variables among the participants in the all India Inter University Women Cricket tournament. The study was to compare the selected psychological variables namely, anxiety, aggression and self- confidence among south, west and north zone inter university women cricketers. For this purpose fifty players each from south, north and west zones were selected at random as subjects. Standard protocol was followed while administering the questionnaires prior to the competition. The following questionnaires were used:

1. Aggressive questionnaire (Smith, 1979)
2. Rekha Agnihotry’s self confidence questionnaire (1987)
3. SCAT questionnaire (Rainer Martens, 1977)

The collected questionnaires were assessed through the scoring system relevant to the concerned questionnaire. The data were then put in to statistical analysis. Analysis of variance was used to find out weather there was any significant difference in the selected variables among west, south and north zone inter university women cricketers. The level of significance was set at .05 per centimeter. Within the limitations of the present study the following conclusions were drawn;

1. Finding of the study showed that the south zone inter university women cricketers were better in aggression.

2. As far as anxiety was concerned, no significant difference was found among the inter university women cricketers of all the three zones.

3. As far as self confidence was concerned there was no significant difference among participants in the inter university women’s cricket tournament of the three zones.

Shilly Joseph\textsuperscript{54} had conducted a study of analysis of sports anxiety and self confidence among female athletes in varying points of time prior to competition. The subjects of the study were 64 female athletes of LNCPE, Kerala University in the age group of 18 to 23 years. They were further categorised into individual and team sports persons.

The test administered for the study was CSAI - 2 questionnaires (Martens 1990). To compare the various sub scales of CSAI - 2 such as CSAI cognitive worry, CSAI - somatic tension, CSAI - self confidence, varying at points of time - 15 days, 7 days and 1 hour before the competition. Suitable questionnaire were used. Mean, standard deviation and ‘t’ ratio were computed to find out the differences. ‘t’ ratio was tested for significance at .05 level of significance. It was concluded that 1) there was a significant positive change on CSAI-2 sub scales when near to the competition 2) No significant differences were found among individual sports athlete and athletes who pursued team sport in competitive anxiety and self confidence at varying points of time. 3) Except on one sub scale of CASI - 2, CASI- somatic tension no significant difference was found between individual sport and team sport athletes.

Lox\textsuperscript{55} studied the perceived threat as a cognitive component of state anxiety of self confidence. This study was designed to test propositions from the 1990 competitive anxiety model proposed by Martens, Vealey and Burton. Specially relationship among perceived threat and state responses of anxiety, confidence and efficiency were examined to assess whether perceived threat might explain anxiety and confidence in 52 inter-collegiate female volleyball players. Somatic anxiety significantly correlated with perception of importance of both outcomes and personal performance while both performance were significantly related to cognitive anxiety. In addition, perceived threat was significantly related to state self-confidence and self-efficiency.

Yogamaya Panda and Reena Kaul\textsuperscript{56}, “Conducted a study whose purpose of the present investigation was to examine the gender differences in task and ego orientation, sport self confidence trait anxiety, and goal setting styles in elite Indian Athletes. The sample comprised elite Indian Athletes (N=100) male =51 and Female =49. All the subjects were tested on task and ego orientation, sport self confidence, sport competition trait anxiety and goal setting styles in sports using standardized questionnaire for task and ego orientation in sports questionnaire (TEOSQ) (Duda, 1992) Sport Self-Confidence Inventory (SSCI) (R. Kaul and M. Mittal, 2003). Sport Competition Anxiety Test was suggested by (Martens, Gill, Scanlan and Simon, 1990). Zero order correlations were computed among all the variables;


‘t’ test was applied to study the gender differences on task and ego orientations, sports self confidence and sports competition trait Anxiety and goal setting styles. Results indicated that male Athletes were more ego oriented than female Athletes. Significant difference was also found on competition trait Anxiety, sport self confidence performance oriented, goal setting styles between Male and Female Athletes.