CHAPTER II

REVIEW OF RELATED LITERATURE

A review of research reports related to the present study that the research scholar could gather, is presented in this chapter in order to provide the background material to evaluate the significance of this study as well as interpret its finding.

The Indiana Physical Fitness Test (1944) for High School boys and girls was designed as a four item test to measure component of motor Fitness and was selected for administrative ease and economy of time. The validity of the test was checked against a criterion of twelve selected and varied motor fitness items, (r = 0.760). The items included staddle clins, Squats thrust, Push up, and vertical jump. A physical fitness score was obtained by multiplying the sum of scores on the first three items by the score on Vertical Jump. Norms were based upon classification index divisions for boys and high-weight class division for girls. The norms were established for each six classification index scores, computed from the best combination of age height and weight.

Barrow and Harold (1954) developed a test for measuring motor ability, for men and the purpose of this study was to develop an easily administered test of motor abilities for college men. Expert opinion was used in the validation process and eight factors of motor ability and 29 items measuring those factors were chosen. The selected
items were administered to 222 college men and statistical analysis covered items like reliability, objectivity, correlation with the criterion inter correlations, through use of the double technique i.e. multiple correlation and regression equation, were also computed for a number of combinations. Two test batteries (including one short indoor test) were recommended. Scoring tables, norms, score cards, profile and directions for administering the test were including in a test manual.

Landiss (1955) designed a study to compare eight selected physical education activities in the development of Physical Fitness and motor ability in the students participating in these activities. The criteria for determining these two factors viz. Physical Fitness and motorability were Physical Fitness tests. The results indicated that improved Physical Fitness rating was achieved in equal measures by participating in conditioning by those students who participated in tumbling gymnastic etc. It was further found from the study that group participation in wrestling and tumbling gymnastic by the participants showed significant gains in the Larson test of Motorability.

Fink (1960) studied on the specificity of conditioning in swimming and running. He tested swimmers and versity runners during the first week of practice and re-tested them after six weeks. After brief warming up, the subjects ran at the maximum speed for 30 seconds on one day
and swam for 30 seconds the following day. The pulse rate stem down method was employed to determine how quickly the cardiovascular system recupitated. The experimental results supported the principles of specificity of the training in that game in general endurance and cardio-vascular efficiency acquired in training for one sport which made only a slight contribution to one's performance in other sport.

Arneet (1962) developed short (minimum-item) motor fitness test batteries for High School girls which could be economically administered in terms of equipments and time. The components which might contribute to motor fitness were listed and appropriate items pertaining to the components were selected for the test validity and suit ability. Utilising appropriate statistical techniques, the modified pull ups, 600 yard run and standing Broad jump were selected as the items for the test batteries. The motor fitness test battery No.1 was recomended over the other three batteries since this battery had validity co-efficient of at least .753 and an estimated reliability co-efficient of .848.

Clark (1962) constructed a muscular strength test for boys through 12 years of age in grade of 4, 5 and 6. The subjects were 826 boys from ten communities. Located in various parts of Oregon, a strength quotient was derived. They achieved score by the norms of strength, composite and
multiplying by 100. Construction of test was based upon 'Cable tension test' from 18 cable tension strength tests, only four were selected by multiple co-rrelation procedure. Shoulder extension, trunk extension, knee extension and ankle plantar flexion (Ankle extension). Norms were prepared which were based on the age and weight utilizing, Royer's method in construction of strength index norms.

Gardner (1963) worked on specificity of strength changes. In this study, he supported the study of Logan that the strength appeared to have been gained at a point in the range where the greatest resistance was applied. In earlier studies, he had said that the strength and endurance could be developed by isometric techniques. The specific nature was not investigated. However, he found that the experimental group showed significant increase of strength at their respective training angles. There was no significant improvement in any one group at an angle other than ones at which it worked. He concluded that strength increases were quite specific according to the position at which a limb was exercised.

Lasenstein and Frost (1964) conducted study of physical fitness of senior High School boys and girls participating in selected physical education programmes in New York State and found that the pupils participating in good programmes improved significantly more in physical fitness than those participating in poor programmes and the
greater improvement was in strength with some gains in agility, balance and endurance.

James (1966) studied the effect of four conditioning treatment on skill development and cardio-vascular efficiency in selected physical education activity courses and found that the skill attained was not apparently affected by the supplementary treatment.

A study was conducted by Stein (1964) to ascertain the reliabilities of individual test items of the Youth Fitness Test when administered in accordance with the instructions in the Youth Fitness Test manual as a part of the regular physical education programmes in the Anningon Country (Virginia) schools. All junior and senior High School boys and girls were given the Youth Fitness Test during the third week of May, 1963. Four boys classes (10th and 11th grades) at Work Field High School were selected as the subject for the study. Before the administration of the initial test all classes were oriented as to the events included in the test battery and the procedure and objective of the respective test items. The administrative procedures recommended in the Youth Fitness Test Manual (1) were strictly followed for pullups, borad jump, situps, shuttle run 1st day:- pullups. 50 yds dash, soft ball throw and 600 yds run or walk. The initial testing was done on Thursday and Friday as a part of the regular programmes.

The original subjects from the four classes, 50
boys were selected at random included in the analysis of data. Raw scores were used for comparative purposes for each of the individual test items. Pearson Product Moment Correlation techniques were used to interpret the results. Five of the seven test items pull ups, broad jump, sit ups, 50 yds dash and soft ball throw had very high and dependable reliability co-efficients ranging between .90 to .98. The other two items (shuttle run and 600 yds run or walk showed average to high relationship ranging between .74 to .83.

Sterling (1965) conducted a study with isometric strength test on two groups of college males at 158 and 170 degree of elbow flexion, knee flexion and knee extension. One group of 29 subjects exercised at a position of 95 degree elbow flexion, 170 degree knee extension, The other group exercised 170 degree elbow flexion 95 degree knee flexion and 95 degree knee extension. The exercises were 8 second maximal contraction, performed 3 days a week for two weeks. Final test was administered in all six positions at the end of the training programme. Position selectivity of strength gain varied from one muscle group to another. As a result of flexion strength was highly specific to the position exercised while knee extension had too low specificity. Knee flexion strength gains varied in position selectively depending upon the position of the exercises.

Box (1967) perpard percentile norm tables for selected measures of strength, power, agility, flexibility,
body composition, cardio-vascular and muscular endurance from data collected in five schools of the United Christian School System of Hudsovntille.

Bird and Alexander (1968) conducted a study on the effects of an individually geared exercise programme of primarily sports activities on certain physical fitness aspects of adult men and established the relationship between fitness measures and content of participation in physical activities. A treadmill was administered to each subject twice during a pre-test period and again during the 11th and 23rd weeks. The effect of total programme was improvement of treadmill performance by 29 percent and metabolic efficiency by 10 percent.

Kraft (1971) constructed and standardized a wrestling knowledge test for college men majoring in physical education who were completing a course of instruction in wrestling. The test questions were developed and submitted to a jury of wrestling experts for review. Two part joint tests of 75 questions each were administered. Based upon their results to try out tests of 50 items each were administered to 723 physical education majors completing a course of instruction in wrestling at 21 institutions throughout the United States. The final test of 50 direct questions of multiple choice items were administered. The Spearman-Brown proficiency reliability coefficient of the test of 50 items was
.87 with a corresponding standard error of measurement of 2.92.

COBB (1972) aimed at constructing a test battery for assessing the motor fitness of first, second and third grade girls. The subjects for the study were 183 girls from selected elementary schools in Natchitoches Parish, Louisiana. The investigator concluded that there was some general agreement among authorities in physical education regarding the components of the motor fitness.

Mckinney (1972) constructed a motor fitness test battery for undergraduate male physical education Majors. Forty nine test items were selected as valid measures of eight motor fitness components and were administered to 121 undergraduate males. The data were analysed according to the Principle Axes Method with the Varimax criterion for rotation. Five factors namely-speed, endurance, strength, agility and flexibility were isolated. Two test batteries having five items each were developed on the basis of rotated factor loadings. Test battery I contained the highest loading test items: (1) Time limit Shuttle Run; (2) Cable Tension; (3) 10 yards dash; (4) Thigh flexion flexibility (5) Roger's Physical Fitness Index. Test battery II contained five administratively feasible test items; (1) Time limit shuttle ru (2) Ankle planter flexion strength; (3) The illionis Agility run (4) Thigh Flexion flexibility and (5) Bar-Push-ups.
Shore's (1972) study aimed at constructing a test battery for assessing motor fitness of boys in lower elementary grades. The investigator formulated the followisnt hypo thesis: what battery of valid, objective and reliable motor fitness test items best reflects the total motor fitness of boys in the lower elementary grades? On the basis of review of literature following components were selected for use in the construction of a motor fitness test battery for boys of lower elementary grades: muscular endurance, cardiovascular endurance-muscular strength, speed, power, agility, flexibility and balance. Thirty experimental test items were selected as valid and reliable measures of motor fitness. These test items were administered to 238 boys, enrolled in first, second and third grades. The resultant, data were factor analysed according to the Principle Axes Method with variance criterion for rotation. Seven factors were revealed and tentatively named: (1) Muscular strength,(2) Balance, (3) Muscular endurance, (4) three factors all of which are identified as flexibility and (5) an Un-identifiable factor. Two test batteries containing seven items were developed on the basis of test items. Test battery I contained the highest loading test items for each factor identified and included the following seven measures : (1) Clarke's Strength Composite; (2) Mocloy's Endurance Ratio; (3) Well's Sit and Reach; (4) Base Balance on Stick lengthwise; (5) Leg flexion and
extension flexibility; (6) Arm flexion on the back flexibility and (7) Modified push-ups.

Robert's and Alspugh (1972) conducted a study on the specificity of training and found that the group which was trained on bicycles when test on bicycle ergometer had shown battery Vo max than the treadmill group and similarly the group trained on treadmill had shown better gain of max Vo than the bicycle group.

In order to construct a scientifically designed evaluative instrument to assess the motor fitness of boys in primary grades, Dinnuce (1973) purported 30 test items to measure muscular strength, muscular endurance, cardiovascular endurance, power, speed, agility, flexibility and balance. Items were administered to an incidental sample of 238 boys, ages six to nine years. An inter correlation matrix was constructed for the factor analysis of the data using the principle axes method. Seven factors having valued above 1000 and accounting for 67.17 percent of the variance were isolated. The first of the two test batteries developed included the test items which were loaded highest on each factor and were as follows: Clarke's Strength Composite; McClay's Endurance Ratio, Wells Sit and Reach, Base Balance on a Stick Length wise, wrist flexion and extension, flexibility, arm flexion on the back flexibility and modified push-ups. The second test battery was developed for more administrative feasibility. It included
items which were loaded high on each factor and eliminated composite score and ratios. The items in this battery were, grip strength, 300 yds run, well's Sit and Reach, Base Balance on a Stick, Lengthwise wrist flexion and extension flexibility, arm flexion on the back flexibility and modified dips.

Cameron (1974) studied the effect of an eight month programme of physical education on selected anthropometric, muscular endurance, measure for sixth grade elementary school children to determine such a programme that would enhance the growth and development of the children as measured by anthropometric strength and muscular endurance measures. There was no significant difference found between the experimental and control groups.

Andrew (1976) conducted a study on physical fitness to establish norms for physical fitness level of South African boys and compared their physical fitness levels with those of Canadian boys. The AAHPER Physical Fitness Battery (1986) consisting of one-minute speed sit-ups, standing broad jump, shuttle run, flexed arm hang, 50 yd dash and three hundred (300yd) run was administered. Test was applied to compare the mean score of the South African and Canadian students. The result was found to be significantly in favour of the South African boys.

Robson (1978) and his colleagues conducted a study on a simple physical fitness test battery for elementary
school children. They took 152 boys and 150 girls of Kendriya Vidyalaya Gawalior. The test battery was far practicable and simpler than the existing physical fitness tests and measured most of the essential motor qualities of elementary school children. The norms were prepared by classifying the children into ability group by assessing their physical fitness.

Sharma, S N (1987) constructed and standardized a specific physical fitness test for badminton players. He used the factor analysis technique on the data of 100 inter-college and district level badminton players of North India. As many as seven factors of specific physical fitness were obtained, out of which five were considered meaningful to select test items for each factor. One test item from each factor which had the highest loading was included in the test battery. The derived test items were applied on 500 players to develop norms.

Sharma, N P (1987) constructed a specific physical fitness test for soccer players in which he used factor analysis on the data of soccer players of North zone universities of India. As many as seven factors of specific physical fitness were obtained out of which six were considered meaningful to select test items for each factor. One test item for each factor with the highest loading was included in the test battery. The derived test items were applied on 500 players to develop norms.
Barbanti (1983) conducted a study to establish physical fitness norms for Brazilian school children and to determine if difference existed between norms for Brazilian and American boys and girls for selecting physical fitness measurements. Physical fitness test battery consisting of sit and reach-test, modified sit-ups test, nine minutes run, 12 minutes run, two tests of athletic ability, 50 metre dash and standing Broad Jump were administered to 2342 boys and girls. The comparison between norms for Brazilian and American boys and girls showed that the American boys and girls in general were taller and heavier, and they scored higher in the sit-and-reach test, modified sit-ups, 50 meter dash and standing Broad Jump test. Brazilian children had higher scores on the nine minutes run test than American children.

Cobb (1972) constructed scientifically designed evaluative instrument for assessing the motor fitness of first, second and third grade girls. 30 test items selected through a pilot investigation were administered to 183 subjects. Pearson Product Moment Raw score formula and the zero-order correlation coefficient were used to construct a correlation matrix for the factor analysis of the data using the Principle Axis Method. The battery of the seven most valued measures which loaded highest on each factor was developed and included: Clark's Strength Composite, Mecloy's Endurance Ratio, leg extension and flexion, well's Sit and
Reach, Dodging Run, Base Lengthwise Stick Balance, and Vertical Jump.

Patrick (1972) constructed a motor fitness test battery for girls in lower elementary grades. The items indicated in this test battery were Clarke's strength composition, Mecloy's Endurance Ratio, Leg extension and flexion, well's Sit and Reach Test, Dodging Run, Base Lengthwise Stick Balance, and Vertical Jump. It measured the essential components of motor fitness, such as muscular strength, muscular endurance; cardiovascular endurance, flexibility, agility, balance and power.

Sandhu (1989) Constructed Motor Fitness Battery for females Volley Ball Players. The subjects of her study were 300 Volley Ball Player representing different colleges of the State of Punjab. They were from different Universities of Punjab and their age was ranged from 17 - 21 years. Factor analysis were used to construct Motor Fitness Test. The subjects were tested on 27 different items of Motor Fitness Test, through the factor analysis technique, 10 factors were expected after an orthogonal rotation of each factor except three. The test items which had the maximum loading were selected for test battery, which consisted of seven tests namely, Spike Jump, W.M. Run, W.M. Agility, Push Ups, 20 Metres Run. The Stick Test and Bend and Reach Test. The Scientific authenticity of the test was established by computing reliability, objectively, validity
and Reach Test. The Scientific authenticity of the test was established by computing reliability, objectively, validity and specificity. For the preparation of the norms 300 Female Volley Ball Players were administered. The items of the Test Battery. The Hull Scale and T Scale were used to prepare the norms for different test items for college female playing Volley Ball.

Hooks (1962) suggested different weight-training programmes for different sports like Basket Ball, foot ball, swimming and track and field events which were taken into account with their different requirements of fitness.