CHAPTER II

REVIEW OF RELATED LITERATURE

Review of related literature gives valuable insight to the investigator regarding the problem to be solved. The review of literature can be extremely helpful to the investigator in identifying the methods that have been successfully used to solve the particular types of problems. Valuable elements from other studies may include the characteristics of the subjects, data collecting, testing procedure, statistical designs and analysis etcetera. An researches and it will creatively help the investigator to know deeply about the chosen study and related studies already done.

The literature in any field forms the foundation upon which all future framework will be built. Hence a study of relevant literature is an essential step to get a detailed information, insight and a good comprehension of what has been done earlier with regard to the present problem under investigation.

In order to get a thorough knowledge about the proposed area of study, the investigator searched available research references, periodicals, journals, books and already conducted similar studies. The collected references have been presented in a logical order here.

2.1. STUDIES ON FITNESS VARIABLES

Hardayal Singh\(^1\) and his associates defined norms of physical fitness which are essential for formulation, control and assessment of training of sportsmen. The norms serve the following purpose.

1. Determination of the level of various motor abilities.

2. Determination of the effectiveness of various means and methods of training.

3. Selection of talents.

**The Norms Scales**

Any Physical fitness tests must be accompanied by norms. When norm scales are to be constructed, one must consider the following practical statistical and educational principles.

1. Sampling techniques
2. Equivalency
3. Progressivity
4. Sensitivity

The AAHPERD health related fitness norms published in 1980 were based on over 12,000 boys and girls. A cluster sample representing several geographic regions was followed in 1985 and the results of National children and youth fitness study was published in the January 1985 issue of journal of Physical Education Recreation and dance over 8,500 boys and girls in grades 5 to 12 were administered health related and motor fitness tests. This represented a national probability sample with few exceptions for selected age groups. The children that comprised the 1980 health related physical fitness test sample were more fit than 1985 Naeyes sample.²

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Yadav\(^3\) conducted a study on standardisation of physical fitness norms for the school children of Haryana (13 to 16 years of age) with the purpose of estimating the fitness and comparing the standard of physical fitness of urban and rural boys of Haryana. For the purpose of this study 3600 school boys of the twelve districts of Haryana state were randomly selected and the performance of the boys were recorded on 50mts dash, shotput, standing broad jump, zig zag run, situps and step up tests. The norms in terms of percentile rank of said group were developed.

Athicha Pillai\(^4\) had conducted a study on computation of norms of twelve minutes run and walk among school boys. The data were collected from 20 districts except in the Nilgiri District in Tamilnadu. Two way analysis of variance was applied to find out whether there was any significant difference between the district and age group in 12 minute run/walk performance. It was found out that no difference between districts and age group. By using hull scale motors were compiled.

Callway\(^5\) has constructed a percentile norm for Albama students in grade 1-9 based on both AAPHER youth fitness test. The subjects were 2545 Albama boys and girls. Norms were constructed for each item based on age and sex. The obtained mean performance on each test items were compared with National norms.

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Senthil Kumar conducted a study on construction of norms for health related physical fitness test for Kanyakumari, Tirunelveli, Chidambaranar and Madras District School boys. Two thousand and eleven students in the age group of 13 to 14 years were selected as subjects for this study. In nine minute run/walk as per the qualitative grading for constructed norms, 298 were poor, 457 were fair, 482 were average, 432 were good, 220 were very fair, 533 were average, 458 were good, 270 were very good and 65 were excellent.

Kesavan conducted a study on construction of norms for health related physical fitness tests for high school boys in Dharmapuri, Salem, Periyar and Nilgiris Districts. Two thousand and thirty eight students were selected as subjects for this study. In situps as per the qualitative grading for constructed norms, 298 students were poor, 345 students were fair, 585 students were average, 499 students were good, 265 students were very good and 51 students were excellent.

Dhandapani conducted a study on construction of physical fitness norms for school boys of eleven to sixteen years of age of South Arcot and Trichy Districts and critical analysis of the selected physical variables for the purpose of the study 7300 boys were selected as subjects. He selected arm / shoulder

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muscular endurance, abdominal/hip muscular endurance, agility, explosive power of legs, speed and circulatory/respiratory endurance variables. Percentile scale was used to construct norms. As a result he concluded poor performance in school boys in the above variables.

Muthusamy⁹ conducted a study on construction of norms for physical fitness for school girls of the union territory of Pondicherry. He selected the school girls between the age of 13 and 15 years. AAHPERD youth fitness tests were administered. Mean, standard deviation and hull scale were computed for the construction of norms. He conducted the test on 100 girls of 13 years of age of which 64 were poor, 10 were good and 3 were excellent. In 14 years of age as per the qualitative grading for the constructed norms, 24 were poor, 34 were good and 7 were excellent. In 15 years of age as per the qualitative grading for the constructed norms, 27 were poor, 28 were good and 4 were excellent.

Rajasree¹⁰ conducted a study on the construction of norms in physical fitness for school girls of the age ranging from 12 to 15 years. 100 subjects were selected as subjects. They were administered the European physical fitness test. The selected variables were shuttle run, sit-ups, standing broad jump, sit and reach and vertical jump. Mean, standard deviation and hull scale were employed for statistical analysis. In shuttle run as per the qualitative grading for the constructed norms, 2 were poor, 12 were good and 71 were excellent. In situps as per the qualitative grading for the constructed norms 19 were poor, 9 were good and 7 were excellent. In standing broad jump as per

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the qualitative grading for the constructed norms 32 were poor, 13 were good and 3 were excellent. In sit and reach 22 were poor, 20 were good and 5 were excellent and in vertical jump 79 were poor no one was good and 19 were found to be excellent.

Sam Inbaraj\textsuperscript{11} conducted a study on construction of norms for agility co-ordination test for high school volleyball players (boys). Three hundred players were selected as subjects at random from 3 districts in Tamilnadu for the study. The data collected from 300 subjects were statistically analysed with the help of mean and standard deviation. The raw scores were converted into the hull scale norm score. As per the qualitative grading for the constructed norms in agility Co-ordination test, 35 subjects were poor, 68 subjects were fair, 100 subjects were average, 66 subjects were good, 23 subjects were very good and 8 subjects were found to be excellent.

Murugapparaja\textsuperscript{12} constructed a study on construction of norms for health related physical fitness tests for high school boys in Pasumpon Muthuramalingam and Pudukkottai Districts and the influence of selected calisthenic exercises on them. The data collected from 2000 subjects were statistically analysed with the help of mean and standard deviation. The raw scores were converted into the hull scale norm score. As per the qualitative grading for the constructed norms, in situps tests 172 subjects were below average, 324 subjects were fair, 948 subjects were average, 260 subjects were good, 220 subjects were very good and 76 subjects were excellent. As per the qualitative grading for constructed norms, in nine minute run and walk, 253 subjects were poor, 492 subjects were fair, 569 subjects were average, 112 subjects were good, 130 subjects were very good and 14 subjects were excellent.

\textsuperscript{11}Sam Inbaraj, "Construction of Norm for Agility Co-ordination Test for High School Volleyball Players (Boys)", \textit{Unpublished M.Phil Thesis}, Karaikudi: Alagappa University, July 1996.

342 subjects were good, 256 subjects were very good and 88 subjects were excellent. As per the qualitative grading for constructed norms, in body composition, 328 subjects were poor, 500 subjects were fair, 491 subjects were average, 370 subjects were good, 196 subjects were very good and 115 subjects were excellent.

Surjit Singh\(^{13}\) had conducted a study on establishing norms for physical fitness of primary school children of Punjab and Haryana states. The data relating to Punjab/Haryana/Male/Female/Rural/Urban elementary school children of age groups 6-11 years were collected by using Groover (1962) physical test battery on (N=2500) each from Punjab and Haryana. To assess physical fitness of elementary school children of age groups (6-11 Years) mean, standard deviation were computed and to determine the differences in selected variable among five levels, one way analysis was computed. "T" ratio was computed to see significance of differences if any existing in inter groups as well as on physical fitness test battery. Further scheffe's Post-hoc test mean pair difference was applied to see significances in pairs and finally percentile scale, T-scale and hull scale were computed for norms for various age groups and in different variables of physical fitness of Punjab/Haryana/Male/Female/Rural/Urban elementary school children. Based on the findings and within the limitations of the study the following conclusions may be drawn.

1. The subjects belonging to age groups 6-11 years of Punjab Haryana showed varied performance in standing broad jump, shuttle race, situps and seal crawl.

2. There were variations in performance in Punjab/Male /Female/Rural/Urban elementary school children in ages 6-11 years in standing broad jump, shuttle race, situps and seat crawl.

3. There were variations in performance in Haryana/Male/Female/Rural/Urban elementary school children in ages 6-11 years in standing broad jump, shuttle race, situps and seal crawl.

Origan motor fitness test batteries were constructed separately for boys and girls each at the upper elementary junior high school and senior high school level in 1962. Motor fitness components and test items to represent each component were proposed by a state wide committee. The components were arm and shoulder girdle muscular endurance, abdominal muscular endurance, muscular power, running speed, circulatory respiratory endurance and trunk-hip flexibility. Construction of the tests followed essentially the same pattern for both the sexes at the three levels. The ‘t’ scale scoring tables for the above for the boys and girls, the origans motor fitness test was developed separately.

Helina conducted a study on construction of norms for the AAHPERD youth fitness test variables for the physical education professional college men and women students in Tamilnadu.

A total of 1064 men students and 460 women students studying in seven physical education colleges in Tamilnadu were selected as the subjects for this study. AAHPERD youth fitness test variables namely shoulder strength, abdominal strength, agility, power, speed and endurance were selected for norm construction separately for men and women. Mean, standard deviation and hull scale were used as the statistical techniques to construct the norm.


The results of the study were as follows. Regarding the shoulder strength of men section 5.92 percent were found in outstanding category, 5.7 percent were in good category, 29.5 percent in above average category, 41.73 percent in average category, 13.53 percent in below average category and 3.6 percent in failing category. In the woman section 6.3 percent, 10.4 percent, 21.1 percent, 53.3 percent, 8.9 percent and zero percent were found in the above respective category.

Regarding abdominal strength of men section 4.6 percent were found in outstanding category, 7.42 percent in good category, 38.6 percent in above average category, 3.9 percent in average category, 13.9 percent in below average category, 2.44 percent in failing category. In the woman section 3.7 percent, 9.3 percent, 38.5 percent, 6.96 percent, 6.7 percent were found in the above respective category.

Regarding the agility of the men section 2.3 percent were found in outstanding category, 8.1 percent in good category in above average category, 33.1 percent in average category, 11.94 percent in below average category and 4.3 percent in failing category. In the women 7 percent, 51.7 percent, 33.9 percent, 5.2 percent, 2.2 percent were found in the above respective category.

Regarding power of the men section 3.8 percent were found in the outstanding category, 8.8 percent in good category, 35.4 percent in above average category, 41.8 percent in average category, 7.6 percent in below average category and 2.5 percent in the failing category. In the woman section 5.2 percent, 7.6 percent, 36.3 percent, 9.3 percent, 3.5 percent were found in the above respective categories.

Regarding speed of the men section, 1.1 percent were found in outstanding category, 4.6 percent in good category, 41.1 percent in the above average category, 43.2 percent in average category, 6.95 percent in below average category, 3.01 percent in failing category. In the women section 0.6 percent, 5 percent, 49.3 percent, 32.4 percent, 6.7 percent, 5.9 percent were found in the above respective category.
Regarding the endurance of the men section 1.5 percent were found in the outstanding category, 4.6 percent in the good category, 49 percent in above average category, 33.3 percent in the average category, 8.2 percent in the below in the women section zero percent, 21.7 percent, 90.4 percent, 6.7 percent, 0.21 percent and 0.4 percent were found in the above respective categories.

Shanmugam Vairamani\textsuperscript{16} constructed an agility test for boys of age ranging from 11 years to 15 years belonging to Kendriya Vidyalaya of Madras Region in the state of Tamilnadu. For this purpose four thousand eight hundred and forty eight boys were selected from all K.V.S. of Tamilnadu state. It was hypothesised that the new agility test might not be reliable and valid.

For establishing reliability and validity of the newly constructed test the scores of the constructed test were correlated with the scores of the existing valid and reliable test that measured the same trait. The two criterion test selected were one Boomerang (Right) 1946 and the second the zig zag run test of (The Texasran 1974). The test scores were correlated by applying the Pearson product moment correlation and Intraclass correlation method. He has obtained a reliability coefficient of different group and total population ranging from 0.75 to 0.99 which were highly significant and a validity coefficient ranged from 0.85 to 0.93 which shows a high validity. He had constructed a norm scale by using hull scale.

Maud and Schultz\textsuperscript{17} conducted a study on the construction of norms for the wingate anaerobic test with comparison to another similar test. The study was undertaken in order to develop norms for the wingate test for physically

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\textsuperscript{17} Peter J. Maud and Barry B. Schultz, "Norms for the Wingate Anaerobic Test With Comparison to Another Similar Test", \textit{Research Quarterly for Exercise and Sports}, 60:2, p.144.
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active young men and women and also to compare mean power measures obtained from wingate test with those obtained from another similar cycle ergometer test. A total of 112 male and 74 females aged 18 to 28 years comprised the subject pool. Data collected from the wingate test included mean power of 30s peak power of 5s and a perfect fatigue index. Data from the second test (Katch test) included the mean power for both 30s and 40s. Percentile norms and descriptive statistics were generated as were multiple regression equation for prediction of mean and power between the two different tests. Correlation between the two tests ranged from 0.66 to 0.87. Comparison among the data derived from this study and reported for other athletic groups were also given.

Bitecon 18 have constructed a norm table for the grades of 9-12 by taking the following tests. Pull-ups, two minutes situps, standing broad jump and 300 meters run. He showed the comparison of the validity of the test against with AAPHER youth fitness test. The obtained validity and the reliability co-efficient were 0.934 and 0.961 respectively.

Rao 19 had conducted a study on construction of norms for health related physical fitness variables for high school boys of 15 years of age in Andhra Pradesh. He selected 1005 subjects from various schools in Andhra Pradesh. The following variables were selected for this study. Aerobic endurance, body composing, muscular strength and upper in this study. As per the qualifications grading after the constructed norm, in aerobic endurance 182 subjects were poor, 194 subjects were fair, 319 subjects were average, 182 subjects were good, 84 subjects were very good and 58 subjects were excellent. In flexibility

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170 were poor, 259 were fair, 242 were average, 210 were good, 72 were very good and 52 were excellent. In muscular strength endurance 334 were poor, 249 were fair, 202 were average, 97 were good, 68 were very good and 55 were excellent.

Singh\textsuperscript{20} had prepared physical fitness norms for high school boys of Punjab state. Data were collected from five thousand subjects from various schools in the state. The test administered consists of eight items that is standing broad jump, sit and reach, test, agility run, knee bent situps, 50 meters dash, push ups (chairs), cricket ball throw and 600 meters run/walk test. The percentile norms for physical test were found to be valid and suitable to assess the physical fitness level of the high school boys of 12 to 15 years of age.

2.2. STUDIES ON ATHLETICS

Gurusamy Inbarajan\textsuperscript{21} conducted a study on construction of norms in selected athletic events namely 100 mts, 1500 mts, long jump and shot put for under graduate physical education men students in Tamilnadu. Three hundred and eighty one men students were selected from various physical education colleges in Tamilnadu and the students studying B.Sc., physical education were selected as subjects. The data collected from 381 subjects were statistically analysed with the help of mean and standard deviation. The raw scores were converted into the hull scale norm score. In 100 mts as per the qualitative grading for the constructed norms 58 subjects were very poor, 72 subjects were fair, 117 subjects were average, 71 subjects were good, 58 subjects were very good and 5 subjects were excellent. In long jump as per the qualitative

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grading for the constructed norms 45 subjects were poor, 113 subjects were fair, 103 subjects were average, 58 subjects were good, 46 subjects were very good and 16 subjects were excellent. In shotput out of 381 subjects 62 were poor, 112 subjects were fair, 95 subjects were average, 35 subjects were good, 50 subjects were very good and 27 subjects were excellent.

Ranjit\textsuperscript{22} conducted a study on construction of norms in selected athletic events for certificate course physical education students in Kerala. He selected 115 physical education students as subjects for this study. He selected 100m, 1500m, long jump and shotput as the variables. Mean, standard deviation and hull scale were the statistical techniques used. In 100m as per the qualitative grading for the constructed norms, no subjects was poor, 30 subjects were good. In 1500m as per the qualitative grading for the constructed norms 4 subjects were poor and 32 subjects were good. In long jump as per the qualitative grading for the constructed norms, 27 subjects were poor and 13 subjects were good. In shotput as per the qualitative grading for the constructed norms, 15 subjects were poor and 17 subjects were good.

Seetharama Gowda\textsuperscript{23} conducted a study on construction of norms in selected athletic events for the under graduate physical education men students in Karnataka State. The study was conducted on 645 under graduate physical education men students in Karnataka State. The data collected from the selected athletic events were 100m, 800m, 1500m, long jump and shotput. The data were statistically analysed with the help of mean and standard deviation.


The raw scores were converted into hull scale norm scores. In 100mts as per the qualitative grading for the constructed norms, 102 subjects out of 645 (15.81 percent) were poor, 120 subjects (18.60 percent) were fair, 160 subjects (24.81 percent) were average, 186 subjects (28.84 percent) were good, 73 subjects (11.32 percent) were very good and 4 subjects (0.62 percent) were excellent. In 800mts as per the qualitative grading for the constructed norms 83 subjects out of 645 (12.87 percent) were poor, 126 subjects average, 191 subjects (8.99 percent) were very good and no one was (0%) found in excellent group. In 1500 meters as per the qualitative grading for the constructed norms, 122 out of 645 subjects (18.91 percent) were poor, 60 subjects (9.31 percent) were fair, 183 subjects (28.37 percent) were average, 243 subjects (37.67 percent) were good, 37 subjects (5.74 percent) were very good and no one (0%) was in excellent group.

In long jump as per the qualitative grading for the constructed norms, 18 subjects out of 645 (18.29 percent) were poor, (15.04 percent) were fair, 172 (26.67 percent) were average, 145 (22.48 percent) were good, 103 (15.97 percent) were per good and 10 (1.55 percent) were in excellent group. In shotput, out of 645 subjects 78 (12.09 percent) were poor, 192 (29.77 percent) were fair, 149 (23.10 percent) were good, 71 (11.01 percent) were very good and 37 subjects (5.74 percent) were excellent.

Daniel\textsuperscript{24} constructed norms for selected athletic events namely 100mts, longjum and shotput for high school boys in Thiruvananthapuram Revenue District in Kerala. To achieve this purpose 500 students were selected as subjects. The data were statistically analysed with the help of mean and standard deviation. The raw scores were converted into the hull scale norm score. In 100mts as per the qualitative grading for the constructed norms, 34 subjects were poor, 40 subjects were fair, 157 subjects were average, 205 subjects

were good, 63 were very good and 1 was excellent. In long jump as per the qualitative grading for the constructed norms 7 subjects were poor, 83 were fair, 162 were average, 165 subjects were good, 73 were very good and 10 subjects were excellent. In shotput as per the qualitative grading for the constructed norms 18 subjects were poor, 75 were fair, 136 subjects were average, 205 subjects were good, 52 subjects were very good and 14 subjects were excellent.

Jackson\textsuperscript{25} and Others were intend to investigate the reliability and validity of one mile walk as field test for aerobic capacity and to develop norms for that test. For establishing reliability and validity the samples included 41 males (n=21) and females (n=20) with the age group of 19-32 years. The subjects perform the treadmill stress test to determine the peak $O_2$ consumption and 3 trails of a maximum one mile walk on an indoor track. The mean trail reliability estimate was 0.96 but a significant trend was present. The $r$ between trail 3rd and peak $O_2$ consumption was 0.57. When the rock port prediction function using age, weight, gender, one mile walk and ending heart rate was used to predict peak $O_2$, the improved to 0.66. The normative samples included males (n=400) and females (n=426) with an age range of 18-30 years. They performed a practice trail of one mile walk followed by a performance trail. Then the percentile norm was constructed.

2.3. STUDIES ON DIFFERENT GAMES

Ratnabai\textsuperscript{26} has conducted a study on construction of norms for basketball skill test for high school girls in Periyar District. To achieve this purpose 100

\textsuperscript{25}Allen Jackson, Jeffrey Solomon and Mary Studek, "One Mile Walk Test Reliability, Validity and Norms for Young Adults", \textit{Research Quarterly for Exercise and Sports Supplement}, 63:1, March 1992, p.52.

girls were selected from each age group of 13, 14 and 15 years. The subjects were basketball players who represented the school for inter school competition. The AAHPER basketball skill test was administered to all the students. The test battery consists of the following items, front shot, side shot, foul shot, speed pass, under basket, jump and reach over arm pass, for accuracy and dribble. The test measured the fundamental skills of basketball and each one of the test was intended to measure a single component of basketball skills. Based on the percentile scale the norms were constructed.

Gracy Mary\textsuperscript{27} conducted a study on construction of norms in basketball skills for college women basketball players. For this purpose 384 subjects were selected at random basis from 32 colleges under six Universities for this study. Shooting test throw for accuracy and dribbling test. Mean, standard deviation and hull scale were the statistical techniques used for this study. As per the qualitative grading for the constructed norms in shooting 22 players were poor, 96 players were good and 17 players were excellent. In throw for accuracy 76 players were poor, 64 were good and 23 were found to be excellent. In dribbling test 72 players were poor 65 players were good and 13 players were excellent.

Jason\textsuperscript{28} conducted a study on construction of norms for Hockey goal keepers on selected physical, psychological and anthrometrical variables. Sixty goal keepers were selected between the age group of 18 years and 25 years from various district head quarters in Tamilnadu. In agility (4x10 yards shuttle run) as per the subjects were poor, 15 subjects were very good and no one was excellent. In flexibility (sit and reach) as per the qualitative grading for the

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constructed norms, 8 subjects were poor, 5 subjects were good, 8 subjects were very good and no one was excellent.

Gupta\textsuperscript{29} had conducted a study for validation of McDonald soccer test and to compile norm for it. For this 250 male soccer players participating in Tripura first division league were selected and their playing ability were determined. The subjects were administered the McDonald test and the scores were taken for statistical application. The mean and standard deviation were calculated to 16.25 and 2.01 respectively. Based on this mean and standard deviation the 'F' scale was computed and norms were constructed.

Newbegin Chellappa\textsuperscript{30} conducted an investigation on construction of norms for soccer goalkeepers on selected skills, physical, psychological and anthropometrical variable. Sixty goalkeepers were taken for the study from various district of Tamilnadu. In kicking test as per the qualitative grading for constructed norms it is evident that 40 goalkeepers out of 64 goal keepers (23.33\%) were very poor. 13 goalkeepers (21.67\%) were fair, 11 goalkeepers (18.33\%) were very good and none of them were excellent in kicking performance.

Alex\textsuperscript{31} conducted a study on computation of norms for the playing ability among college football players. He had computed the norms for kicking skill test based on the hull scale for 150 players were above the average level. Thus it was proved that the performance of the warner soccer kicking skill test for college players were good.


Pitchaiappa\textsuperscript{32} constructed norms for the predicted fundamental volleyball skills of Tamilnadu school boys at different age level.

To achieve this purpose 100 volleyball players in each age group were selected as subjects for the prediction of the fundamental skills. Underhand pass, overhead pass, service, setting, spiking, block were selected as independent variables. The dependent variable was the volleyball playing ability. All the skills were measured using standardised tests. The block and playing ability were assessed by subjective rating by a panel of three judges. To choose the minimum number of independent variables in the order of contribution Wherry Doo Little method of variable selection was used.

When the multiple correlation computed four different fundamental volleyball skills in each age group were predicted. In the construction of norm 2000 volleyball players were selected as subjects for each age groups. The Helmen volleyball test was used to test the overhead and underhand pass skill. Russel lange volleyball service test was used for serving skill, wall a pike test by Harold and Mcgee, AAPHER volleyball set up test was used to measure the skill. Blocking was measured by the judges ratings. The collected data were statistically analysed for computing mean, standard deviation and hull scale value. Then the norms were constructed for the predicted fundamental volleyball skills for each age groups.

Among the skill variables service and underhand pass were found to be significantly related with playing ability for all the age groups, spiking with 16 and 17 years. Setting with 16 and 18 years overhead pass and blocking in 17 and 18 years.

The hull scale norms on the performance of service under hand pass, setting and spiking shows out of 2000 subjects in all the selected variables can be identifies according to their index in the norm table such as failing category, below average, average, good and outstanding category.

Reginold Varghese\textsuperscript{33} conducted a study on construction of norms for the predicted skills, physical and anthropometrical variables for college men soccer players in Kerala. Accordingly 2000 soccer players were chosen from in University in Kerala, as the subjects for norm construction. The age group of the subjects was between 18 and 25 years. Totally a variables were selected for the study variables selected under fundamental skill were

1. Kicking
2. Dribbling
3. Ball Control

Variables selected under physical characteristics were
1. Speed
2. Power
3. Endurance

Variables selected under anthorpemetric characteristics were
1. Standing Height
2. Leg Length
3. Thigh Girth

To construct the norms for the predicted variables, mean, standard deviation and the hull scale were used as the statistical technique the predicted variables in the order of their importance were ball control power dribbling and endurance.

In the performance of ball control among the 2075 players, 317 were found to be in the failing group. 873 were in the below average group, 748 were in the average group, 137 were good. None among them were in outstanding category.

In the performance of explosive power among the 2075 players, 18 were found in the failing group, 260 were in the below average group, 829 were in the average, 609 were in the above average, 266 were good and 93 were in the outstanding category.

In the performance of endurance among the 2075 players 101 subjects were found to be in the failing group, 90 were in the below average 767 were in the average, 813 were above average 276 were good and 28 were outstanding.

Somasundaram Bascaran conducted the study on “Construction of volleyball skill tests and computation of norms for school boys of different age groups in Pondicherry State.” This study was designed to construct new skill tests for service placement skill, under hand pass skill, and to construct norms for tests for the school boys in the age group of 13 to 15 years. One thousand five hundred five male students in each age group were selected as subjects. For establishing the reliability of test, the intra class correlation co-efficient was used, and for validity concurrent validity and Pearson product moment correlation was employed for construction of norms, mean standard deviation and hull scale were used as statistical technique.

In the performance of under hand pass of 13 years, 52 subjects were in failing category, 159 subjects below average 595 subjects in average, 520 subjects in above average, 148 subjects in good 31 in outstanding category.

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In the performance of 14 years boys in under hand pass, 71 subject in failing category, 128 subjects in below average, 579 subjects in average category, 584 subjects in above average, 135 subjects in good category, 8 subjects in outstanding category.

In the performance of 15 years boys in under hand pass, 80 subjects in failing category, 209 subjects in below average, 408 subjects in average, 640 subjects in above average, 160 subjects in good category, 8 subjects in outstanding category.

In the performance of 13 years subjects in service placement, 73 subject in failing category, 194 subjects in below average, 544 subjects in average, 180 subjects in good category and 31 subject in outstanding category.

In the performance of 14 years subjects in service placement 86 subject in failing category, 170 subjects in below average category, 543 subjects in average category, 522 subjects in above average, 138 subjects in good category, 46 subjects in outstanding category.

In the performance of 15 years subjects in service placement, 12 subjects in failing category, 82 subjects in below average category, 321 subjects in average, 320 subjects in good category and, 128 subjects in outstanding category.

2.4. STUDIES IN GENERAL

Montgomery and Connolly\(^{35}\) conducted a criterion referenced tests. The purpose of this article are 1) To compare the similarities and difference between

norm referenced and criterion referenced tests and 2) To summarize how each should be used in the assessment of developmental performance in children. Specific developmental assessments, the populations they address and the information they provide are described briefly. The need for additional criterion referenced tests in physical therapy is discussed, and an example of how task analysis can be applied to movement or motor skills in the development of a criterion-referenced test is provided. Physical therapists can enhance the credibility of their assessments by appropriate use of norm-referenced and criterion referenced tests.

Fastenau and other constructed norms for Rey-osterrieth complex figure test. The Rey-osterrieth complex figure test ("they Rey", Osterrieth, 1944, Rey, 1941) has accumulated a considerable literature as a test of visual spatial perception/construction and memory. The extended complex figure test (ECFT: Fastenau, 1996a, in press-a" Fastenau & Manning, 1992) supplements the Rey with recognition matching trials that follows copy. Immediate recall and delayed recall. The Rey and ECFT were administered to 211 healthy adults. Age ranged from 30 years to 85 years (M=62.9,SD=14.2), education ranged from 12 years to 25 years (M=14.9, SD=2.6) 55% were women Andover 95% were Caucasian. Age and education effects were evident on all trails (multiple R ranged 0.23 to 0.50 P< 0.05) but education explained minimal variance (usually 2-3%) on copy and memory trials. Gender effects were negligible, if present. Age-appropriate norms are presented using Osterrieth's 36 points scoring overlapping cells and convenient tables for converting raw scores to scaled scores.

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Fastenau, N.I. Denburg and B.J. Hufford, "Adult Norms for the Rey-Osterieth Complex Figure Test and for Supplemental Recognition and Matching Trials from the Extended Complex Figure Test", Clinical Neuropsychological Journal, Indian University, 13:1, February 1999, pp.30-47.