CHAPTER II

REVIEW OF RELATED LITERATURE

An abstract of normative studies reported in the professional literature that supports the need for normative study for specific target populations are given in this chapter. The related studies found from various sources are enumerated below:

Corner and Cureton\(^1\) developed a motor fitness test for high school girls. The tests consisted of two forms—a single period test of 6 items and a double period test of 12 items. The test comprised of following paired items—Foot and toe balance and Dizziness recovery, Trunk extension and trunk flexion, Kneeling and jump and Illinois agility run, Sit-ups and kneeling push-ups, Basketball throw and Standing broad jump and Squat thrust (30 seconds) and Brouka step test. Test items correlation with the composite item scores ranged from 39 to 62 Percentile norms based on a limited sample were available.

John\(^2\), prepared National Norms for the one minute Basketball throw for goal, Pull-ups, Potato race, Standing hop step and jump, Push-up, standing broad jump and Softball target throw, items of the Y.M.C.A. National Athletic

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Achievement Programme. Different centers of Y.M.C.A. tested 2000 boys in each age group of 8, 9 and 10 years throughout the United States.

Box prepared percentile norms and tables for selected measures of strength, power, agility, flexibility, body composition, cardiovascular and muscular endurance from data collected in five schools of the Unity Christian School system of Hudson Ville.

Shore Jr. constructed a test battery for assessing motor fitness for boys in the lower elementary grades. Seven factors were revealed and two test batteries were formed. Test batteries included were Clarke's Strength Composite, McCloy's Endurance Ratio, Well's Sit and Reach Test, Leg Flexion-Extension etc. The battery two was made of three hundred yard run, balance on stick, flexibility test modified push-up etc. Both the motor fitness test batteries for elementary grades were highly valid.

Patrick constructed a motor fitness test battery for girls in lower elementary grades. The following items were included in these tests. Clarks's strength composite, McCloy's endurance ratio, Leg extension and flexion, Well's sit and reach, Dodging run, Bass length wire-stick balance and Vertical jump. The tests measured the essential components of motor fitness such as

3 David L. Box, "Physical Ability Testing Male Students in Grades Four Through Twelve," *Completed Research in Health, Physical Education and Recreation* 9(1967):77


muscular strength, muscular endurance, cardio-vascular endurance, flexibility, agility, balance and power.

Veerawarni\(^6\) conducted a study to evolve physical fitness norms for higher secondary schools of Greater Gwalior. 212 male students from four higher secondary schools and 793 male students from remaining 23 schools were selected and AAHPER Youth fitness and ICHPER physical fitness Tests were administered on them respectively. The percentile norms for each test item were evolved for the boys of age group 13-17 years. It was also concluded that in all items except pull-ups of the AAHPER Youth Fitness, the mean scores of Indian boys in all age groups were lower than the 50\(^{th}\) percentile of American Norms. There was a positive, but low order of relationship between physical fitness and participation in physical activities. There was a positive correlation though low (r=0.13) between physical fitness and academic achievement.

Bessonette\(^7\) identified four factors as components of physical fitness. These are static strength, hip flexibility, recovery pulse and muscular endurance. The AAHPER Youth Fitness Test Project represented the first attempt by the physical education profession to establish national norms. It was evolved and developed in 1957 under the chairmanship of Dr. Paul A.


Hunsicker. The national percentile norms were computed in 1958 and were revised in 1965. The test consisted of the items – Pull-ups (for boys), Flexed Arm Hang (for girls), Sit-ups, Shuttle Run, Standing Broad Jump, 50 Yard Dash, 600 Yard Run/Walk, for both boys and girls of age group 10 to 17 and college men and women.  

Physical fitness norms for Nigerian boys and girls of 11 to 18 years of age were constructed by Anyanwu. The test items were Shuttle-run, Push-ups, Chair push-ups for girls, Flexed knee, Sit-ups, 45 meters. Dash, Standing long jump, Pull-ups for boys, Flexed arm hang for girls, 9 min. Run for subjects 11-12 years and 12 minutes run for subjects 13-18 years. A comparison of the mean scores of the United States and the Nigerian Youth showed that of the upper age levels, the United States Youth had a better physical fitness status than their Nigerian counter parts, where as at the lower level there was not much difference.

Backford, conducted a research to evaluate the physical fitness level of Navajo girls through AAHPER Youth Fitness Test. The Navajo girls of 14 to 16 years were selected from seven schools to measure physical fitness level. Also percentile norms were established on the basis of scores obtained from

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test results. These norms were compared to national norms found in the manual accompanying the AAHPER Youth Fitness Test. The results gave an indication of the overall fitness level of 14, 15 and 16 years old Navajo girls of the seven test items. The Navajo norms were found to be below the national norms on 5 items and above on the softball throw and 600 yard run/walk.

Zuti and Corbin\textsuperscript{11} conducted a research of physical fitness norms for college freshmen. They took 3000 freshmen of Kansas University within the age from 17.6 to 19.5 years. The tests were conducted for Strength, Flexibility, Body composition and Cardio-vascular fitness. The results appeared to indicate that the college freshmen at Kansas State University were above average than the standards were appropriate to use for Americans.

Watson\textsuperscript{12} prepared test items for the physical fitness tests consisting of Long jump or Vertical jump, 50-Yard dash, Sit-up, Stick jump and 300-Yard distance run. The norms were established for each test item for girls and boys according to chronological age. Percentile tables were constructed based on the results of investigation. Watson further recommended that in elementary level, there should be some test items and norms to evaluate shoulder girdle strength.


Robson and his Colleagues\textsuperscript{13} have conducted a study of a simple fitness test battery for elementary school children. The norms were prepared for classifying the children into ability groups by assessing their physical fitness.

Horak\textsuperscript{14} evaluated the physical fitness of the 1972 Olympic men’s Football team of Czechoslovakia to know the level and divided the players in two groups. Correlations were computed and divided in two groups. Correlations were computed between the coach’s subjective evaluation with strength, speed and agility. It was concluded that arm strength and agility were not valid predictors of football ability. Total strength and total ‘T’ scores were moderate predictors of football playing ability, while the leg strength and speed were significant predictors.

Haag and Singer\textsuperscript{15} developed a test to measure motor fitness for boys and girls representing school in the age groups 10 to 20 years. The study was conducted with the objective to help the children in schools and clubs to learn and develop complex motor skill by achieving basic fitness level. Students from grade five and eight were tested (n=580)- in order to calculate the major test criteria. The objectivity of the test was .999. the reliability of the test was


0.902. the validity obtained through comparison with standard fitness test was 0.78 - 0.87. The test included the following items: (1) Figure-8-run, (2) Sit-up, (3) Jumping, (4) Push-up, (5) Shuttle Run and (6) Ball throw.

Ray, compared the physical fitness of urban and tribal students of Agartala. Sixty male students from each age group ranged from 16 to 20 years were randomly selected as subjects. Data was obtained by administering the AAHPER Youth Fitness Test and was statistically analyzed by using percentile scale. It was concluded that the performance of urban students in Pull-ups and Softball throw for distance was significantly greater than the tribal subjects and also there was no significant difference between the urban and tribal students in Standing broad jump, Shuttle-run, 600 meter run/walk, 50 meter dash and Sit-ups. Results also showed that there was no significant difference in physical fitness level between urban and tribal college students of Agrartala.

Das prepared physical fitness norms for classes 9 through 11 of Delhi Administration Schools. In each school 10% of students were tested on the items of AAHPER youth fitness test and N.P.F.P Battery "A". The item in the N.P.F.P battery "A" was the same as included in the syllabus of Central Board of Secondary Education. Percentile norms were prepared and were

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17 Tapan Kumar Das, "Norms in Physical Fitness Tests for Boys of Class IX to XI of Government Schools of Delhi Administration" (Unpublished Master's theses, Jiwaji University, Gwalior, 1980)
statistically analyzed which concluded that abdominal strength of Indian students seems to be very poor compared to that of American Students. The performance of students of class IX was very poor in all items of fitness tests and there was a remarkable sport performance of class X and XI, though still lower than that of students in America except in Pull-ups measuring Shoulder girdle strength.

Walia\textsuperscript{18} (1981) conducted a study on 42 men gymnasts who had participated in Senior National Gymnastics Championship in 1981. He has reported a significant correlation between competitive performance on one hand and certain physical abilities (arm strength, abdominal strength and explosive leg strength) on other hand. Further he divided the group of 42 gymnasts into three sub-groups on the basis of competitive performance. He has reported that the best group in competitive performance was also better than other two groups in arm strength, abdominal strength, leg strength and grip strength.

Sittmann\textsuperscript{19} developed norms for 372 male and 648 female students enrolled in the health and physical fitness concept classes of North East Missouri State University. The subjects were tested for the sum of six skin folds, predicted 1% fat, predicted VO\textsubscript{2} max, grip strength, leg strength, back


strength, vertical jump distance and vertical jump power. Means, standard deviations, and range for all variables were calculated. Percentiles in increments of five were constructed for each variable in each classification.

Reddy\textsuperscript{20} conducted a study on computation of AAHPER volleyball skill test norms for college students. The subjects were 60 male students from five different colleges affiliated to Sri Venkateswara University in Andhra Pradesh. The subjects were administered AAHPER Volleyball skill test items namely, Volleyball serving, Sit-ups and Passing for establishing the reliability. 20 students were selected randomly and test was repeated after a gap of one day. The reliability co-efficient obtained for the two tests, were significantly at .01 level for the purpose of providing norms, t-scale and Hull scale were computed.

One hundred junior high school boys were administered a devised physical fitness test by Huang\textsuperscript{21}. Factor analysis here yielded five factors. Seventy percent of total variance of physical fitness was observed. The factors identified by him were speed, explosive strength of leg muscles, dynamics flexibility, dynamic strength and flexibility.

\textsuperscript{20} N.V. Swammy Reddy, "Computation of AAHPER Skill Test Norms for College Students", (Unpublished Master's Theses, Jiwaji University, 1982).

Thiruppahl,\textsuperscript{22} computed physical fitness norms for boys of the Junior Colleges in Solapur District. 20 boys from classes XI and XII of fifteen randomly selected junior colleges were taken as subjects for this study. AAHPER Youth Fitness Test was administered on them. The two scales namely T-scale and Hull Scale, were constructed for the combined samples of the Junior Colleges and separately for classes XI and XII.

Barbanti\textsuperscript{23} established physical fitness norms for Brazilian school children. In the Physical fitness test battery he included Sit and reach test, Modified sit ups test, Nine minute run, Twelve minute run, 50 mts. Dash, and Standing long jump. The test was administered to 2,342 school boys and girls.

Sree Devi\textsuperscript{24} constructed motor fitness norms for Secondary School girls. For this purpose, she selected 80 students of Central School No. 1 Gwalior, from grades eight and nine as subjects for this study. AAHPER Youth Fitness Test was administered on all subjects. Based on mean and standard deviation values, T-scale, 6 sigma scale and Hull Scale were prepared for each test items, Also, it was concluded that a common scale of AAHPER Youth fitness test could be used for grades eight and nine and 6 sigma scale and Hull scale were more suitable than T-scale.

\textsuperscript{22} V. Thiruppahl, "Computation of Physical Fitness Norms for Boys of the Junior Colleges in Solapur District," (Unpublished Master's Thesis, Jiwaji University, Gwalior 1982).

\textsuperscript{23} Valdir Jose Barbanti, "A Study of Selected Anthropometrics and Physical fitness Measurements of Brazilian and School Children," Dissertation Abstracts International 43 (June 1983): 3840-A

Guruvammal, constructed norms in selected physical fitness test items for Secondary School Girls in Madras city. 10 girls from each ten randomly selected schools were taken as subjects and tested on the selected physical fitness test items, consisting of Sit-ups, Vertical jump, Flexed arm hang, 4 x 10 meter Shuttle run, 50 meter Dash and 600 meter Run. The percentile scales were computed for the combined samples of the girl students. It was also concluded that performance of the girl students was very poor in the selected test items.

Robins conducted a normative study for Alabama students. AAHPER Youth Fitness Test (YFT) and AAHPER Health related Fitness Test (HRFT) were given to 2,545, six to fourteen years old boys and girls. Percentile norms tables were constructed for each item based on age and sex. Alabama and national means were compared. Alabama students scored better on events measuring Agility, Speed and Cardiovascular endurance but the national score in Abdominal muscular endurance and Flexibility was better.

Singh prepared physical fitness norms for high school boys of Punjab State. The test items were administered on 5000 subjects from various schools. The test items were Standing broad hump, Sit and reach test, Agility

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run, Bent-Knee Sit-ups, 50 meters dash, Push-up (chair), Cricket ball throw, 600 meters run/walk. The percentile norms for physical fitness test were found to be valid and suitable to assess the physical fitness level of the high school boys between the ages of 12 to 15 years.

Singh\(^2\) constructed physical fitness norms for four thousand male students belonging to pre-university classes of Punjab University Chandigarh. Fleischmann's Physical Fitness Battery was administered on them. The 3 scales namely-percentile scale, Hull scale T-scale were prepared. It was also concluded that physical fitness improved linearly with age and the student belonging to rural areas were significantly superior in their performance, when compared to the students of urban area.

Sharma\(^3\) constructed and standardized specific physical fitness test for Badminton players. He used factor analysis technique on the data of 100 Inter College District Badminton players of north India. As many as 7 factors specific physical fitness were obtained, out of which, 5 were considered as meaningful to select test items from each factor 1 test item having the highest loading was included in the test battery, from each factor. The test items thus derived were applied on 500 badminton players to develop the norms. The selected five factors were Trunk strength, Flexibility Badminton agility,


Badminton endurance and Arm-leg explosive strength and the test items selected endurance specific physical fitness test for Badminton players were Sit-ups, Court agility Trunk flexion six corners endurance and Softball throw. Factor analysis technique was used to select the test items out of twenty variables.

Singh\textsuperscript{30} constructed physical fitness norms for male Teenagers of Jammu and Kashmir State. He used AAHPER Physical Fitness Test items to measure physical fitness, which included Pull-ups, Bent-knee sit-ups, Standing broad jump, Shuttle-run, 50 meter dash, 600 meters run/walk. The study concluded that the subjects belonging to age group 16 to 19 years showed better performance in all the test items, over the other age group 13-15 years. On the average physical fitness improved linearly according to age. The scales, percentile scale, Hull scale and T-scale were also prepared for each age group separately.

Singh\textsuperscript{31} constructed and standardized specific physical fitness test for boys volleyball players. He took 100 players of Inter College and District level. Wherry-do-Little method of multiple correlation was employed to extract the test items out of 26 variables. A test battery formed was administered to the volleyball players to formulate the norms. The study concluded that (i) the


battery of tests developed by the researcher has the ability to predict the specific fitness of volleyball players, (ii) the five tests selected (Spike jump, W.M. Run, Squat thrust, Basketball throw and Wrist flexion) showed highly significant relationship with the volleyball playing ability.

Thomas\textsuperscript{32} constructed a specific test battery of motor fitness for Hockey players. He took forty-five Intercollegiate Hockey Players of Jiwaji University, Gwalior. The multiple correlations yielded five specific motor fitness tests, namely Speed, Endurance, Power, Flexibility and Agility are deemed to be meaningful in representing the specific motor fitness of Hockey players. All the five tests (20m. run, Six point run, Two hand medicine ball throw, Trunk Flexion and Court agility) showed high significant relationship with the Hockey playing ability. The battery of tests developed by the researcher has the ability to predict the specific motor fitness of Hockey players.

Prakash\textsuperscript{33} has worked on construction and standardization of physical fitness test for High school boys. For study selected age group of 13 to 15 years from 180 high school boys of eleven identified institutions, Dakshina Kannada District, Karnataka, India. 32 test variables were administered on subjects. They were Age, Weight Height Push ups, Reverse Sit-ups, 2 Hops by dominated leg, 2 Jumps by both legs, Medicine Ball Throw, Over Head Medicine Ball throw Basket Ball throw, Leg raise, Upper body Raise, Push


ups, Burpee, Sit-ups, Leg Raise (Sec. Hold), 50 mts hopping. The raw scores have been converted into standard T-Scores, for the age groups of 13 to 15 years high school boys.

Manoj Kumar\textsuperscript{34} "Developed norms on selected motor fitness components in the age group of 13 to 17 year of Gwalior District Schools. Test items to measure the motor fitness components were 50 meters dash, Standing broad jump, Sit-ups, One-minute stork for balance and 600 meter run/walk.

Ramputy\textsuperscript{35} constructed norms in selected fitness test items for girls of age group 12-16 years in Gwalior District. She administered the test on 650 students of Kendriya Vidyalaya and public schools of Gwalior District. The test items were Flexed Armed hang, Curl up, Sit and Reach Shuttle-run, 1 minute run/walk 50 yard Dash, Standing Broad Jump. The data obtained was correlated following the product moment correlation method.

Thomas\textsuperscript{36} undertook construction and standardization of specific physical fitness test for soccer players. His study was confined to District level soccer players of the age 17 to 21 years from different Districts of Kerala State. The test items were Push up, Bent knee sit up, Burpee Jump, Standing

\textsuperscript{34} Manoj Kumar "Development of Norms on Selected Motor Fitness Components in the Age Group of 13 to 17 years Students of Schools of Gwalior District." (Unpublished Master's Thesis L.N.I.P.E, Gwalior, 1996).


\textsuperscript{36} Biju Thomas, "Construction and standardization of specific physical fitness test for soccer players" (Unpublished Doctoral Thesis, Jwaji University, Gwalior, 2000).
Broad Jump, Vertical Jump, Kicking for Distance (Foot Ball), 12Min Run/Walk, 1Mile Run, 800 mts Run, 30 mts Run, 50 mts Run, 70 mts Run, Shuttle Run, Illion's agility Test, Special agility test, Bridge up test, Trunk extension test, Sit and Reach test, from raw score a significant difference in the means was found to exist between the test variables when applied to the successful and unsuccessful soccer players.

Bhatia\(^ 3^7\) constructed norms on selected motor fitness components for ages between 13 to 17 years, studying in schools of Greater Gwalior. School children ages of 13 to 17 years were selected as subjects. The test items, were 50 Mts, Standing Broad Jump, Sit ups, Stork for Balance & 600mts run/walk. The raw score was standardized into T scale, Hall scale and Percentile scale.

\(^3^7\) Vimal Bhatia, "Construction of Norms on selected motor fitness components for ages between 13 to 17 years studying in schools of greater Gwalior, District Gwalior" (unpublished Masters Thesis, L.N.I..P.E. Deemed University, Gwalior 2001)