CHAPTER II

REVIEW OF RELATED LITERATURE

It is all the more important for a research scholar to gather relevant literature which is an essential step to get a full picture of what has been done with regard to the problem undertaken. The related findings born out of already accomplished research will bring about a deep and clear perspective of the research problem under study.

It is to be noted that getting reference materials from various sources is a time-consuming but rewarding phase of the research work. The reproduction of the findings of similar works is supportive and throw ample light on the research investigation. The literature of the same nature aids the investigator to discover what is already done, and known, what the previous researchers have endeavoured to find out and what research designs have proved fruitful and what problem stands unsolved.

Over the globe, a great number of research articles have been published on physical fitness and several international norms have been formulated after extensive research work in the past and were used for international and inter-continental comparisons on physical fitness. In
every part of the world, considerable researches have been individually and collectively conducted on normative studies related to physical fitness tests. Hence, the authorities, concerned in the Union Territory of Pondicherry could very well utilize the norms constructed in various countries if it serve this purpose.

The related literature have been taken from the libraries of Pondicherry University, Pondicherry, YMCA College of Physical Education, Madras, Alagappa University, Karaikudi, Lakshmibai National College of Physical Education, Gwalior and University of Madras, Madras.

A serious and scholarly attempt has been made by the scholar to go through the related literature and a brief review of the studies related to the present problem is described in this chapter.

A National Plan of Physical Education and Recreation\textsuperscript{1} was prepared by the Central Advisory Board of Physical Education and Recreation. It suggested the following physical efficiency test items for boys and girls, of the age group 10 to 17.

**Boys - Age Group 10 to 12**

Test Items:

1. 50 Metres Run
2. High Jump
3. Long Jump
4. Cricket Ball Throw

**Boys - Age Group 13 to 17**

Test Items:

1. 100 Metres Run
2. High Jump
3. Long Jump
4. Cricket Ball Throw
5. Chin ups, Dands, and baithaks

**Girls - Age Group 10 to 12**

Test Items:

1. 50 Metres Run
2. Skipping - 30 Sec.
3. Ball Bouncing - 30 Sec
4. Cricket Ball Throw
5. Sit-ups - 30 Sec.

**Girls - Age Group 13 to 17**

Test Items:

1. 100 Metres Run
2. Long Jump
3. Cricket Ball Throw
4. Sit-ups (1 minute)
The All India Seminar on Physical Education Institutions\(^2\) recommended the motor ability test as prescribed on the National Plan to be conducted in schools all over the country to ascertain its validity and supply proper norms for various age groups. The seminar also recommended to achieve norms for Kraus Weber test and the Canadian Fitness tests.

The Central Board of Secondary Education\(^3\) took the lead in introducing physical education as an academic subject at school level. The Board appointed a committee with Shri S.D. Chopade as the Chairman to form a curriculum on physical education. Later it was introduced as a required common subject for Junior Secondary (ninth and tenth classes) and senior secondary education (eleventh and twelfth classes). The syllabi and courses (1980) for secondary school examination physical fitness play an important role in the curriculum of physical education, in addition to the various objectives of physical education.


\(^3\)Central Board of Secondary Education, Syllabi and Courses for Secondary School Examination (New Delhi: Central Board of Education, 1980) : 118.
The physical fitness could be realised only through physical education activities.

There are no special periods allotted for physical fitness in the syllabus of the Central Board of Secondary Education. It is expected that the students would develop a certain amount of physical fitness through participation in other physical education activities. However, there is provision for assessing physical fitness.

In the scheme of examination, a student is permitted to sit for examination at the end of class ten only if he has obtained grade 4 (fair) in health and physical education. Maximum of seventy five marks are allotted for physical education. Twenty marks are allotted for theory and fifty five marks for practical, out of which, ten marks are for fitness.

The battery A of NPED has been adapted as the standard test for evaluating physical fitness in classes ninth and tenth in the schools under the local norms. The battery A is an ad hoc norm. Therefore a computed norm on the basis of performance of comparable student group is needed. Though the scheme of required physical education got implemented over a number of years, yet no State Board of Education has taken up any research works for preparing suitable norms.
Thomas\textsuperscript{4} states that the Madras Physical Efficiency Test was constructed for Secondary school boys. The Physical ability of boys was assessed in five item tests comprising basic natural activities like 1) climbing 2) Jumping 3) Running 4) Running Long Jump 5) Running High Jump 6) 100 Metres run and 7) Throwing cricket ball for distance.

Only medically fit students were allowed to take part. Students were graded class I, class II and class III in each event and consolidated grading was given under "All round efficiency".

Thomas\textsuperscript{5} further adds that Bombay Achievement test prepared by P.M. Joseph was a very progressive type of test. The tests were conducted in 50 yards run for Elementary and Sub-Juniors, 75 yards run for Seniors, Jump and reach (vertical Jump test) ball throw for distance, pull-ups and running broad jump. Marks were allotted separately for each part (a) achievement tests (b) tests in physical activities and (c) attendance. The performances were converted into points by using a scoring table prescribed by him.


\textsuperscript{5}\textit{Ibid.}, p.166.
Thomas\textsuperscript{6} also stated about Bengal Athletic Test which was conducted to assess Physical efficiency of the High School students in each district by the District organiser of physical education. The successful candidates were awarded certificates of merit.

Events of the test are:

- 100-yards: 13.4 sec
- 50-yards: 7 sec or less
- 880-yards: 3 Min. and 30 sec
- Running High Jump: 4 feet
- Running Broad Jump: 14 feet
- Press-ups: 8 times
- Pull-ups: 5 times

Robson and others\textsuperscript{7} conducted a study on a simple physical fitness test battery for elementary school children. 152 boys and 150 girls of Kendriya Vidyalaya, Gwalior, studying from grade one through five, acted as the subjects which were at random. All the subjects and assistants were oriented to the test battery comprising (1) 50 metres dash, (2) 600 meters run/walk, (3) straight leg

\textsuperscript{6}\textit{Ibid.}, pp.192-194.

sit ups, (4) Vertical jump, (5) 4x10 meters shuttle run and (6) Modified push ups. The subjects were given practice in these items so that they were able to give the correct performance in each item. The assistants were properly oriented to record measurements accurately so that mistakes could be avoided. The test items were administered to the subjects on two days allotting three items each day. After a day's rest, the test items were administered again to the same students on the fourth and fifth day for finding out the reliability. The value of $r$ obtained was 0.87 which revealed that the subjects had achieved consistency of performance in the test items. The readings were taken during forenoon session. Norms were computed for the six physical fitness test items. The norms can be used for classifying the children into ability groups by assessing their physical fitness.

Singh\textsuperscript{8} prepared physical fitness norms for high school boys of Punjab state. Data were collected on five thousand subjects from various schools in the state. The test administered consisted of eight items i.e., standing broad jump, sit and reach test, agility run, knee bent sit-ups, 50 meters dash, push-up (chairs), cricket ball throw

and 600 meters run-walk. The percentile norms for physical fitness tests 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.

Physical fitness norms for Nigerian boys and girls of 11 to 18 years of age were constructed by Anyanwu. The test items included were shuttle run, push-ups for boys, chair push-ups for girls, flexed knee sit-ups, 45 meter dash, standing long jump, pull-ups for boys, flexed arm hang for girls, nine minute run for subjects 11-12 years and 12 minutes run for subjects 13-18 years. A comparison of the United State and the Nigerian Youths showed that at the upper age level the United State Youth had better physical fitness status than their Nigerian counter parts, whereas at the lower age level there was not much difference.

Zuti and Corbin conducted a research on physical fitness norms for college freshmen. They took 3,000 freshmen of Kansas State University with in the age from 17.6 to 19.5 years. The tests were conducted for strength

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tests, flexibility, body composition, cardio-vascular fitness. The results appear to indicate that the college freshmen at Kansas State University were above average and the standards were appropriate for their use at national level.

Resmussen\textsuperscript{11} conducted a study on South Dakota high school activities association. For this study one school was selected to represent each region or section, the number of subjects selected from each school was in proportion to the school enrollment. The AAHPER Youth Fitness Test was administered to 1000 South Dakota boys in grade 7 through 10. Norms were established by computing every fifth percentile. The scores of South Dakota boys were compared with those of national boys only on age. He found that the median scores of South Dakota boys at all age were higher than those for national boys on all items except the pull-ups, the shuttle run and the 50 yard dash.

Busch\textsuperscript{12} conducted a study on South Dakota high school girls. One school was selected to represent each

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\textsuperscript{11}Glen L. Resmussen, "A Normative Study of the AAHPER Youth Fitness Test for Boys in Grade Seventh Through Ten in the State of South Dakota," Completed Research in Health, Physical Education and Recreation IX (1970) : 207.
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\textsuperscript{12}Judy G. Busch, "A Normative Study of the AAHPER Youth Fitness Test in Grade Seven Through Ten in the State of South Dakota," Completed Research in Health, Physical Education and Recreation. XII (1970) : 204.
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region or section and the number of students selected from each school was in proportion to the school's enrollment. 1000 South Dakota girls were selected as subjects from all the high schools from grade 7 through 10. AAHPER Youth Fitness test was administered. Norms were established by computing every fifth percentile. The scores of South Dakota girls were compared with those of National girls, using age only. The median scores of South Dakota girls were higher than those for national girls in all items except flexed-arm hand.

Beckford\textsuperscript{13} conducted a study to evaluate the physical fitness level of Navajo girls who were 14 to 16 years old. AAHPER Youth fitness test was administered on the subjects selected from seven schools of the region to measure the physical fitness level. It was also established on the basis of scores obtained from test results from these schools. These norms were compared to national norms found in the manual accompanying the AAHPER Youth fitness test. The results of this study 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 below the norms.

\textsuperscript{13}Patricia A. Beckford, "A Normative Study of the Physical Fitness of 14, 15 and 16 years Old Navajo Girls using AAHPER Youth Fitness Test," Completed Research in Health, Physical Education and Recreation. 14 (1976) : 159.
national norms on 5 items and above on the softball throw and 600-yard run-walk.

Cureton\textsuperscript{14} identified by factor analysis of six components of motor fitness, balance, flexibility, agility, strength, power and endurance for Illinois Motor Fitness Test. Two test batteries were developed, one of 14 items and the other with 18 items and requiring no apparatus. The 14 items Motor Fitness Screen test included foot and toe balance, squat stand, trunk extension, flexibility, trunk flexion, sitting extension, press-ups, man lift and letdown leg lifts, sit-ups and medicine ball put, Illinois agility run, bar or fence vault, chinning, standing broad jump and mile run, validity was 0.87 with 30 items criterion, reliability was 0.81 for situations requiring more administration. For simplicity a 7 item short screen test was proposed with score as pass or fail, to screen those poor in ability without demanding a strenuous effort for the majority of Individuals. The items included dive and roll, medicine ball put, bar vault, chinning, leg lift and sit-ups, breath holding and man-lift.

Patrick\textsuperscript{15} had constructed a motor fitness test battery for girls in lower elementary grades. The items included in this test were Clarke'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. It measured the essential components of motor fitness such as muscular strength, muscular endurance, cardiovascular endurance, flexibility, agility, balance and power.

Barnam\textsuperscript{16} studied the AAHPER Youth Fitness test battery and administered the test to 78 girls in grade VIII at Mitchell Junior High School. The girls were classified by the Neilson-Cozens Classification index and compared with national norms. The girls were above the average in sit-ups, standing broad jump, 600 yards run-walk, 50 yards dash and shuttle run but below in the soft-ball throw and modified pull-ups. The differences were attributed to their physical education programmes.


Elnashar\textsuperscript{17} conducted a study on 399 males and 311 females aged 9-18 years enrolled in physical education classes in Fayoum, Egypt and were evaluated using the 6 item AAHPER Youth fitness test. Comparison of 50\% with American norms revealed that Egyptian sample was substantially below average fitness in both sexes across all age groups. Only pull-ups in males and flexed arm in females in the early age group were above the American Standard Comparison between males and females revealed males significance superior across all ages even when age, height and weight were held constant by ANCOVA. An eight week physical fitness programme produced significant improvement in all tests in both sexes.

Taddonio\textsuperscript{18} conducted a study to compare the physical fitness of public school students from economically deprived areas with national norms. He also compared the physical fitness to public school students from high poverty area with those from low poverty area. The national norms

\textsuperscript{17}Adel M. Elnashar, "A Study of AAHPER Youth Fitness Test Results for Egyptian Male and Females," Completed Research in Health, Physical Education and Recreations (24 (1982): 58.

were developed from the 1975 national survey of youth fitness. The AAHPER youth fitness test was used as the measures of physical fitness. The subjects 90 titles 1 eligible schools, 180 class rooms and 1080 students from 12 largest standard areas in the United State were taken for this study.

When statistical analysis involved, it was found that there was no difference in the physical fitness of boys and girls represented by 1975 national norms. It was found that also there was no difference in physical fitness of boys or girls, of high poverty areas and girls from low poverty areas.

Barrow\textsuperscript{19} conducted a study to develop an easily administered test of motor ability for college men. Expert opinion was used in the validation process and eight factors of motor ability and 20 items measuring those factors were chosen. The selected tests were administered to 222 college men and in statistical analysis items reliability, objectivity, correlations with the criteria, and inter-correlations were studied. Two test batteries including one short indoor test was recommended. Test scores should

indicate performance in relation to norms which have been established for the particular groups for the classification. Such norms were provided for both battery number one and battery number two for the following two groups: (a) college men on an unclassified basis and (b) physical education major students. The test's raw scores were recorded on a score card. The raw scores were converted into 'T'-scores and weighted standard scores. The weighted standard scores were summed and a general motor ability was obtained. This score was referred to the appropriate table of norms and the students' motor ability rating was found.

Fleishman conducted a study on thirteen tests measuring eight physical fitness factors which were administered to over 20,000 students between the ages of 12-18 in 45 cities distributed throughout the United State. The results of this study provided (a) normative table by which individual programme could be evaluated by test, age and sex and (b) 'growth curves' which showed the development of the different physical proficiency components during the adolescent and sub-adult period. Finally, the

recommendations were made for batteries of tests which provided a more comprehensive and efficient coverage of physical factors.

Barrow and McGee\(^{21}\) have reported that Glover constructed a physical fitness test battery for boys and girls for primary grade children. The items included in this test were: (1) standing broad jump (to measure power and leg strength), (2) shuttle run (to measure leg strength, speed and endurance), (3) seal crawl (to measure arm and shoulder girdle strength, endurance and speed). The test measured the essential components of motor qualities of primary grade children. The norms were prepared for the four items and were also used for classifying the children into ability groups by assessing their physical fitness.

The Amateur Athletic Union of U.S. constructed A.B.C. Physical fitness and proficiency test\(^{22}\) and has published standards designed to motivate boys and girls to increase athletic sports participation for the development of physical fitness. Certificates of achievement are

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available for youngsters, who meet the standards in five required and one optional event. The requirement events were sprints, walk and run, sit-ups, and standing long jump. The optional items were push-ups, soft ball throw for distance and running high jump. The distance varied according to age groups in running and walking items, and modified pull-ups and press-ups were prescribed for girls and for boys under 10 years of age. Separate standards were prescribed for boys and girls, in two years age categories from 6 to 15 and in final grouping for 16 to 18 years old.

Johnson in his study proved that AAHPER youth fitness test is a partial indicator of both motor and cardio-respiratory fitness. He administered these two tests on 47 women physical educator major. Significant relationship was found between the 't' score total of the AAHPER test and both the distance covered and fitness categories of Cooper's 12 minutes run/walk test. Other significant relationships were found between each items of AAHPER battery and 't' score total of the battery. Five of these items i.e., 600 yard run-walk, soft ball throw, standing broad jump, shuttle run, and bent arm hang were

found to be significantly related to 12 minutes run-walk test.

Sittmann\textsuperscript{24} conducted a study to develop norms for North East Missouri State University students enrolled in the health and physical fitness concept classes. 372 male and 648 female subjects were tested for the sum of 6 skinfolds, predicted \% 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 classification was based on sex. Percentiles in increments of 5 were constructed for each variable in each classification.

Johnson\textsuperscript{25} carried out a study to gain an understanding of the inter-relationship between a student's level of physical fitness. A further purpose was to determine if Negro students differ significantly in terms of physical fitness and self-concept from white students. He found out that Negro high school boys were superior to white


boys in strength, cardio-vascular endurance, state in health, physical appearance, skills and sexuality. A greater relationship between physical fitness and self concept was found among white than among Negro high school students.

The Canadian Association of Health, Physical Education and Recreation Youth Fitness Programme\textsuperscript{26} was started in 1964. The battery consists of the following six items, for boys and girls age Group 7 to 17 years.

1. One minute speed sit-up
2. Standing broad jump
3. Shuttle run
4. The flexed arm hang
5. 50 yard run
6. 300 yard run.

Elizabeth\textsuperscript{27} prepared the norms for girls age 12, 13, 14, and 15 on the North Carolina AAHPER Tests. The

\textsuperscript{26}The Canadian Association of Health, Physical Education and Recreation, Fitness - Programme Test Manual (The Canadian Association of the Health, Physical Education and Recreation, 1966).

\textsuperscript{27}Francis Elizabeth, "North Carolina Association for Health Physical Education and Recreation, Physical Fitness: Percentile Norms for Girls of Age Groups 12, 13, 14 and 15," Research Quarterly, (1960) : 85.
norms were prepared for each of the five test items, sit-ups, side stepping, standing broad jump, modified pull-ups and squat thrusts. The sit-ups item provided differentiation on the percentile scale for each age group. The concentration of scores in the middle of the distribution for the side stepping test and the squat thrust test resulted in effective discrimination in the centre of the ranges for all age groups. The standing broad jump test provided the greatest ranges and the best differentiation of scores on the percentile scale for the age groups. The modified pull-ups test failed to differentiate the lower end of the distribution for all age groups but did not discriminate above the 20th percentile.

The AAHPERyouth fitness test project represented the first attempt by the physical education profession establish national norms. The test battery was originally developed in 1957 by a special committee of the AAHPER recreation council. The youth fitness test now consists of six items, for both boys and girls of age group of 10 to 17 years. The norms were revised and made up-to-date to make more scientific after comparing the achievement

of the youth of Great Britain, Japan, etc., with the American norms.

Falls et al.\(^\text{29}\) developed physical fitness test batteries by the factor analysis technique. Utilizing the Pearsons Product Moment, correlation, a matrix of inter-correlation among 53 variables was obtained. The data were then subjected to factor analysis, utilizing the principal axis from the preliminary solution.

Two separate rotations of the axis were carried through one orthogonal and the other oblique. For the orthogonal rotation Kaiser's Varimax criterion was used. A regression equation was developed for each isolated factor so as to make possible the estimation of a subject score on the factor items having low beta weights were dropped from the equations in order to reduce the number of variables on each extracted factor were utilised as the validity correlation, utilising the factor loadings of a variables on each extracted factor in the orthogonal solution, on the criterion coefficients. Multiple regression techniques were utilized to develop a test battery for the isolated factors.

In order to construct a scientifically designed evaluative instrument to assess the motor fitness, boys in the primary grades Dinnucl purposed 30 test items to measure muscular strength, muscular endurance, cardiovascular endurance. Power, speed, agility, flexibility and balance were administered to an incidental sample of 238 boys ages six to nine years. An inter correlational matrix was constructed for the factor analysis of the data using the principal axes method. Seven factors having values above 1000 and accounting for 67.17 per cent of the variance were isolated. The first of the two test batteries developed including the test items which loaded highest on each factor and were as follows Clerk's strength composite, McClay's endurance ratio, Well's 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 developed for more administrative feasibility, including the item which loaded high on each factor and eliminated composite scores and ratio. The items in test battery II were grip strength, 300 yards run, Well's sit and reach, Base balance on a stick length wise, Wrist flexion and extension flexibility, arm flexion and the back flexibility and modified push-ups.

Meeks administered the AAHPER youth fitness test to 264 girls at Homan Junior High school St. Ann. Missouri. The 27 girls who scored highest on the test were designed as the 'unfit group'. These groups were compared in academic achievement by grade point average, personality by the California Test of personality, and social acceptance among their peer group by a socio metric design. The physical fit students had better personalities, made better grades and were more socially accepted by their peers than the physically unfit students.

Walker, conducted research on 50 blacks and 50 white females 10th grade students were randomly selected and compared on the AAHPERD youth fitness test. The black students scored significantly higher (P 0.05) than the white students on leg power (M=44.6% and 31.2% respectively) and speed (M=57.8% and 30.1% respectively). The white students performed significantly higher than the black students on abdominal strength (M=31.5% and 27.7% respectively). No other comparisons were significant.


Alston\textsuperscript{33} made a comparison between the performance of girls on the Virginia physical fitness test, AAHPERD youth physical fitness test and North Carolina physical fitness test. He found the correlations between the Virginia and the AAHPERD test was 0.89 between AAHPERD test and the North Carolina test 0.80. The mean difference gave essentially equivalent result for assessing physical fitness of high school.

Carre\textsuperscript{34}, et al. in 1979, made a comprehensive study of the class instructional programs in physical education. It was undertaken in the province of British Columbia, in an attempt to determine the current status of both students and programs in the province. The study was initiated by the learning Assessment Branch of Ministry of Education and conducted by a research team based at the University of British Columbia. A representative sample of approximately 3,000 public school students, enrolled in grades 3, 7 and 11 was assessed. As well over 5,000 teachers, administrators and parents completed questionnaires related to instructional practices and


program considerations with respect to physical education in British Columbia. This paper outlines the basic organisation and development of the assessment and summarizes its major findings.

Hawking's physical fitness status of AR Junior state-ranked Tennis players was evaluated. The study was limited to 50 (27 boys and 23 girls) AR Junior tennis players who were ranked by the AR Junior Tennis Association. Fitness traits evaluated were: balance (Bass stepping stone test); strength (sit-ups, standing long jump, push-ups), agility (shuttle run-, endurance 600 yard run/walk) and flexibility (shoulder flexibility). Those ranked high as tennis players were compared on each of the measures with those ranked lower. Analyses were computed separately for boys and girls and also for 3 age levels within each group. No significant differences were found. When compared with national norms the students were above average on the national norms except for the shuttle run. When boys were compared with girls, 11-12 year old had no significant difference; 13-14 year old boys were significantly better than girls on endurance, and 15-16 year old boys were better than girls on endurance, speed, strength and agility.

Knuttgen\textsuperscript{36} conducted a partial determination of fitness, the youth fitness test of the American Association for Health, Physical Education and Recreation. The test were given to 319 male and 135 female Danish school children. The results of the testing were compared with the American standards which were compiled in terms of both age and the Neilso-Cozens classification index. It was found that approximately 70 per cent of the boys and 86 per cent of the girls exceeded the various American mean scores.

Craig\textsuperscript{37} compared the physical fitness levels of Canadian and South African School boys. He used CAHPER Physical Fitness Test battery. The results showed that physical fitness levels of South African high school boys were higher than these of Canadian high school boys.

Kirchner and Gliner,\textsuperscript{38} made a comparative analysis of Eugene, Oregon elementary school children using the

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Kraus-Weber test of minimum muscular fitness. The Kraus-Weber test was administered in 1956 to a random sample population of 1195 elementary school children of Eugene, Oregon. Of the children in the Eugene sample 38.1% failed in one or more of the test items. This was lower than the original Kraus's findings of 58.7%. The girls were superior to the boys at all age levels. The reason for this difference was largely due to failures in flexibility test of the 455 children who failed the test, 78.7% failed only in one item, 17.4% in two items, 2.9% in three items and 1.1% in four items. For both sexes, there was a decrease in strength failures at each increased age level, at the same time, there was an increase in flexibility failures at each increased age level.

Stein determined the reliability coefficient for all the items. He found that pull-ups, Broad jump, Sit-ups, 50-yard run and soft ball throw have high reliability coefficient ranging from 0.90 to 0.98. Shuttle run and 600 yard run / walk have reliability ranging from 0.74 to 0.83 only. All the reliability coefficient were significant beyond 0.001 level.

Hirst indicated in his study that when the total population of the motor activity programmes were considered for reading recognition, the subjects in the motor perceptual programme group made significant gain in reading recognition over the subjects in the other two motor activity programme groups.

Berger and Paradir studied the comparison of physical fitness scores of white and black seventh grade boys of similar socio-economic level. Boys (N=115) in the seventh grade of Junior High School were tested for physical fitness by the AAHPER youth fitness test. In addition, data were collected for age, height, weight and socio-economic level of each boy. Two racial groups were formed consisting of 30 white and 30 black students who were matched in age and socio-economic level. The purpose of this study was to determine whether the physical fitness of white and black students of equal socio-economic level was significantly different. There were no significant differences between the groups in age, height, weight, and socio-economic level.


The black students exceeded the white students significantly on the shuttle run, 50 yard dash, 600 yard run and composite fitness score. It was concluded that black male students of similar socio-economic level to white students in the seventh grade have a higher level of physical fitness.

An international research programme for the standardization of physical fitness test was undertaken by the International council on Health, Physical Education and Recreation (ICHPER). A committee for the standardization of Physical Fitness Test was appointed at Tokyo in 1964 to set up standards and to construct instruments for the measurement of physical fitness. A survey was conducted and a list of tentative standards was distributed to all member of the committee for review. The comments and recommendations received were discussed at the meeting held in Switzerland in August 1967.

The performance tests were developed into two parts, the basic combination of test items including the endurance run (800 metres run and walk), the 50 metres sprint pull-ups, or the flexed arm hanging (for girls), standing broad jump and grip strength. The following additional test items applied under special circumstances were short sprint, two minutes sit-ups, bench press (15 kg
press and 25-30 repetition), one minute trunk curl, vertical jump, 10 metres shuttle run and arm flexion strength.  

McQui used the Quartile limits of the American and Japanese norms as bases for comparing separately with chi-square, the performance of Philippines students whose ages were 15,16,17 and 18 and over years. Most of the shuttle run items were in the top quartile of both the American and Japanese norms for all the age groups. 15 years old Philippines boys performed better than their American counterparts on the other items. However the performance of Philippines boys in the pull-ups soft ball throw for distance and sit-ups showed considerable deficiency in arm and abdominal fitness.

Singh prepared physical fitness norms for high and higher secondary school boys of Jammu and Kashmir State. Data was collected on 4200 male students belongs to six to

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43 Aparcio McQui, "Comparison of Performances in the AAHPER Youth Fitness Tests Between the University of the Philippines Entering Freshman Students and American Japanese Boys," Completed Research, 8 (1966), 178.

eleventh classes of age 13 to 19 years subjects randomly selected and they were administered the AAHPER Youth Fitness Test. Age wise norms were prepared in terms of Percentile scale, Hull scale and T-scale.

Norms for classes ninth and tenth boys of higher secondary schools and intermediate college of Varanasi town has been prepared on eight motor fitness test. The test items included were standing Long jump, Burpee, Sit and reach, Bent knee sit ups, Push up, 50 yard dash, Nine minutes run / walk. For this purpose the number collected data from 4021 subjects and on eight motor fitness test and constructed Percentile scale, 6 sigma scale and Hull scale, on each test separately. Besides preparing the correlation it was also studied age, height, weight and all the items of motor fitness test.45

Pillai conducted a study on computation of norms for 12 minute run and walk among school boys. Data was collected on 1000 school boys belongs to sixth to tenth classes of age 13 to 15 years subjects were randomly


selected and they were administered the Cooper's 12 Minutes Run / Walk test. Age wise norms were prepared in terms of Hull scale.

Callaway\textsuperscript{47} constructed a Percentile norms for Alabama students in grade 1-9 based on both AAHPER Youth Fitness Test and AAHPER Health Related Fitness Test. The subjects were 2545 Alabama boys and girls. Norms were constructed for each test item based on age and sex. The obtained mean performance on each test items were compared with national norms.

Ikeda,\textsuperscript{48} conducted a study on a comparison of physical fitness of children in Iowa, U.S.A., and Tokyo, Japan. He reported that Tokyo children scored better than Iowan (U.S.A.) children in pull-ups (boys) bent-arm hang (girls) and the grass-hopper (a test of endurance) while the Iowan children scored better in sit-ups.
