Chapter II

REVIEW OF RELATED LITERATURE

Research scholar made sincere efforts to locate both critical and allied literature pertaining to the present study. Relevant studies reviewed from various sources of the Lakshmi Bai National institute of physical Education, Gwalior have been cited below.

Finkerberg\(^1\) conducted a study with gender, ethincity and age as the independent variables and nine physical measurements. A 3-way multivariate analysis of variance was applied. Height was the most important discriminated physical measurement with girls significantly batter than boys at age 10 and 11 ; with boys significantly batter than Girls at age 13.

Andersen LB et al.\(^2\) measured the physical activity, aerobic capacity, muscle strength, muscle endurance and flexibility in 550 boys and 710 girls, 15-19 years of age, randomly selected among adolescents attending school in Denmark. A lower level of physical activity was expected with higher age, based on earlier report from Sweden. Other types of physical activity than sports decreased with age, but no difference was found between age groups in sport activity, neither in hours per week or percentage of subjects participating in sports. Strength increased in both genders with increasing age and no difference as found in muscle endurance.

\(^1\) Finkerberg ME and Dinuccle J.M. "Age, Ethnic and Gender Differences in Physical Fitness of Middle School Children in EAST Texas "Sports Documetation Monthly Bulletin. 25:5 (May 1995);3.

A questionnaire, which was modified from the Canada Fitness Survey was distributed by mail to physically disabled, sensory impaired and chronically ill children and adolescents in Ontario Canada. Twenty nine percent of physically challenged youth were found to be sedentary and 39% were active. Activity levels were significantly related to age with a marked decline in the second decade of life. Activity levels were not significantly influenced by gender, but the data suggest that girls have lower activity levels and a faster and earlier decline in activity than boys³.

Curby⁴ examined the pattern of change in fitness scores over the course of four year in a high school physical education program. A composite score was computed using the sum of T scores values from the five individual subjects of physical test battery. Two hundred boys and two hundred thirty six girls participated during both their freshman and senior years.

Boys showed improvement on each subject and on all overall composite score, while girls only showed improvement on the sit-up test and the sit and reach test.

A cross-sectional study of physical and motor fitness measurement was undertaken by S. Chatterjee et.al.⁵ on 629 healthy Indian (Bengalee) school going boys of 9-18 years. The study brought to light gradual increase in physical and motor fitness measurements with the advancement of age except physical fitness score. Major


increments were recorded between 13 and 15 year of age. All the fitness test scores showed significant positive correlations with age, height and weight but Dash, Shuttle Run and PFI showed significantly negative relationship.

Borrow⁶ conducted a study on Korean secondary Korean students of physical fitness. The purpose of this study was to compare 1979 KSPFT and 1986 KSPFT results and to see if changes is occurring Analysis of the data supports the following conclusions -(1) A significant difference between grade level was found between boys and girls with the 12th grade students, scoring better on most item of the KSPFT, with the girls there was mixed performance between 9th and 12th grades. (2) A significant difference in gender was found on all KSPFT items. (3) A significant difference in year was found between all 1979 group and 1986 group. The 1986 group in the distance throwing and pull ups and flexed arm hang for girls. (4) A significant grade gender interaction was found in sit ups, standing long jump, 100 M. run and distance throwing (5) A significant grade by year interaction was found in the distance throwing and 800 meter run/walk. (6) A significant gender by year interaction was found in the standing broad jump and sit-ups. (7) No significant grade by gender year interaction was found in the KSPFT items.

Sohi and Hardayal Singh (1987)⁷ compared sub-age groups of boys from India and Nigeria. In case of Indian Boys of 10-14 years of age from six state were randomly taken and from specific areas, boys belonging to the same age span were from oyo


state of Nigeria. Physical growth was measured with respect to variable i.e. height and body weight. Two motor skills i.e. standing broad jump and 50 meter sprint were selected to measure motor development of the boys belonging to different age groups. The pattern of development however were mostly of similar in nature. The study also found that physical growth and development of motor ability can be seen in various prospective. The yearly increments in growth and skill performance indicate at development changes but skill changes development of the child in respect of motor ability also found at different levels.

Haley* studies the effect of age on physical performance of elementary school boys in grades one through six. Thirty subjects were randomly selected from each class. The age of subjects ranged from 5yr 9 mths to 12 yr 2 mths. Twelve tests were conducted to judge the motor performance of subjects. The study showed that (1) Motor performance score increased with age and (2) flexibility tended to decrease with age.

Elnashar⁹ conducted the 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 hang in the early age group were above the American standard. Comparison between males and females revealed males significantly superior across all ages even when age, height and weight


were held constant by ANCOVA. An eight week physical training programme produced significant improvement in all tests in both sexes.

Slaughter et. al\textsuperscript{14} studied to determine whether anthropometric dimensions accounts for a significant amount of variation in physical performance in 7-12 year old children (N=159). The Physical performance measures consisted of three tests of running (1 mile run, 600 yard dash and 50-yard dash) and two tests of jumping (standing board jump and vertical jump).

It was concluded that physical performance measures in children can be estimated with moderate success from a combination of skinfolds and circumferences along with age and height and that anthropometry may provide additional information to body size and age with respect to performance expectations of children.

Morris\textsuperscript{11} studied the relationship of age and sex to the performance of 3,4,5 and 6 year olds on seven motor performance test items. Although significant age and sex differences were found on most of the motor tests, it appears that age generally was related more to performance than was gender. Overall, change with age was fairly linear except perhaps for balancing and general tapering in improvement in the 5 to 6 year old category. On the tests of throwing and balancing, gender was as important as age, or more so, in its relationship to performance boys were superior to girls at all ages on the throwing tests ; girls were superior to boys at age 6 on the Balance test.


Gender differences of a lesser magnitude were found on the Speed run and Standing Broad Jump tests with the performance of boys generally being superior to the performance to girls. Thus it appears that gender differences in motor performance occur as early as pre school years. Interestingly except for the Balance test on all the tests the 3 and 4 year old boys performed similarly and the 5 and 6 year old boys performed similarly. For the girls there were more significant differences from year to year in performance, with the data generally indicating at least three distinct skill groups for girls from age 3 to 6.

Robson, Uppal and Bose\textsuperscript{12} conducted a study to determine the selected physical fitness components of boys and girls at different stages of elementary school. Twenty boys and twenty girls were selected at random from each grade one through five, their ages ranged from five to eleven years. The components tested were speed, shoulder strength, explosive power and agility. It was found that boys had more shoulder strength than girls in all grades. In standing broad jump there was no significant difference in performance between boys and girls of grade one and two. Boys of grades three and four were significantly superior to the girls of the same grade in standing broad jump. It was also found that boys of grade five were significantly superior to the girls of the same grade in speed and agility.

Colgan\textsuperscript{13} conducted this study to compare the AHPER youth Fitness Test and a proposed fitness test to determine the tests measured the same fitness components.


Girls and Boys (N : 326) from St. John’s English school in Waterloo, Begium (grade V-XII were evaluated on both tests.

The fitness item used were the 6 items of the AAHPER youth fitness and 3 items recommended by APAPCS commitee. Both the tests when statistically treated revealed that the AAHPER youth fitness and proposed test were measuring different components of fitness. It was concluded that AAHPER youth fitness measures “Motor Performance” while the proposed fitness test measures fitness and endurance. AAHPER youth fitness measures the same components for males and females, but age interacts with performance to a greater extent in females.

The purpose of the study of Fredrick\textsuperscript{14} was to determine motor ability differences among five age groups composed of black and white boys and girls in the performance of eight selected motor task - (1) Running 20 yards, (2) Verticle Jump, (3) Standing Broad Jump, (4) Balancing on right foot, (5) Balancing on left foot, (6) throwing for distance (7) throwing for accuracy and (8) kicking for accuracy. Subject were measured for height, weight and eye hand foot dominance. Analysis of variance was used to test for significant differences in motor performance in terms of age, sex and race and based upon the findings, conclusions were drawn : (1) Children between ages of three and one half and five and one half increase in performance as they increase in age, (2) black children are superior to white children in vertical jump, (3) boys are superior to girls in throwing and jumping events and (4) girls are superior to boys in balance activities.

Hurt\textsuperscript{15} in his study on junior high school boys and girls, he concluded that chronological age, standing height and weight are of little value as classifiers in


performing the minute sit-up, standing broad jump and 300 yard run in Manitoba’s physical and motor performance Test.

Cratty\textsuperscript{16} studied that in young children it is possible to discern difference in the manner in which they perform physical skills. Boys as young as three or four year seem to use more of their bodies when throwing than do girls of the same age; although girls usually outperform boys in motor tasks requiring precision and accuracy (hopping, drawing and the like). Young boys on the other hand, often outdo most of the girls in their class in activities requiring force and/or speed, including running for speed, throwing for distance, standing broad jumping and similar vigorous activities.

Clyde\textsuperscript{17} made a study to determine if selected differences occur in neuro-muscular power in boys and girls ranging between five through seventeen years of age and concluded that girls follow a parallel progression in power performance with the girls only, slightly below the boys until the early teenage years. At thirteen years of age the female tends to level off in power development, while the males continue to advance through age seventeen.

Hill\textsuperscript{18} made a study taking 133 male and 133 female subjects between 5 and 8 years of age. The data shows the following:

Both reaction time and movement time decreased significantly with increasing age. Both of those functions were significantly related to each item of the physical

---


\textsuperscript{17} Berry Conrid Clyde. “A Progressive Cross-Sectional Analysis of Neuro Muscular Power in Boys and Girls Five Through Seventeen Years of Age” Dissertation Abstracts International. 35 (Sept 1974); 1482.

\textsuperscript{18} James Fred Hill. “Inter-relation of the Reaction Time, Movement Time, Motor Ability and Physical Fitness of Children Five Through Eight Years Old.” Dissertation Abstracts International. 32 (Jan 1972); 3759.
fitness tests. Both correlated significantly with the motor ability criterion, but however, in combination with other variabilities considered they had no value in the prediction of motor ability.

Cratty\textsuperscript{19} stated that between the ages six and twelve years, the boys were stronger than the girls in both shoulder girdle and hip region and their scores exceeded the scores of the girls in grip strength, throwing for speed, vertical jump and standing broad jump. Sex differences in throwing, running and strength tasks seemed to become greater as late childhood is reached, with boys superior to girls.

Nagate and Hayashi (1969)\textsuperscript{20} measured physical fitness and motor ability of 17,000 school children aged 10 to 17 years in Kyoter city. The relationship between body build and motor ability was examined when children were classified into five groups according to their height, it was found that the tallest group had generally the most excellent physical fitness and motor ability both in boys and girls of every age group.

Morehouse and Miller\textsuperscript{21} have stated that the ability of boys to perform athletic activities requiring strength, speed, endurance and skill increased steadily between the age of five and twenty, with adolescence retarding but not interrupting the process. He


continued to say that athletic ability in girls reached a maximum at the age of 13 or 14 years then tended to decline so that a six years old girl usually had a better performance than a girl of 18 years of age.

Vincent\textsuperscript{22} studied the motor performance of girls from twelve through eighteen years of age. Three hundred girls in Georgia Ranging from 12 through 18 years of age and enrolled in physical education from the seventh grade through the freshman year in college were given eight motor performance test items to measure running, jumping, throwing, speed and agility. The study was under taken to test the hypothesis that girls do not improve in motor performance after age of 13.5 years, and also to investigate, whether significant difference existed in motor skills according to age grade level. Analysis of variance was used to test the significance of variation on each of the eight test items for the seven age-grade groups. Significance of differences in means for each test for each age grade was also calculated. Since ninth-grade girls, with a mean age of 14.4 years, scored highest on two items. Tenth grade girls scored highest in four tests and college girls scored higher on two tests. The hypothesis that girls generally do not evidence improvement in motor skill after the age of 13.5 was rejected.

Noble and his Colleagues\textsuperscript{23} studied the effects of age and sex on motor learning. Six hundred subjects ranging in age from 8 to 87 years were tested. The results,

\textsuperscript{22} Marilyn F. Vincent, “Motor Performance of Girls from Twelve Through Eighteen Years of Age” Research Quarterly 39 (December 1968) : 1094.

found that (1) The two sexes were quite similar in performance and rate of growth until the age of about 16 years, after which the females begin a linear decline into their 70's (2) The males continued to improve until they were 20, after which they also evidenced a decline.

Gross and Casciani\textsuperscript{24} studied more than 13,000 secondary school students who were given the seven tests reported in the AAHPER Youth Fitness Test Manual to determine the value of age, height and weight as a classification device. The IBM type 650 Magnetic Drum Data Processing Machine was used to calculate simple correlations, multiple correlations, and regression co-efficients for the ten variables of age, height and weight and the seven tests for each of the four groups of senior high school girls, junior high school girls, senior high school boys and junior high school boys. In general, age, height and weight have negligible value for classification purposes in all four groups. This study indicates that if classification indexes are used, they should be calculated for the specific selected events.

Fleishman et.al.\textsuperscript{25} studied the test that evaluated flexibility, throwing ability, strength, agility, trunk strength and the like, the physical fitness of 20,000 boys and girls between the ages of 12 and 18 years. The findings of the investigation indicated the following general trends when the data were plotted for each task by age. Most of the curves for boys showed negative acceleration; improvement was noted to a "critical" age, after which there was little improvement, grip test presented a linear

\textsuperscript{24} Elmer A. Gross and Jerome A. Casciani, "The Value of Age, Height and Weight as a Classification Device for Secondary School Students in the Seven AAHPER Youth Fitness Tests" \textit{Research Quarterly} 33 : 1 (March 1962) : 51.

relationship of age; abdominal strength test showed no increase from age of 14 to 18; and test of dynamic flexibility showed a decreased upto the age of 16 years.

The curves based on the girls scores, indicated (1) Decrease in running speed upto age 15, some improvement through 17, then a decrease to age 18 years. (2) In the softball throw and broad jump there is relatively little improvement to age 16 or 17, after which some improvement is evidenced.

Cratty\textsuperscript{26} studied the changes in motor ability traits from the ages of 6 to 12 years. It revealed that although children of this age range do not change as rapidly as children from birth to 5 years of age, there is invariably a regular improvement, with the performance curves usually assuming a rough linear relationship of age. A variety of complex tasks are able to be mastered by older children within this age range.

The boys begin to move ahead in most tasks involving simple applications of force and power during the early part of this period; the girls catch up and surpass them in late childhood, as they become influenced by hormonal changes earlier than do the boys. Throwing is generally more efficiently carried out by boys between the age of 6 and 12 years, but girls are often superior in tasks requiring agility and rhythm. Boys often excel girls in measures of running speed.

Espenschede\textsuperscript{27} conducted a comparative study of motor fitness of boys and girls for age ten and one half through fifteen and one half years. He found that before thirteen and a half years there were only slight difference between boys and girls in the agility, control strength and static balance elements of the brace test. After that

\textsuperscript{26} Bryant J. Cratty, "Perceptual And Motor Development in Infants and Children" ; 195.

boy's scores increased up to 17 years, but girls scores tended to decrease.

Jones after an intensive study of motor performance in adolescent boys concluded that height correlated very well with muscular strength and physical ability when closely associated with the variables of weight and mesomorphy.

Yadav conducted a study on school boys aging six to eleven years to cross sectionally analyze the motor fitness components in them. The boys were taken from the Central School No.1 Gwalior. Each age group contained forty-five students. He used analysis of variance and Scheffe's Test to analyze and to interpret the data. He found that the boys ranging in age between six and eleven years improved in their motor components as the age advanced, except in case of sit and reach test. He suggested that the boys of age six and seven and nine and ten can be put together in pushing and pulling activities which are determined arm shoulder strength. He further, suggested that the activities requiring running, speed and abdominal strength, the boys between age groups of eight and ten and ten and eleven can be classified together.

Physical fitness norms for Nigerian boys and girls of 11 to 18 years of age were constructed by Anyanwes. The test items included were shuttle run, push-ups of 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 mean score of the
united states and the Nigerian Youth showed that at the upper age levels, the united
states youth had better physical fitness status than their Nigerian counterpart parts, where
as at the lower age level there was not much difference.

Lauro\(^{31}\) carried out a study on motor performance of primary grade children.
Balance, flexibility and jumping were tested in two hundred and sixty Negro and
White six, seven and eight year old children.

Static balance, dynamic balance, broad jump and reach measures improved
significantly for 6-8 years. Flexibility means decreased with age, but age differences
were not significant. Sex comparison showed boys consistency superior in jumping
and girls superior in static balance and flexibility but few of the differences were
significant. Racial comparison indicated Negro children significantly better in jump
and reach and the six broad jump groupings.

Sleitz\(^{32}\) conducted research on relationship of reaction time, speed, sargent jump,
physical fitness and other variables, to success in scientific sports. 190 students were
selected and tested. On the above said variables. Their rattling score were converted
into numerical value and computed for each activities. The ‘t’ ratio shows possible
difference between the groups.

\(^{31}\) Geraldine Lauro, “Motor Performance of Primary Grade Children” Completed
Research in Health, Physical Education and Recreation 10 (1968) : 15.

\(^{32}\) Edward S. Sleitz “The Relationship of Reaction Time, Speed, Sargent Jump,
Physical Fitness and Other Variables to Success in Specific Sports. “Research Quarterly
Vol. 6 (1964) : 65.