CHAPTER II

REVIEW OF RELATED LITERATURE

An attempt was made by the author to review the literature related to the present study on the inter-relationships of varying levels of motor fitness to socio-economic status and structural variations among children in the age range of fourteen through sixteen years, in the libraries of Panjab University, Chandigarh and Lakshmibai National College of Physical Education, Gwalior. The selected studies have been abstracted in this chapter to provide the background material for this study.

Singh, R. (1987) conducted a study to investigate the relationship of somatotype components to personality traits, self-concept, reaction to frustration and selected motor ability variables among secondary school boys and made the following conclusions:

1. Shoulder strength, cardio-respiratory endurance, trunk flexibility and spine flexibility are significantly related to and contribute most significantly to endomorphy can be predicted on the basis of motor ability variables.

2. Speed, abdominal strength, explosive power and agility are not significantly related to
endomorphy.

3. Speed, abdominal strength, explosive power, agility and spine flexibility are significantly related to mesomorphy and cardio-respiratory endurance and trunk flexibility contributes most significantly to mesomorphy. Also mesomorphy can be predicted on the basis of motor ability variables.

4. Speed, explosive power and cardio-respiratory endurance are significantly related to ectomorphy, and cardio-respiratory endurance and speed contribute significantly to ectomorphy. Also, ectomorphy can be predicted on the basis of motor ability variables.

5. Agility and spine flexibility have no significant relationship to ectomorphy.

Sharma et al. (1986) studied the socio-economic differences in growth patterns for 13 anthropometric measurements and 3 derived measures in adolescent punjabi girls. The data were based on a sample of 223 girls ranging in age from 10 to 16 years, from government and public schools of Chandigarh. The study revealed that public school girls (high socio-economic status) were superior in body size traits than their counterparts from government schools (low socio-economic status).
Haley (1985) studied 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 the subjects ranged from five years, nine months to twelve years, two months. Twelve tests were conducted to judge the motor performances of the subjects. The study showed that:

i) Motor performance scores increased with age, and

ii) Flexibility tended to decrease with age.

Karabulut (1985) undertook a study to describe and compare selected physical and performance characteristics of intercollegiate football players of various socio-economic backgrounds. The physical variables chosen were: height, weight, somatotype components and percentage of body fat. The performance variables consisted of squats, bench presses, power clean, 40-yard dash, aerobic capacity and anaerobic power. There were no significant differences between offensive and defensive players when grouped as two teams. There were also no significant differences between upper, middle and lower class players on all experimental variables. The results of correlations for the entire group, the offensive and defensive players as teams, and the socio-economic classes, indicated that most of the experimental variables correlated significantly with each
Uppal and Khare (1984) undertook a study to determine the relationship of body composition to agility and speed of movement. Their conclusions were:

i) Agility and speed of movement significantly affect performance in those games and sports where speed as a motor component plays a vital role.

ii) The efficiency of agility and speed depend to a larger extent on the nervous system and the muscles. All the nerves, nerve processes and muscles have to work actively to execute quick movements and also to change the body position and direction quickly.

iii) Fat also adversely affects performance in motor activities. The weight of the inactive fat produces more work load and does not provide any benefit during active work especially in activities where quick movements are executed.

iv) To improve agility and speed, the amount of body fat should be reduced through a vigorous activity programme.

v) Agility and speed of movement have a significant negative correlation with percentage of body fat.

Taddonio (1982) conducted a study to compare the
physical fitness of public school students from economically deprived areas with national norms in the United States. The study also compared the physical fitness of public school students from high poverty areas with those from low poverty areas. The national norms were developed from the 1975 national survey of youth fitness and the AAHPER Youth Fitness Test was used as the measure of physical fitness. It was found that there was no difference in physical fitness of girls and boys from economically deprived sample and boys and girls represented by the 1975 survey. Also, there was no difference in physical fitness of boys and girls from high poverty areas and girls from low poverty areas.

Hindmarch (1981) conducted a study upon eight year old boys. He found significant difference in mean score of standing broad jump between mesomorphs and endomorphs. The mesomorphs were found to be superior in all the motor ability variables than the endomorphs.

Malik (1981), after comparing the physical fitness of students of different socio-economic groups from selected schools of Delhi, concludes that:

i) The male school students belonging to upper-middle status and lower-middle status did not differ significantly in physical fitness as revealed by the AAHPER Youth Fitness Test.
ii) The male school students belonging to upper-middle status were found to possess better abdominal strength and endurance as compared to school students belonging to lower-middle status.

Robson and associates (1978) administered the Simple Physical Fitness Test Battery to study the physical fitness of elementary school children of defence and non-defence personnel. One hundred and fifty boys and girls from grades one through five of Kendriya Vidyalaya, Gwalior were selected at random as synthesis for the study. To determine the physical fitness, the subjects were administered the Simple Physical Fitness Test Battery for Elementary School Children which was constructed at Lakshmibai National College of Physical Education, Gwalior, in the year 1977. The test battery consisting of six test items (50 yard dash, 4 x 10 metres shuttle run, sit-ups, modified pull-ups, vertical jump and 600 metres run-walk) was administered to both boys and girls. It was found that boys and girls belonging to defence personnel had shown statistically higher performance in physical fitness as compared to boys and girls of non-defence personnel.

Tuteja (1978) conducted a study to find out the comparison of physical fitness of rural and urban school students of Delhi. The subjects were 100 male students from rural area high schools and 100 male students from urban
area high schools and were of 14 to 17 years of age. Physical fitness levels of the subjects were obtained by administering the AAHPER Youth Fitness Test and the N.P.E.D. test. It was found that in AAHPER Youth Fitness Test the mean of the urban high school students was higher than the mean of the rural high school students, whereas the mean of the rural high school students was slightly higher than the mean of the urban high school students in the N.P.E.D. test. It was also found that there was no significant difference in the physical fitness level of rural and urban high school students of Delhi.

In their study, Slaughter and associates (1977) concluded that somatotype was not highly related to physical performance. However, Ponderal Index correlated better with performance scores. Somatotype components have lower correlations with running and jumping variables than body compositions or body size variables.

Luce (1976) conducted a study by comparing the selected anthropometric measurements and physical performance between Mexican-American and Anglo-American adolescent boys. Also, comparisons of body size, body structure and physical performance were made between the subjects at adjacent age levels within each individual social group. It was concluded that Anglo-American subjects were significantly taller than Mexican-American subjects. It was also concluded that excluding standing height, the
Mexican-American and Anglo-American subjects did not differ in body size and body structure and also these two races did not differ in physical performance.

Earls (1975) experimented to determine the effect of a newly organized physical education programme on physical fitness, motor skills and knowledge of physical education of 1,000 boys and girls in grades one through six from September 1970 to May 1973. All students were given the treatment programme daily. A random sample of 50% of students in grades four through six received the AAHPER Youth Fitness Test twice a year. Selected items from Minnesota Motor Performance Test were administered twice yearly to 50% students in grades two through six in the years 1971-72 and 1972-73. A random sample of 30% of the students in grades four through six were administered the AAHPER Youth Fitness Test in April every year. Physical fitness and motor skill levels improved significantly. Knowledge improved significantly for fourth grade.

Ward and associates (1975) conducted a study to compare anthropometric measurements between master-level and first-class level Olympic weight lifters and to assess if body segment proportionately contributed to performance level. A total of 39 measurements were recorded which included lengths, circumferences, age and center-of-gravity position. The results indicated for statistically significant differences between seven first-class level and
three master-class level Olympic weight lifters. The master-class weight lifters were, however, characterized as being stouter in body-type than the first-class level weight lifters.

Slooten and Harold (1974) conducted a study on the performance of selected motor co-ordination tasks by young boys and girls from six socio-economic groups and concluded that the task performance of children from the low socio-economic levels was superior to performance of children from the average and high socio-economic levels.

Brogdon (1973) undertook a study on comparing certain physical fitness and anthropometric measures for early adolescent Mexican-American and Anglo-American males. The findings revealed significant differences between the Mexican-American and Anglo-American males in certain physical fitness and anthropometric measures. The Anglo-American males were superior in performing sit-ups and the standing broad jump. The findings also revealed significantly large anthropometric measures for Anglo-American males in all but four measurements, that is, hip width, shoulder width, waist girth and chest girth were larger in Mexican-American males. The relationship between selected anthropometric measures and various physical fitness test items was significantly higher for the Mexican-American males.

Williams (1973) studied the relationship between
race and socio-economic status to the early development of motor ability in elementary school children. The subjects were given the Georgia Adaptation Children's Physical Development Scale. The study showed a significant difference between blacks and whites, and their socio-economic status levels. Further analysis of data showed that the motor ability scores in blacks increased with an increase in level of socio-economic status. However, when socio-economic levels were compared on motor performance with regard to race, non-significant differences were observed.

Lashley (1972) undertook a comparative study of Negro and Caucasian boys on the factors of personality, socio-economic status, and physical fitness. He found some significant relationship between the personality characteristics and the levels of physical fitness. He also found some significant relationship between the socio-economic status and the levels of physical fitness. He further concludes:

i) Negro junior high school boys are significantly better in pull-ups than Caucasian junior high school boys.

ii) Caucasian junior high school boys have a significantly higher socio-economic status than do the negro junior high school boys.
iii) Negro junior high school boys are significantly better in sit-ups than Caucasian junior high school boys.

iv) Caucasian junior high school boys are significantly better in 600 yard run-walk than Negro junior high school boys.

v) There is no significant difference between the two groups on the shuttle run, standing broad jump, fifty yard dash and soft ball throw.

Radcliff (1972), in fourteen year old boys, had found the highest correlations between somatotype components and strength. The motor ability variables were negatively related with endomorphy. These correlations were -.48 for physical fitness index; -.43 for standing broad jump and -.43 for total reaction time (negative connotation).

Davis (1970) identified the physical fitness level and socio-economic level of children and determined their relationship. He also found factors of each socio-economic level and physical fitness level contributing to the child's physical fitness. He concluded that social level does not contribute to the total physical fitness.

Gregor and Barnie (1970) tested fourteen year old boys who had lived in typical rural and urban settings of Prince Edward Island. Their study proved that the urban boys performed better on selected fitness tests of jumping and
sit-ups. They were inferior to rural boys in 50 yard dash and flexed arm hang.

Berger and Paradis (1969) compared the physical fitness scores of white and black seventh grade boys of similar socio-economic levels. It was concluded that black male students have a higher level of physical fitness.

Cole (1969) found that an individual's socio-economic status does not lead to the prediction of his attitudes toward physical education activities and his gross motor performance ability.

Young (1969) in her study conducted on junior girls in a metropolitan sub-urban high school, found that there were no significant differences between the socio-economic status groups with reference to their physical fitness.

Chappel (1968) conducted a study to determine the inter-relationship between selected physical variables and academic achievement. He did not find high relationship between the two. However, he suggested that greater health and vitality aids students in achieving academic potential.

Ross (1968) in his study of "Selected Life Experience and Social Factors as Related to Choice of Leisure Activities" selected thirteen social factors and concluded that students' family income and education of their fathers were two strong influencing factors on the rate of participation of the students in recreational
activities.

Stone (1968) studied the influence of race and socio-economic status on physical performance. 112 Negro and White boys, aged 10 through 12 years, were arranged into four matched groups on the basis of age and physique (Wetzel Grid) and on upper-middle and lower-middle socio-economic status. Negro boys were significantly superior in sit-ups, broad jump, 50-yard dash, shuttle run and softball throw (other items were pull-ups and 600-yard run-walk). The softball throw was the only item showing reliable difference between the social groups, with the lower-middle class being superior.

Broekhoff (1967) made an effort to investigate the relationship between physical, socio-psychological and mental characteristics of thirteen year old boys. He determined high Physical Fitness Index (PFI) boys tended to perform well in their school work, they showed interest in their academic subjects and were favorably rated by their teachers.

Herman (1967) administered the AAHPER Youth Fitness Test to 100 rural and 100 urban boys. The urban boys were superior to the rural boys and the difference was significant at .01 level. The two samples were weaker on the same components of physical fitness.

The relationship of socio-economic status and physical fitness was studied by Jasper (1967). Sixteen girls
of grade six, each from families having annual incomes below 5,000 dollars, from 5,000 to 9,999 dollars and above 10,000 dollars served as subjects. The girls were tested in flexed-arm hang, sit-ups, squat thrust, standing broad jump and 200-yard run. Analysis of variance showed no significance among the socio-economic groups.

Morton (1967), with adolescent boys as subjects, concluded that motor ability variables were not significantly related to somatotype assessment. The only variables which showed a consistently significant relationship with ectomorphy were standing broad jump, bar push-ups, and physical fitness index.

Borms (1966) compared the somatotype component ratings of high and low strength groups of boys at 10,13 and 16 years of age. Grouping for strength was based on a composite score comprising of Roger's Strength Index and Physical Fitness Index, and a mean of eleven cable-tension strength tests. It was found that the higher gross strength group at each age level was more mesomorphic than the lower strength group, and that the lower strength groups were more ectomorphic than the other group.

Richardson (1966) conducted a study to determine the relationship in college women of high and low motor ability to scholastic achievement and other variables. The purpose was to better understand students with problems in learning movements. Highly skilled students surpassed the
low skilled in status, sociability, social presence, tolerance, aptitude scores and scholastic average. They participated more in sports and associated with people who were more sports-minded.

Pontheux and Barker (1965) investigated the relationship between socio-economic status and AAHPER physical fitness scores. Subjects were 329 girls and 304 boys of ages 10, 11 and 12 years. Significant relationships were found but they did not favour any one status group in all the components of physical fitness. There were indications that lower status girls were faster, better coordinated and had more endurance but that upper status girls were stronger in arm and shoulder girdle strength, in abdominal and hip-flexer muscles and muscular explosiveness. Results indicated that lower status boys were faster and better in combined agility and speed and strength of abdominal and hip-flexer muscles.

Stockdill (1965) in his study of junior high school boys related physical fitness scores to the families' socio-economic status, size and type of occupation. 490 boys in 12 physical education classes for grades 7, 8 and 9 were given the AAHPER Youth Fitness Test. The correlation between physical fitness and socio-economic status of parents was too low for predictive purposes.

Backe (1964) utilised data from 87 male high school students to determine the relationship of selected
anthropometric and physical performance measures to performance in the running hop-step and jump. He concluded that all the variables as measured in the study showed a significant relationship with criteria beyond the .05 level of confidence.

Siewert (1963) examined the impact of different elementary school experiences upon achievement in certain aspects of physical fitness and sports skills. He listed 85 grade nine boys (27 with rural background, 20 with parochial school background and 38 with urban background) for speed, power, muscular endurance and skills in different games. Study of total scores showed that boys with rural, parochial or urban experiences did not differ in physical fitness but boys from urban and parochial school backgrounds were superior in sports skill.

Hawthorne (1961) studied the relationship of structural and functional aspects of college men by correlating the ratings in the three components of somatotypes with scores in Roger's Physical Fitness Index, vertical jump and Brace Test of Motor Ability. It was observed that a real relationship did exist between mesomorphy and Roger's Physical Fitness Index, ectomorphy and vertical jump, and endomorphy and motor ability as measured by the Brace Test.

Waterstreet (1961) studied the physical fitness and determined the rate of improvement in the test and
compared those who had elementary school physical education training with those who had no specialized instructions. A test battery consisting of push-ups, sit-ups and standing run was administered three times annually from 1959 to 1960, and achievement scales were developed and subjects showed improvement from the beginning to the end of each school year. The group with elementary physical education background was superior in all the initial tests in the freshman year. However, the group with no elementary physical education background equalled or surpassed the other group in all tests during the Sophomore years.

Espenschede (1956) 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 fifteen and half years there were only slight differences between boys and girls in the agility control, strength and static balance elements of the brace test. After that boys' scores increased up to seventeen years, but girls' scores tended to decrease.

According to Willgoose (1956) one may examine individuals ranking high or low in the components of endomorphy and ectomorphy and make a great deal about their potential motor ability by the degree of mesomorphy present in the structure.

Sills and Everett (1952) studied the relationship of somatotypes to performance in motor and strength tests.
Four hundred boys in the age group of 14 to 29 years as subjects were selected. It was found that:

i) Mesomorphs were stronger than endomorphs.

ii) Endomorphs were stronger than ectomorphs.

iii) Ectomorphs were superior to endomorphs in speed, agility and endurance.

iv) Mesomorphs were superior to both endomorphs and ectomorphs in agility, speed and endurance.

v) Excess body weight is a handicap to endomorphs in the performance of physical tests, and

vi) Considerations should be given to body types in formulating standards for achievement in strength tests and motor tests.

Jones (1949) 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.

Cureton and Hunsicker (1941) reported that certain somatotypes are related to specific types of athletic performance. Findings with a sample of Springfield college men consisting primarily of athletes and a few endomorphs were as follows:-
i) Mesomorphs received the highest score in athletic performance involving strength and power.

ii) Ectomorphs performed better in the Brace Test, a test which requires body balance, flexibility and agility.

iii) Mesomorphs and meso-endomorphs did better in aquatic events.

iv) Ectomorphs received the lowest score in the McCurdy Larsen Organic Efficiency Test.

Metheny (1939) studied the differences between Negro and White athletes in respect of their body measurements. Forty seven direct and derived anthropometric measurements on 51 American Negro and 51 White male college students were analyzed and compared with the findings of other investigators in the field. The Negroes were found to exceed the Whites in weight, arm length, elbow width, leg length, lower leg length, knee width, shoulder breadth, chest depth and width, neck girth, all relative to stature. While the Whites exceeded Negroes in sitting height, total fat, hip width, and ilium width. Certain differences in foot proportions, chest confirmation and pelvic proportions were also noted.

Gesell (1928) indicates that there seems to be very little relationship between malnutrition and motor ability. Children with rickets seem to do about as well on
motor tests as do children without rickets. Even though the limited data do not indicate that malnutrition is a significant factor in the development of motor skills, general observations and common sense lead one to believe that if one hopes to have good general health and to do well in physical activities he should be adequately nourished.