The purpose of this study was to prepare norms for seven to 11-year-old girls of Panjab and Chandigarh on motor ability tests, and to study how development in motor abilities take place in this age group.

Further, an attempt was made to study the difference in motor ability patterns between rural and urban girls belonging to the same age group.

The study was titled:

"A Cross-sectional Study of Motor Abilities of Girls in the Age Group of 7 to 11 years".

Objectives of the study:

The study had the following objectives:

1) To find out how motor abilities such as speed, strength, flexibility and endurance develop among girls in the age group seven to 11 years.
ii) To construct norms of motor abilities for the said population.

iii) To help coaches in selecting talent suitable for specific sports events.

iv) To provide a tool for the assessment of motor abilities of girls in this age group.

v) To help teachers and coaches in designing learning material according to the needs of children.

vi) To find out how residence and age interact in the development process of motor abilities.

Hypotheses:

The hypotheses formulated for the study were as follows:

i) There will be significant differences between the selected older girls and the younger girls in speed, i.e. the older girls will be better in speed than the younger girls.

ii) The older girls will be better in strength than the younger girls.
iii) The younger girls will be better in flexibility than the older girls.

iv) The older girls will be better in agility than the younger girls.

v) The older girls will be better in endurance than younger girls.

vi) There will be an improvement in the motor ability with an increase in age.

vii) There will be significant independent effect of age, residence and age plus residence on the studied motor ability variables.

METHODOLOGY

Design of the study

Motor abilities of a cross-section of children from the age of seven to 11 were studied. This status study was also focused on the construction of norms for the motor abilities of girls at the primary school level. Further, the study aimed at comparing the motor fitness of rural girls with that of girls from urban areas. The study, therefore, was status descriptive and cross-sectional in design.
Sample

The sample consisted of 2455 girls from the State of Panjab and the Union Territory of Chandigarh, studying in primary schools. Apart from the Union Territory of Chandigarh, five districts from the State of Punjab were selected randomly for the collection of data. As many as 409 subjects from each of five districts of Punjab and from Chandigarh were given tests for motor abilities. An equal number of subjects from urban and rural areas were taken, i.e. 1227 from urban areas and 1228 from rural areas. These subjects were in the seven-11 age group. There were five age steps with an interval of one year between each step. As many as 409 subjects were chosen for each age level, thus making a total of 2455 for the five age levels.

An equal number of schools in the urban and rural areas were selected randomly for the purpose of this study. A total of 84 schools of Panjab and Chandigarh were randomly selected for data collection.

Selection of tests:

The following tests were used to measure motor abilities:

1) A 50 metre sprint was used to measure speed.
ii) The standing broad jump was selected to measure the explosive power of the legs.

iii) A 4 x 9 metre shuttle run was selected to assess agility.

iv) The forward-bend-and-reach test was used to measure trunk flexibility.

v) A 600-metre run-walk test was used to measure the endurance of the subjects.

vi) A cricket ball throw was used to measure arm and shoulder strength.

vii) Bent-knee sit-ups (number in 30 seconds) were used to assess abdominal strength.

Collection of data:

In the course of collecting data, the seven tests were conducted to each subject one after the other, separately. Teachers in physical education of the respective schools helped in the administration of the tests.

The subjects were given instructions regarding each test, which was followed by a demonstration to show them exactly how they should take the test. Groups (25 subjects in each group) rotated to undergo two different tests,
followed by two more tests until all the tests were completed.

**Statistical design:**

The data were statistically analysed by, firstly, determining the nature of the distribution of the scores through calculating the values of skewness and kurtosis for all the motor ability variables and all the age groups of the girls. A percentile scale was used to compute norms for the different age groups. The mean and standard deviations were calculated for all the variables. The analysis of variance, $(2 \times 5)$ ANOVA, was used to test the hypotheses of the study. Wherever 'F' was found significant, the t-test was carried out to determine the direction of the differences. The confidence level to test the hypotheses was set at the .05 level.

**Results**

As regards the results of the analyses undertaken, the skewness computed revealed that the data were skewed positively on certain tests, while in others these were skewed negatively. In the group of seven-year-old girls the data were skewed positively in two test items, while in five tests these were negatively skewed. In the case of eight-year-old girls, the data were positively skewed in
three tests while in four tests the skewness was found negative. For the age group of nin-year-olds the data were skewed positively in three test items and negatively in four. In the case of 10-year-old girls, the data were positively skewed in two tests while in five tests these were negatively skewed. For the group of 11-year-olds the data were positively skewed in one test item and negative in six.

The percentile norms indicated that there was significant improvement in performance levels from seven to 11 years on all the variables except trunk flexibility.

The results of the 2x5 ANOVA revealed that there were interaction effects of residence, age and residence plus age on certain motor ability variables, while on the other variables the effects were found independent, i.e. the studied factors did not interact to influence the results.

CONCLUSIONS

On the basis of the data collected and the analyses of these, the following conclusions could be drawn:

(1) The percentile norms worked out for the motor ability variables were found suitable to assess the motor fitness levels of primary school girls of Panjab and Chandigarh between the ages seven and 11.
The two groups based on residence (urban and rural) were found significantly different from each other against such motor ability variables as speed, trunk flexibility, agility, endurance and arm and shoulder strength, whereas there were no significant differences against the variables leg explosive power and abdominal strength.

The five age steps were found significantly different from each other against all the motor ability variables, except trunk flexibility. This suggested that performance in the investigated motor ability variables improved at each age step from age seven to age 11 in the case of girls. On the trunk flexibility variable, however, the scores consistently and significantly decreased at eight and nine years of age, while no pattern emerged in the case of 10 and 11-year-old girls on this variable.

The subjects with an urban residence were significantly superior to the rural subjects in speed and endurance tests. But the urban group was significantly better than the rural group in trunk flexibility, agility and arm and shoulder strength variables. But the results were not found to be significant when the urban and rural girls were compared for explosive power and abdominal strength.

The results of the interaction between residence and age revealed significantly independent effects against
the variables speed, arm and shoulder strength and abdominal strength, but the results were not found to be significant for the variables leg explosive power, trunk flexibility, agility and endurance, suggesting that there is a high degree of interaction between residence and age in the latter group of motor ability variables.

(6) The results of residence (urban and rural) revealed an independent effect on the dependent variables speed, trunk flexibility, agility, endurance and arm and shoulder strength. But the results were not found significant for the variables leg explosive power and abdominal strength suggesting the interaction effects of rural and urban residence.

(7) The results of age revealed that there was a significantly independent effect of age in all the variables except trunk flexibility.

(8) The results of the residence x age interaction revealed significant independent effect on the variables speed, arm and shoulder strength and abdominal strength. However, the results were not found significant for the variables leg explosive power, trunk flexibility, agility and endurance, indicating that there was notable interaction between residence and age in these motor fitness variables.
On the basis of the data collected, the analyses undertaken and the results obtained thereby, we could enumerate a few implications that seem to emerge from our findings:

(1) The norms developed through this study should provide an opportunity to physical education teachers to assess the motor fitness levels of their students and to determine their relative fitness status. Periodic tests could be conducted to assess, on the basis of these norms, the effectiveness of physical education programmes with regard to motor development.

(2) The study revealed that the performance levels of rural students on some of the motor ability variables was lower as compared to their urban counterparts. Therefore, teachers and coaches working in rural areas must pay special attention to developing those motor ability variables in which the girls are lagging behind their urban counterparts.

(3) Special programmes should be designed to improve the motor fitness of urban girls in those variables in which they are lagging behind the rural girls.
The study of motor fitness programmes should be based on age to suit each age group. The development needs of each age step should be kept in view and the programmes structured accordingly.

Special programmes should be worked out to promote the various motor fitness variables among girls seven to 11 years old.

A State-level competition programme should be planned to intensify the interest of children in motor development.

SUGGESTIONS FOR FURTHER RESEARCH

Finally, on the basis of our findings and their implications, a few suggestions could be made to further enrich our understanding of the motor abilities of growing children:

1. A similar study can be conducted on boys between the ages seven and 11.
2. The possibility of conducting similar studies in other States of the country could be considered.
3. Motor ability may be studied by using tests other than the ones which have been used in this study.
4. Longitudinal studies ought to be conducted to discover the diverse development patterns in motor abilities.