CHAPTER-V

SUMMARY, CONCLUSION AND RECOMMENDATION

This chapter contains summary of the study and conclusions drawn on the basis of the findings of the study. Besides, recommendations for future research works also been mentioned in subsequent paragraphs.

5.1 Summary

In modern age, there has been a lot of interest about the growth pattern, motor development as well as cognitive development. The researcher and the others were more aware of the need for accurate information about growth process, motor development and cognitive development and its influence on the growing child. In this study, growth pattern refers to an increase in height, weight and body mass index.

Growth patterns of children are generally controlled by genetic make-up as well as environmental factors, which have impact on proper growth of a child. All youngsters follow a general growth pattern; however, each child has its unique growth characteristics. Some children are physically advanced in compare to their chronological age. Whereas, others are slow mature. ‘Normal growth’ considered when the basic growth characteristics fall within the broad range of population mean values.

The development of all human beings follows a similar pattern on a sequence. These sequential patterns are mainly of two types: cephalo-caudal and proximo-distal.

The childhood growth can be affected by the influencing factors such as nutrition, physical activity, illness and life-style.

The speed of physical growth is rapid after the birth, and then slows up to 24 months. Growth then proceeds at a slower rate until shortly before puberty,
when a period of rapid growth occurs. Growth is not uniform in rate and timing across all body parts.

Genetic factors play a major role in determining the growth rate and particularly the changes in proportion characteristics. Poor nutrition and frequent injury and disease can reduce the individual’s adult stature, but the best environment cannot be a cause for stature than is determined by heredity.

The second major area was motor development. It has an important role in learning process as well as movement. Motor learning takes place into three phases:

i) **Cognitive phase** - the learner creates a mental image in the brain of the motor development,

ii) **Associate phase** – the learner takes into account all the parts of a movement and assimilate the whole thing, and

iii) **Autonomous phase** – performance of the motor movement without any hindrance.

Cognitive phase takes less time and the autonomous phase takes more time than the remaining of the motor learning phases.

All voluntary movement involves an element of perceptual awareness resulting from sensory stimulation. The role of perception and its importance in motor learning and performance has now been given due importance. The word ‘perception’ means awareness or interpretation of information, which one gathers through various sense organs with stored information that leads to a modified response pattern. A person’s ability to receive and distinguish among available causes in a given situation enables him to perform more skillfully. If the person cannot concentrate on a sport event or even among simple form of movement, his/her performance would be hampering.

The term ‘perceptual motor’, where the first part of the term signifies the dependence of voluntary movement activity on some form of sensory information
and the second part of the term as ‘motor’ indicates that the motion in holistic
development of one’s perceptual abilities in regard to movement.

It has recognized that the quality of one’s movement performance depends
on the accuracy of perception and the ability to interpret these perceptions into a
series of coordinated movement acts. All voluntary movement involves the use of
one or more sensory modalities to a greater or lesser degree, depending on the
movement act to be performed. The movement activities for children play an
important role in their physical fitness as well as in movement skill learning. They
learn to move with efficiency, control, enjoyment and enhancing their learning for
interrelated process of motor, cognitive and affective domains of development of
children. Among various motor characteristics of childhood changes during each
of the periods are the rate of growth, the development of the movement abilities,
and motor control. ‘Motor ability’ is concerned with the capacity to move the
body with efficiency. It is measured by a combination of factors like speed,
agility, power, co-ordination, balance and simple reaction time.

The term cognitive ability also has an important role to predict cognitive
level of an individual through the measurement of ‘kinesthetic perception’, which
is the ability to perceive the position, effort and movement of parts of the body or
the entire body during muscular action. The word ‘kinesthesia’ or ‘kinesthetic’ is
an inner neuromuscular feeling of where the body parts are found and how to
move them by recalling previous experiences.

Kinesthetic receptors are of three types: spray-type receptors, pressure-
types receptors, and GTO-type receptors. These receptors send information
directly to the brain about movement occurring in joints.

Kinesthetic feedback is another source of information about performance
during movement activities. Kinesthetic perception has an important role in motor
learning and it involves mental as well as physical aspects of learning that is
characterized to improve in general population during their growth and
development period.
At the perceptual level, collection of kinesthetic sensory data throughout the body are integrated into distinct kinesthetic perceptual system senses, those are - i) balance and equilibrium, ii) self-motion, iii) limb position, iv) limb movement and v) force.

In rural society, the characteristics are dominance of agriculture related occupation, the closeness of the people in the natural human environment, relatively spare population, less territorial occupation, social mobility of the population etc. Besides, the urban areas are all municipal towns, cantonments and other areas being administrated by local bodies such as town communities, union committees, etc.

Motor development of children differs due to cultural differences, which may encourage motor skills. Cultural factors help to improve voluntary movements. For enhancing motor development it is necessary that with any skill, to develop it, one needs to explore it, to experience it and to practice it.

Cognitive development can be measured by cognitive ability of a person. Cognitive ability can be measured by stimulus discrimination and perceptual ability. The influencing factors of cognitive development are (i) child level factors, (ii) mother level factors, (iii) household level factors, and (iv) area level deprivation.

In cognitive development, the mechanisms are (i) genetic and biological, (ii) food, physical activity, love and (iii) daily experiences as environmental side that can influence every body’s brain development. Cognitive development follows intra-individual and inter-individual differences.

With this backdrop, the statement of the problem was “A Comparative Study on Urban and Rural Children in Respect of Growth Pattern, Motor and Cognitive Development”.

The purpose of the study was to compare growth pattern, motor and cognitive development of 10-12 years children of urban and rural areas.
For the way of systematic investigation, the researcher compelled to delimit the study by – (i) the locality of the subject, (ii) the sample size, (iii) the age group, and (iv) the selected variables of the study.

The limitations of the study were the differences in (i) testing date and time (ii) socio-economic status of the subjects (iii) parents education level and (iv) motivation, interest and attitude of the subjects, those were beyond the control of the researcher.

The researcher found about review of related literature on growth patterns, on motor and cognitive ability and the major findings are mentioned in the forthcoming paragraphs.

**Growth Pattern**

The researcher observed that growth rate slow in infancy. It was opined that growth in height as slower and relatively gradual from 3-years to 12-years. Then adolescent spurt begins. Investigator observed that urban children become significantly taller and heavier than rural children in the 6-13 years of age. It was suggested that between the ages of four and six years there is a period of disproportionate growth which would possible have an effect on performance. Another view was that from childhood to adolescent height and weight should relatively stable. Investigators reported that physical growth signifies physiological and anatomical changes within bodily structures. The researchers were found that physical growth tests showed high levels of inter ages. As the boys advance in age, their means on all measures were indexes increased and decreased at different ages. Researchers found that most of the variables displayed a near liner growth pattern.

Investigators found that the peak height of Belgian boys and girls. The values were more than 5.5 cm per year for boys and more 3.5 cm per year of for girls. They found that the height of the tribal boys was higher than that of the non-tribal boys. They also found that height and weight increased at approximately same rate and girls were significantly taller and heavier than boys during adolescence. American girls and boys were taller and heavier than Brazilian boys
and girls. The researcher observed that there were significant differences obtained for weight, no difference in height, and no relationship was found between any growth pattern motor ability. But it was found that, body weight increased steadily from age 5 to 12.

**Motor Ability**

Investigators found that in the ages of 6-11 years the performances of boys were increased with the age advances in the variables like speed, agility, power and co-ordination.

The other researchers observed that in the ages 5-11 years in these variables that the motor performance scores generally indicate an improvement with successive years for both sexes. It was found in the ages of 6-12 years in children with the higher age groups comparatively superior than those of lower age groups in the variables of power and speed. Investigators also found a general role in the variables of speed, agility, balance, power and co-ordination that the performance increases with age throughout childhood and improve in performance up to varying ages.

Investigator found in the ages of 6-17 years in respect of gender differences that the performance of boys was superior to girls by age. It also observed that boys continue to improve through 17 years while girls leveled off and decreased in performance after age 15 years. Researchers investigated in the ages of 1-6 years among the variables of speed, agility, power, balance and reaction time and observed that there was difference in those abilities according to age.

Study revealed in 6-12 years old children generally become progressively more flexible in each year until they reached adolescence. They noted that the level of performance was positively related to age and that all age levels constantly improve with training. Researchers found that a significant difference between gender levels among speed, power, agility, balance and reaction time. The performance scores formed curve-linear relationships for these variables.

In a study conducted on rural and urban children of 6-13 years of age in the Southern Mexico and better performance was observed by urban children than rural children in speed and power with varied age and sex.
Study on Nigerian boys and girls of ages 11-18 years revealed on the variables of speed, agility, power that performance of the boys improved from the lower to the upper age levels and vice-versa for girls.

Comparison made between 12 – 19 years Belgian children of rural and urban areas that urban group tend to be taller and performed better in motor ability tests and showed a greater amount of sports involvement in compare to rural group.

Investigation conducted on Negro and White boys of 10-12 years of age that observed that Negro boys were significantly superior in speed, agility, power and co-ordination.

**a) On cognitive ability**

Test on reaction time in the ages of 2.5 - 11.5 years observed to decrease in reaction time with age. Boys and girls in the 7-9 years age range had no differences in kinesthesia revealed from a study. The question of relationship between performance of motor activity and cognitive activity has always been a controversial issue. The researchers agreed that kinesthetic sensitivity develops early, and suggested that it remains stable until fifty, then it deteriorates.

An investigator conducted a study on 240 rural and urban children to compare the cognitive development and the findings revealed that the cognitive development of urban school children were more, compared with the rural school children in Africa.

With the help of the systematic process of research, the investigator followed the processes step by step. This part dealt with the subject, criterion measure, tools and techniques used for data collection, administration of tests for data collection and the last one was statistical application for data analysis related to this study.

A total of 600 hundred children, aged 10-12 years were selected for the study. The equal numbers of subjects were selected from rural and urban areas. There were three age groups i.e., 10, 11 and 12 years for both boys and girls of rural and urban areas each. The number of subjects for each group was 50.
Subjects were selected randomly from six rural schools and from eight urban schools.

Criteria measures of the study were growth pattern, motor ability and cognitive ability. The ‘growth pattern’ was measured by the variables such height, weight and BMI. Motor ability was measured by speed, agility, power, balance, co-ordination and reaction time. ‘Cognitive ability’ was measured by choice reaction time (CRT) and three kinesthetic perception tests.

Height and weight was measured by standard procedure. BMI was derived from height and weight ratio. Motor ability was measured by appropriate test related to each motor ability variables of the study. SRT and CRT were measured by electronic reaction timer. ‘Kinesthetic perception’ was assessed by Distance Perception Jump (DPJ), Pedesterial Kinesthetic Tests of Size (PKTS) and Vertical Linear Space Test (VLST). The researcher used suitable equipments for the purpose of data collection and maintained proper procedure for test administration for data collection. Statistical techniques for the data analysis were done using SPSS software to come into definite conclusion for satisfying the purpose of the study.

In growth pattern parameter there were three variables, namely- height, weight and BMI. The researcher found that significant difference existed in height, weight and BMI in respect of age of the subjects. It was also observed that the growth variables of children increased in magnitude almost linear fashion, with advancements of age.

The study findings revealed that the female subjects were better in growth pattern variables than the male subjects with regard to height and weight but no significant difference between two genders was observed in BMI.

It is revealed from the findings of the study that the urban children were better than the rural children in weight and BMI, for height no significant difference existed with respect of the locality of the subjects.

In motor ability parameter there were six variables, namely- speed, agility, power, co-ordination, balance and Simple Reaction Time (SRT).
In case of speed, the difference among the three age groups was statistically significant according to age; and the difference existed with 10-year to 11-year and 12-year groups, but not between 11-year and 12-year groups. Difference in speed was observed according to gender and locality, with the better performance went in favour of boys group and rural group than their respective counterpart.

For agility, there was no difference according to age group of the subjects; however, the agility difference was statistically significant between boys and girls group as well as urban and rural groups. Boys were better than girls group as well as rural group was better than urban group in agility.

In case of power, the difference among the three groups was statistically significant according age and gender but not in locality. Two consecutive age groups did differ in power and the higher was the age of the subjects the greater was the ability in power. Boys were having more power than the girls.

So far the co-ordination ability is concerned the difference was statistically significant according to age, gender and locality of the subjects. According to age the difference in co-ordination was not significant between 10-year and 11-year groups but in the remaining two age group comparisons the difference in coordinative ability was statistically significant. Boys group and rural group were superior in co-ordination than their respective comparing group.

To balance, the differences were statistically significant according to age, gender and locality of the subjects. Significant difference existed in balance with 10-year group to 11-year and 12-year group but not between 11-year and 12-year groups. Boys group and urban group were observed to be better in balance ability than their other group.

In cognitive ability parameters there were two variables, namely-perception and CRT. Perceptual ability was measured by three tests, i.e., DPJ, PKTS and VLST.

In DPJ, difference was statistically significant according to gender, but for age and locality variables, the difference was not statistically significant. Boys group had better ability in DPJ.
In CRT, the difference was not significant in respect of age. However, for gender the male children had better performance than the female children, and urban children were better than their rural counterpart.

For PKTS and VLST, the subjects had no significant difference according to either of the variables of age, gender and locality.

To CRT, the differences were statistically significant according to age, gender and locality. According to age, CRT found to be reduced and thereby it indicating that CRT improved significantly with advancement of age. Girls group and urban group were better in CRT than the remaining comparing group.

5.2. Conclusion

The study was confined to the growth pattern, motor and cognitive development of rural and urban children of 10-12 years of age. On the basis of findings of the study and the study of other researchers following conclusions were drawn.

On Growth Pattern

i) Height, weight and BMI of rural and urban children did differ according to their age. The higher was the age the better was the status in all the three growth pattern variables.

ii) Height and weight, but not the BMI, had difference between the boys and girls. Girls were superior to boys in height and weight.

iii) Weight and BMI, but not height, did differ between rural and urban children. However, the urban children were superior to their rural counterpart in height and BMI.

On Motor Ability

i) Among the six motor ability variables, namely- speed, agility, power, coordination, balance and SRT, the subjects did differ according to their age in all the variables except in SRT. The difference in motor ability variables
was of three kinds. In power the higher was the age of subjects the greater was the power. In speed, agility and balance difference observed between ten-year and eleven-year groups: and ten-year and twelve-year groups but not between eleven-year and twelve-year groups. In co-ordination, difference observed according to age between eleven-year and twelve-year groups; and ten-year and twelve-year groups but not with eleven-year group.

ii) In respect of gender, male children had better ability in all the six motor ability variables than the female children.

iii) According to the locality of subject, difference existed in all the motor ability variables except power. Rural children were observed to be superior to the urban children in speed, agility and balance. However, the urban children were superior in co-ordination and SRT than their rural counterparts.

**On Cognitive Ability**

i) Difference existed among the subjects of the study in CRT according to their age. However, in the remaining three cognitive ability variables related to kinesthetic perception of distance, size and linear space- there was no difference among the subjects of three age groups.

ii) According to gender, difference observed to exist in CRT and depth perception but not in the remaining cases. Boys perform better in DPJ than the girls, and for CRT it was vice-versa.

iii) In respect of locality difference existed between rural and urban subjects only in CRT but not in any of the three kinesthetic perception measures. Urban subjects were better in CRT than the rural subject of the study.
5.3. Recommendation

During the course of this study the following thoughts came in the mind of the researcher as the recommendations for further study.

i) A longitudinal study with proper supervision is needed to obtain more accurate result for this kind of study.

ii) Further research is needed so that the influence of other factors, if any, can be investigated.

iii) Similar study may be conducted on other age groups.

iv) Parental background, socio-cultural factors may be included to observed their influence in growth pattern, motor and cognitive ability of this age group.

v) Growth pattern, motor and cognitive ability of the particular age group of this study can be conducted considering other variables of those parameters with different statistical interpretations.

vi) Similar study may be conducted with locality classification like hill, plane and other geographical variations.

vii) Similar study would have been conducted on the children of different population.

viii) The growth pattern, motor development and cognitive development of children would be further investigated on basis of different cultural background.