CHAPTER - VI
DISCUSSION
6. **DISCUSSION:**

Analysis of the data, presented in the previous chapter, has yielded some observations which is now discussed in this chapter. The discussions of the results have been presented in three different segments, viz., (i) Nutritional status, (ii) Physical Development and (iii) Educational Achievement.

(i) **Nutritional Status:**

Diet plays a crucial role in the management of malnutrition. The quality and adequacy of the diet, children receive, ultimately are reflected in the rate of their physical and mental development, nutrition being the major factor responsible for the maintenance of health and physical fitness. The researcher, through the present study, attempted to assess the nutritional status of children and the causes responsible for nutritional deprivation. Here, the assessment of the nutritional status of children is based on only calorie intake of the children because India is a cereal based country. Study of Bailur (1972, p.256) stated that dietary surveys conducted under the auspices of ICMR at Delhi, Calcutta, Bombay, Puna, Hyderabad and Vellore, have indicated that 92% of children had calorie deficiency. Though protein intake was adequate in amount, but was utilized for energy production in the body, so inadequacy of protein was due to primary calorie deficiency, not deficiency of protein. It can, thus, be emphasized that the major problem was deficiency of calories, and not of proteins.
In the present study, nutritional status of urban, rural and slum children were assessed for four age groups of children of both the sexes and the responsible factors were also studied to find their influence on the calorie status.

The researcher observed that there was apparent difference between calorie intake of urban, rural and slum children as shown in Table 1 where the calorie intake of urban children was better (1462.87) than rural (1353.22) and on the other hand, rural children had good calorie intake than slum children (1313.08). The researcher also tried to find out the factors responsible for inadequate calorie intake. Firstly, it was observed that parents' education was more (27.97) in urban areas than rural (11.31) and slum (11.27) areas as found from Table 1 which might be one of the factors for their calorie intake. The present study is similar to the earlier study of Devdas et al. (1972, p.32) where it was found that parents of urban samples had better educational status than rural and slum for which they being more nutrition conscious would have provided good nutrition to their children. This can be better proved by discussing the correlation between parents' education and calorie intake of the children. As evident from Table 10 the relation was positive in case of both the urban and rural areas but no significant correlation was found in case of slum children.

Secondly, it was observed from Table 1 that economic conditions varied from area to area. Urban families had higher income per month (Rs.1838.74p) than rural (Rs.758.47p) and slum (Rs.438.56p) families which, undoubtedly, is another cause for difference in calorie intake. As found
from the result that income of the family was positively and significantly correlated with calorie intake at 0.05 level in case of urban and rural areas and at 0.01 level for slum areas. Such findings were also reported by Devdas et. al. (1972 p.32).

Thirdly, number of children in the family might be one of the causes. As shown in the result number of children in urban families were less (2.7) than rural (3.69) and slum (3.76) families. It was also found that its relation with calorie status was inverse but significant at 0.05 level for urban and rural families and at 0.01 level for slum families.

Number of members in the family might be one of the factors responsible for nutritional status. As found from Table 1 slum families had higher number of members (6.34) than urban (5.47) and rural (4.9). From the correlation Table 10 it is found that in case of slum areas calorie status was significantly related at 0.01 level with number of members. The study of Shah (1979, p.69) was agreed to this finding that size of the family affected nutritional status. But in case of other two areas it was not significant because it might be due to better economic condition and parents' education.

As per ICMR recommendation none of the age groups had adequate calorie intake as has been observed from the results of the present study. It was also found that nutritional status was positively related with parents' education but significantly at 0.01 level for 7,8 and 9 years of children as shown in Table 11. Income of the families was also related significantly at 0.01 level with calorie status of children. Number of children in the family was also related inversely with significant relation
at 0.01 level in respect to all age groups, but not significant in case of 6 years of children. Number of members might be one of the factors, where both were inversely related but significant at 0.01 level in case of 7 years and 8 years of children.

In case of both the sexes calorie difference was there (boys-1389.01 and girls - 1356.9) and all the above factors were also found to be correlated with calorie intake. As the result shows all the factors were significantly related at 0.01 level with nutritional status in case of both the sexes. But number of members in the family was related with significance at 0.05 level with calorie status in case of girls. The less calorie intake by girls might be due to the comparative weakness of mothers for boys.

Results of the two way analysis of variance, across age and area dimensions, also reveal that differences of calorie intake of children across both the dimensions were very largely significant with F ratio of 53.64 (P<0.001) and 31.742 (P<0.001) respectively. However, interactional effect was found to be non-significant with F value of 1.263. This points out that across age and area the groups of children studied were significantly different from each other, but the difference of the differences was not large enough to be significant.

To summarize, the present study revealed that the urban children were consuming more calories than the children of rural and slum areas, though not according to the ICMR recommendations. On the other hand, rural children were taking more calories than their counterparts of slum areas. Hence, it provides a continuum of urban-rural-slum paradigm, for undertaking comparative analysis of nutritional deficiencies.
Intercorrelation between calorie intake and parents' education, age and sex, compared separately in all the three areas showed significantly positive relationship in all the cases except for parents' education and for 6 years of age groups. This becomes quite obvious that nutritional status of the children is affected by the educational background of the parents in both urban and rural areas, though this does not hold good for the slum dwellers. Further examination of the result of ANOVA, pertaining to parents' education, reveals that there was a very large difference in parents' education when three areas were compared. Thus, it is further proved that parents' education plays a very vital role in determining the nutritional status of a child irrespective of place of living. However, in slum areas parents' education seems to be playing a low key role.

When the family income was correlated with nutritional status the results indicated high positive relationship which proves that better the income of the family better is the calorie status of the child. This was the condition in all the dimensions i.e., area, age and sex. When number of children and members in the family were correlated negative relationships were obtained. This means more the number of children in the family or more the number of members in the family, more the child is deprived of nutritious food. Further examination of results of ANOVA indicated that across residential areas there were wide differences in income of the families and a significant interaction was found between areas and age groups, which means that income was obviously determining the developmental sequence of the child. Similarly, ANOVA result pertaining
to number of children in the family showed wide differences, in different areas. So as the case was for number of members in the family. However, the total number of family members was found to be significantly interacting with developmental sequence of the child.

(ii) Physical Development:

In the present study the anthropometric indices were used to assess the growth which influences the developmental status of the children. It is recommended for evaluating the biological impact of Public Health programmes in developing countries (Keller, et.al. 1976, p.591). A number of simple and composite anthropometric indices have been introduced by various workers, those most frequently mentioned being based on height, weight, head circumference, mid-arm circumference, triceps and subscapular skinfold (Keller, et.al. 1976 p.591; Jelliffe, 1966).

Growth in children are extremely sensitive index of the general state of health. The growth standards are likely to exhibit considerable regional variations in a country like India due to several factors, e.g., socio-economic status, dietary, educational, cultural and available medical facilities (Katiyar, et.al., 1978, p.301).

In the present study growth characteristics (anthropometric indices) have been studied for urban, rural and slum areas of four age groups of both the sexes to assess the extent of differences induced by nutritional as well environmental factor and which include economic status and other responsible factors.
Height:

Present project showed that children in urban areas have achieved better heights (123.35 cms.) than rural (117.96 cms.) and slum children (116.72 cms.) whereas children of rural areas were slightly taller than slum areas. There could be several reasons for this difference. Firstly, it is established that nutrition plays a significant role in growth and development which follows definite sequence of development under optimum nutritional condition. Udani (1963) in this context has revealed that physical growth in Bombay city was severely affected from birth to school age by various factors, most important of which was nutrition (p.593). The present observation is also in accordance with the earlier works of Topp et.al. (1972, p.154), Rao (1961, p.26) and Vijayaraghavan (1971, p.653). Here it has been observed that the pattern of growth and physical status though genetically determined but are strongly influenced by the dietary intake as found from the correlation between height and calorie intake of the child which was significant at 0.01 level. Study of Banik (1982, p.172) indicated that children with good nutrition in well privileged community were taller and heavier, from which it appeared that nutritional factor plays greater role than genetic factor in influencing growth rate of children which is similar to the findings of the present study. Here the urban children were getting better nutrition than rural and slum children and for which they achieved better heights.

Secondly, it has been found that parents' educational status would be the cause behind urban children's good height which was ultimately related to their nutritional intake. As discussed previously parents'
education of urban children was better than rural and slum areas. As such education might be the cause for which parents of urban children had better nutritional knowledge than others. Similar observation has been made by Devdas, et.al. (1973, p.29). Observation of the present study has shown positive correlation between parents’ education and height of the children.

Thirdly, heights of the children might be affected due to their family income as observed in the study. It was found from the result that family income of urban children were better than that of rural and slum children. It was also found that the correlation between income of the families and height of children was positive. Earlier studies of Easwaran, et.al. (1972, p.143), Sen (1976) and Martin (1973, p.770) and Udani (1963, p.611) have also concluded that socio-economic condition had good correlation with growth pattern.

Fourthly, it was examined to what extent number of children and members in the family have affected the height growth pattern of the children. It was evident that urban families had less number of children than rural and slum families. It was found from the inverse relationship between number of children and heights that more the children in the family less is the chance of their growth in terms of height. This finding agreed to the earlier observation of Easwaran et.al. (1972, p.143).

Number of family members must be now seen in perspective as to how it has affected heights of children. As found at the beginning number of members in urban families was more than rural families. But the slum families have highest number of members as compared to the
other two. Inverse relation between height and number of the members proved that family size is a responsible factors for growth in height. However, for urban children family size did not show positive correlation with height which might be due to better education of the parents and economic conditions.

Physical space provided at home for each member might be another reason in hampering height pattern. The findings show that urban children had more physical space in their homes than rural and slum children. It was proved by a positive correlation in respect to rural and slum children, but this had no significant effect on urban children as overcrowding was not a phenomenon. Overcrowding at home leads to chronic illness which interferes the growth of the child, and thus it stood true for slum and rural children.

But while considering different age groups, above discussed factors might be responsible for their low height achievement. As depicted from the observation, heights of none of the age groups were satisfactory (6 years - 110.39 cms., 7 years - 116.91 cms., 8 years - 122 cms., and 9 years - 128.37 cms.) as per the recommendation of ICMR and the reason behind this low achievement in height might be due to above factors. As the finding shows, the correlation between parents' education and height was significant at 0.01 level in case of all age groups except 9 years children. Income of the family might be another factor as found from the findings, where the relation was significant at 0.01 level for all age groups but at 0.05 level for 9 years of children. Number of children could be also a factor in hampering heights of children as it
was related inversely with height. And number of members was also related inversely in case of all the age groups but significantly for 8 years of children showing its effect on height. But in case of children of 9 years no such effect was found. The factors discussed earlier might also be the causes for low heights which were again proved by their correlation with heights of both the sexes. As the observation proves all the said factors were significantly related with heights of both the sexes; in case of girls, number of members in the family was not related significantly with their heights.

Besides the factors discussed above, other factors might be responsible for low height of the children, such as heredity and lack of proper nutrition in the early age either in combination or separately. The linear growth is affected due to chronic malnutrition during the early age. As Katiyar (1978, p.303) had stated, it was a fact that body length showed only stationary tendency and not the loss, as was the case with weight.

Weight:

Weight of the children of urban areas was better (21.68 kgs.) when compared with rural (19.37 kgs.) and slum (18.44 kgs.) children. There might be several reasons for this difference. Firstly, nutritional status is the most important factor that affects the weight of the child. In the present study very few children had attained normal weight for age. As the study of Banik (1982, p.172) has stated, weight is more retarded than height as former is more likely to be influenced by nutritional factor and later by genetic factor. So when the study was conducted
most of the children might have fell short of their calorie intake just a few days before the study which might have immediate effect on their weights. The positive correlation between weight and calorie intake which was significant at 0.01 level, proved that calorie intake had affected the weight gain of the children. Studies of Udani, Topp et.al., Rao and Vijayaraghavan have also agreed to this finding.

Secondly, parents' educational status might be the factor responsible for weight gain. As found from the Table - 1 it was proved that urban children, due to better educational status of their parents, had better weight gain than children of other two areas which could be proved by their positive correlations. This finding is in accordance with the study of Devdas (1973, p.29). Parents' education imparts better knowledge about the nutrition and sharing of it amongst the members irrespective of the head of the family or male sex.

Thirdly, income of the family might be another factor affecting weight gain of the children. As found from the study, income of urban families were more than others. There was also significant positive correlation between these two variables. This observation gives similar findings to that of Udani, Easwaran et.al., Sen and Martin.

Fourthly, failure in weight gain might be due to number of children as discussed in height. It was also found that rural and slum families were having more number of children than urban families for which required amount of food could not be provided to the rural and slum children. In these two areas social customs prevail for which head of
the family takes a larger share than rest of the members. This was obvious from its inverse relation with weight which was significant at 0.01 level for slum and rural areas and at 0.05 level for urban areas.

Number of members in the family might have affected weight gain of the children. The result shows that slum families had more members than rural and urban families. And there was an inverse relationship between weight gain and number of members which was significant at 0.01 level. But it might be due to better economic condition and educational status of the parents, inspite of more members in urban families weight of the urban children did not get much hampered compared to rural and slum children.

Physical space provided at homes per member also showed its effect on weight gain. There were differences in the space provided for each member in three areas. This had significant correlation at 0.05 level with weight gain in case of rural and slum areas but showed no such relation for urban areas. Due to better environmental condition of urban children this variable might not have affected their weight gain.

When discussing about different age groups a growth trend was found in all age groups (6 years - 16.38 kgs., 7 years - 18.96 kgs., 8 years - 20.72 kgs. and 9 years - 23.27 kgs.), but not satisfactory as per ICMR recommendation. Above discussed factors might be responsible for this low weight gain. Calorie intake was most important factor as none of the age groups was taking adequate calorie in their food. The weight gain was correlated with calorie intake significantly at 0.01 level. Weight failure might be due to parents' educational status where the
correlation was positive in respect to all the age groups but significant at 0.01 level for 7 years, 8 years and 9 years of children. Income of the family might be another cause which also significantly correlated at 0.01 level with weights of all age groups. Weight gain was correlated inversely with number of children in the family which was significant at 0.01 level for 8 years and 9 years of children but at 0.05 level in 7 years of children. Number of members might be explained as a factor because of its inverse correlation with weight gain which was significant at 0.05 level for 7 years of children. Number of members might be explained as a factor for its inverse correlation with weight gain that was significant at 0.05 level in case of 7 years of children and at 0.01 level for 8 years of children. Weight gain might also be affected by the physical space provided at the home which was evident from its positive correlation with weight. This correlation was significant at 0.05 level for 6 years children but at 0.01 level in respect to other age groups.

In case of both the sexes none of the sexes had attained satisfactory mean weight (boys 20.23 kgs., girls 19.42 kgs.). All the discussed factors were found to be responsible for affecting the weights of both the sexes. It was also found that all the factors, such as calorie and other environmental factors were related significantly at 0.01 level with their weights, but for girls, the correlation between weight and number of members was not significant.
Mid-upper arm circumference (mac)

From the growth indicators mac is one that might be affected by calorie status of the child. It is found that mean mac of urban children was better (15.65 cms.) than rural (14.98 cms.) and slum samples (14.36 cms.). This difference occurred perhaps be due to, firstly, nutritional intake of the children as proved by the positive correlation between calorie intake and mac which was significant at 0.01 level.

Secondly, as discussed in height and weight, mac might be affected by parents' education of the samples which was higher in urban area than rural and slum areas. This factor was correlated with mac to prove its effect on mac where correlations were positive.

Thirdly, economic condition of the family might be one of the factors affecting mac development. As found from the result urban samples were from well-to-do families than rural and slum. Correlation between mac and income of the families was positive and significant at 0.01 level for slum areas which gave a good support to prove that this factor is responsible for retarded mac development.

Fourthly, number of children in the family was highest in slum areas which might be another reason. To support this reason, correlation showed an inverse relation between these two variables.

Number of members in the family was also an added factor. Families of slum areas comprised of more members. Even though urban families had more members in their families than rural families, mac development was not impaired due to better economic condition and proper knowledge
regarding nutritional requirement for child's growth and development, as compared to rural and slum areas.

Fifthly, physical space provided for each member might have affected the growth and development. As discussed in height and weight, rooms per member ratio was better in case of urban areas than other two areas. But it did not have any effect on mac of urban samples while it showed positive correlation for rural and slum areas.

As evident from the present study, in case of different age-groups there was a gradual rise in mac, with every advancing year but there was very little difference in mac between each age group which corroborates with observations made by Vijayaraghavan (1974, p.995). But the development of mac was not satisfactory, which might be due to lack of food or other environmental causes. To support the dietary effect on mac the observation shows its significant correlation at 0.01 level. Mac was positively related with parents' education and significantly at 0.05 level for 7 years of children and at 0.01 level for 8 years and 9 years of children which proves that parents' education had also its impact. It was correlated with economic condition to show its effect on physical development and it was found that there was positive relation between those two. There was an inverse relationship between mac and number of children which was significant at 0.05 level in case of 8 years of children. It was also seen that mac was inversely related with number of members in the family indicating the impact of number of members on mac development. Lastly, mac was positively correlated with rooms
per member ratio in respect to all age groups and significantly at 0.01 level for 9 years of children, but for 8 years of children no such impact was found.

But while taking the case of sex, girls showed less progress in mac development, than boys. Development of mac might also be affected by the same factors. It was observed that parents' education and income of the families might have their effects on mac, as there were positive correlation between them, but significant with income of the families at 0.01 level in case of boys. Similarly, it inversely related with number of children and members in the family but significantly with number of children in case of boys only. And the relationship between mac and rooms per member ratio for both the sexes was positive.

**Chest circumference:**

Chest circumference is another indicator of physical growth and development. It was also apparently observed that there was not much difference in chest circumference of urban (55.36 cms), rural (55.22 cms) and slum (54.40 cms) children. When it was statistically analysed to find out the influence of discussed factors, firstly, it was found out that calorie intake and chest circumference were significantly related at 0.01 level.

Secondly, it was observed that chest circumference was positively related with parents' education in urban and rural areas, but no such relation was found in slum areas which proved that slum children's chest development did not get affected by their parents' education.
Thirdly, income might be another factor affecting chest development of the children. As found from the results urban families were well-to-do families than rural and slum families. So the correlation between income and chest circumference was positive in case of urban and slum areas positively significant at 0.05 level for rural areas (Table-17).

Fourthly, number of children and members had also inverse relation with chest circumference but significant at 0.05 level for slum areas, but number of members did not prove any such relation with chest development in case of urban children as discussed previously that more number of members in urban families had no effect on their developmental pattern.

Fifthly, similar result was obtained in urban areas with the factor room per member ratio. But the relation was positive at 0.05 level in respect to rural areas and slum areas.

In different age groups chest circumference showed progressive tendency with each older age. This also showed a good correlation with calorie intake which was significant at 0.01 level. Its correlation with parents' education was positive for 7 years of children, 8 years and in 9 years of children but for 6 years of children parents' education did not show such effect. Income of the family might be the factor for proper development as shown by its positive correlation with chest circumference but it was significant at 0.05 level in case of years of the children. Number of children and members in the family were negatively related with chest circumference and was significant at 0.05 level in regard to 8 years children and these two factors did not show any such
effect on 6 years of children. Number of rooms per member might be another reason affecting growth which was proved from its positive relation with chest circumference, but had no effect on 6 years of children.

Amongst both the sexes girls' chest circumference was less (54.71 cms.) than boys (55.21 cms.) as shown in Table 6. As discussed above, besides calorie status other environmental factors might have affected the growth of chest circumference. Calorie intake effect was significant on the chest growth of both the sexes. It was found that development of chest circumference was positively related with parents' education, income of the family and rooms per member ratio. It related inversely with number of children in regard to both the sexes but significantly at 0.01 level in respect to boys. Number of members had also inverse relation with chest circumference in case of boys and significant at 0.01 level. The larger chest circumference of boys than girls could be due to boys taking more calories than girls and/or more involvement of boys in play and exercise which was related to the expansion of chest and ultimately an increase in chest circumference.

Head circumference:

Head circumference of the child was also studied to support the information on health status. As found from the result urban children had better head circumference (50.11 cms.) than rural (49.72 cms.) and slum (49.73 cms.) children. Here also those discussed factors might be responsible for the growth of the head as seen from their correlation.
with head circumference. Firstly, nutritional intake of urban children was more than others. So to find out its effect on head circumference correlation between both head circumference and calorie intake was computed where relation was positive and significant at 0.01 level in case of all the three areas proving its effect on head circumference.

Secondly, other environmental factor like parents' education related to head circumference development in respect to urban and rural areas but for slum areas no such effect was found. This proved that parents' education might be one of the factors responsible for head circumference development for urban and rural children but not for slum children where some other factors might have played significant roles.

Thirdly, income of the families might cause difference in head circumference of children of three areas. To show its effect it was correlated with head circumference which showed positive relation for both urban and slum children, but for rural children no such effect was found.

Fourthly, number of children was correlated to show its effect on head circumference development which showed that in case of urban and slum children the relation was inverse and for urban areas it was significant at 0.05 level. But in respect to rural areas, this relation was not found.

Number of members in the family also related inversely with the head circumference development which proved its effect on head circumference of the children.
Fifthly, rooms per member ratio might be another reason that showed its effect on head circumference development. In case of each area this variable showed its positive relation with head circumference.

When difference between age groups were studied it was seen that there was an increased growth trend of head circumference in each older age group. This development showed significant correlation with calorie intake. This positive correlation proved that calorie intake had impact on head circumference development. Parents' educational status also showed its positive relation with head circumference in case of all age groups, but not for 6 years of children which proved that it had very little effect on some children's head circumference. Income of the families might have also effect on head circumference development where it was positively related with head circumference in case of 7 years and 8 years of children but no such effect found in regard to 6 years and 9 years of children. Number of children and members were also inversely related with head circumference development to prove their effect on head circumference and for 7 years children number of members had significant effect at 0.05 level on head circumference. As another factor, rooms per member also showed its effect on head circumference development of all children but for 7 years of children the relation was significant at 0.01 level.

Sex difference was also there with regard to head circumference. As discussed above, all those factors might be responsible for the development of head circumference of children, one of which was calorie intake which was significantly related at 0.01 level with head circumference.
Other factors, might also be responsible for the head circumference development of children.

Skinfold thickness over tricep:

Skinfold thickness over tricep was also selected to find out the health status of children. Urban children had far better triceps (9.91 mms.) than rural (7.45 mms.) and slum children (6.16 mms). The reasons behind might be same as discussed in case of other indicators.

Firstly, calorie difference might be the causative factor which showed positive correlations with tricep in regard to all the three areas and significant at 0.01 level for urban and slum areas.

Secondly, amongst the environmental factors, parents' education was related positively with tricep development and significantly at 0.01 level in respect to urban areas.

Thirdly, economic condition of the family in rural areas did not show any such effect but in case of urban and slum children it was positively related and significantly at 0.05 level in respect to urban areas.

Fourthly, number of children and members in the family also showed its effect on tricep thickness where the correlations were inverse which proved its effect on tricep.

Fifthly, rooms per members ratio was positively related, with tricep for all the three areas which also showed its effect on tricep development.

It was observed that there was a difference in tricep in different age groups depicting growth tendency in every growing age. So to see the effect of discussed factors it was also related to calorie intake and
other environmental factors. Calorie status was significantly correlated with tricep at 0.01 level for all age groups. It was also found that parents' education and economic status of the children were significantly related at 0.01 level with tricep in case of all age groups. There was also inverse relationship between number of children and tricep and significant at 0.01 level in case of all age groups showing that this factor might have affected tricep development of children much. And number of members in the family was also related inversely with tricep for the age groups of 6 years, 8 years and 9 years and significantly at 0.01 level in case of 7 years children. Lastly, tricep related significantly with physical space provided per member at the home for all the age groups.

While coming to sex differences, it shows that triceps of both the sexes were almost same. Status of tricep might be dependant on calorie status and other factor as studied in this project. As Table 15 shows, tricep was significantly related at 0.01 level with calorie intake. Table 23 shows all other factors affected tricep of boys significantly at 0.01 level, but in case of girls (Table 24) the correlation of tricep with parents' education, economic condition and rooms per member ratio was significant at 0.01 level but its correlation with number of children and members in the family was significant at 0.05 level.

**Deficiency diseases:**

This indicator was also selected to assess the physical development status. In slum areas children had maximum number of deficiency diseases (1.87) and rural samples had 1.06 and urban samples had 0.21 number of deficiency diseases. But the reason behind this difference might be due to previously discussed factors.
Firstly, calorie intake had significant but inverse relation with presence of deficiency diseases. One of the major reasons was lack of proper food, resistance of body leading to occurrence of more number of deficiency diseases in case of slum children than rural and lastly in urban children.

Secondly, parents' education might be one of the causes as discussed in other cases, because due to lack of education, parents might not have knowledge regarding health, hygiene and nutrition for which their children get affected and this was proved by its inverse relation with number of deficiency diseases present in the children.

Thirdly, as another important factor, economic status of the family was also inversely related with presence of deficiency diseases and significantly at 0.05 level for urban and slum areas. Due to poor economic condition the parents might not be able to provide proper nutrition and care to their children which would have led to a condition that was more prone to disease.

Fourthly, number of children and members in the family had direct relation with appearance of deficiency diseases as found from Tables 16 to 18, which was significant at 0.01 level for slum areas. Large families are responsible for poor health care of the youngsters.

Fifthly, it was also found that rooms per member ratio might be one of the causes. Its relation with deficiency disease was inverse and significant at 0.05 level for slum areas which might be the leading cause of unhealthy condition of the children.
In case of different age groups also this difference was found, i.e., 6 years and 7 years children had more number of clinical manifestations of deficiency diseases than others, which might be due to improper care given to lower age groups in the families. It was quite evident that calorie status was the main reason for the presence of deficiency diseases as discussed previously. Other discussed factors might have affected the resistance of the children as found from Tables 19 to 22. Parents' education, income of the family, rooms per member ratio were inversely related with presence of deficiency diseases which were significant at 0.01 level. Number of children and members were directly related with deficiency diseases which proved to be one of the causes. These relations were significant at 0.01 level for 6 years, 7 years and 9 years.

In Table 6 it is given that girls had less number of deficiency diseases (0.97) than boys (1.13). The cause might be the same as discussed above for the presence of deficiency diseases. Firstly, calorie status as shown in Table 15 was inversely but significantly related in case of both the sexes. As was observed in case of other indicators here also those factors were significantly related at 0.01 level with deficiency diseases for both the sexes, as given in Tables 23 and 24, but number of children and members and rooms per member in case of girls were not significantly related. Even if the same attention had given to the boys and girls still boys showed more deficiency diseases and infection as boys were exposed to more unhygienic conditions outside the home.
Haemoglobin (Hb.)

Hb level in blood was also assessed as an indicator of health status. From Table 4 it was found that urban children had high level of Hb. (89.45%) than rural (86.69%) and slum children (81.01%). This difference might also be due to those other factors. Firstly, to support this finding, it was correlated significantly with calorie intake in regard to rural and slum areas. Because of low calorie intake, compared to urban and rural children, Hb. level might be low in slum children.

Secondly, parents' education might have the effect on Hb. level because of lack of knowledge, parents might not be able to provide required food to their children. This became more authentic when the correlation showed positive and significant relation at 0.05 level in case of rural areas.

Thirdly, economic condition might be another reason that was proved from Tables 16 to 18 where both were positively related and significant in case of rural and slum children which showed that due to low economic status enough food could not be provided, that affected their Hb. level.

Fourthly, number of children and members were inversely related with level of Hb. as shown from Tables 16 to 18 and significantly at 0.01 level in respect to slum areas from which it was concluded that size of the family had also its effect on Hb. level.

Fifthly, number of rooms per member might be another reason which was positively related with Hb. percentage of the children of all the three areas and significantly at 0.01 level for slum and at 0.05 level
for rural children. Leaving aside the above discussed factors, other factors like environmental sanitation which pertains to helminthic infestation and infections of slum children as well as rural children might be leading to low Hb. content.

When age groups' health status were discussed it was found that Hb. level in blood was lowest for 6 years of children (86.67%), 7 years and 9 years had also low level (85.89% and 85.33% respectively) and 8 years of children had highest level of Hb. (87.14%). The causes of such low level of Hb. might be due to low calorie intake, compared to their age group or other environmental factors. Correlation between calorie intake and Hb. were significant at 0.01 level in case of all age groups. Parents' education might be another factor affecting level of Hb., because lack of knowledge might be responsible for improper food intake that ultimately led to low Hb. in blood. Tables 19 to 22 show correlation of parents education, income and rooms per member ratio with Hb. level, which were significant at 0.01 level which proved that those were also important factors. Number of children and members were also important factors, both were inversely related with Hb. level.

Sex difference was very minor which was almost equal. Girls' Hb. level was 85.75% and of boys 85.69% as shown in Table 6. But it was found that none of the sex had satisfactory Hb. level, which might be due to their low food intake, and proved that calorie status was one of the important factors. Parents' education, income of the families, number of children and members in the family and rooms per member
ratio, all were significantly related with Hb level at 0.01 level in case of boys and for girls the correlation was significant at 0.01 level with parents' education and number of children.

So from the above discussion it is clear that besides the discussed factors, other factors might be responsible for physical development. Urban children's physical development was better because they were enlightened in all aspects, exposed to good care, nutrition, health and hygiene, and other facilities in the society which were not available in slum and rural areas. Amongst the different age groups, upper age groups were getting more care than youngsters.

Amongst both the sexes boys were getting better care than girls because parents had more preference for male children than female as male members would be the supporters of the families for which they had to take better food to do more strenous and outside works. Sometimes, might be due to girls' demand for less food than their requirements because of their consciousness of health status. Girls suffered less because they were more conscious of their personal hygiene and for lack of such concern and parental care boys suffered more.

To summarize, all the anthropometric indices of physical development showed very highly expected correlation with calorie intake of children of three areas. This proved that the growth and development of the child is fully dependant upon his/her nutritional status. Better the nutritional status of a child less prone he/she is towards deficiency diseases. Now, so far as other environmental factors are concerned these indices very
largely showed expected result in respect of parents' education except one deviation for chest circumference and head circumference of the slum children, and deficiency diseases of rural children. Such deviations can be ignored without much penetration into its hidden causes and hence, it can be very conclusively stated that parents' education, irrespective of its direct or indirect effect, determines the healthy development of a child.

Similarly, for income of the family it was observed that in all the three areas income of the family showed an expected significant influence on physical development indicators except one deviation for head circumference and tricep for rural children which may not be so very important to prevent to conclude that economic condition of the family is an important factor to assess the growth and development of the child.

So far as size of the family (number of children and members) is concerned it was found that development of the child is affected by the size of the family as observed from the findings where expected results have been obtained except in four cases where there was deviations, such as, head circumference in respect to number of children and haemoglobin level in rural children and height and chest circumference for urban children in respect of number of members in the family. These four deviations particularly because of their erratic occurrence, can now be ignored and it can be very conclusively stated that family size significantly influence a healthy development of a child.
When physical space provided for each member in the family was interpreted, it is seen that in majority of the cases it was proved that this factor has also direct or indirect effect on the growth and development of the child. But a few deviations were found in case of urban children for height, weight, mac and chest circumference which show a definite trend that urban children are unaffected by the provision of the physical space. However, this observation may be analysed from another point of view that since urban children have adequate living space their development automatically remains disjointed from the space problem. When the relationship between physical development indicators and, calorie intake and environmental factors, were analysed across four different age groups out of 192 correlation of co-efficients there were only 12 deviations which occurred quite irregularly. Hence it is rather easier to accept these deviations as chance occurrences than indicators of any definite relationship. On the basis of the general trend it can be very assertively concluded that calorie intake and other responsible variables influence the physical development of the child throughout the developmental span, at least from 6 years to 9 years of age. Now, let it be seen what feature emerges if the above relationship is analysed across boy vs. girl dimensions. Here again, the result is in the expected dimension even without a single deviation. Thus, it is rather easier to draw a definite conclusion that physical development indicators have a very strong relationship with calorie intake and environmental factors both for boys and girls.
(iii) Educational Achievement:

As much physical development is a vital aspect of a child's growth, his/her educational achievements are important to make him/her a fit and healthy individual to cope in the future in the ever changing social structure. Hence, a thorough analysis of the child’s educational achievement, across area, age and sex became quite pertinent. The researcher adopted two indices, viz., TEI and AA as measures for ascertaining levels of educational attainments.

Teacher Evaluating Inventory (TEI):

It was found that the slum children were rated poorly (28.74) by their teachers than rural (33.96) and urban children (47.80). This might be due to several reasons discussed previously. Firstly, calorie intake might have greater impact on the children's achievement in the school. As Table 25 shows TEI was positively related with calorie status in case of all the three areas significantly at 0.01 level which proved that calorie intake of the children was of greatest importance with regard to their personal academic qualities. This finding corroborates with the reports of Pollitt (1984, p.7), Cabak and Najdanvic (1965 p.p.532-34), Cravioto et.al. (1966 p.319-72), Devdas et.al. (1972, p.32) and Devdas (1973, p.29).

Secondly, parents' education might be considered as another factor affecting children's evaluation by their teachers. As discussed earlier parents' education in urban areas was higher than rural and slum areas and to see the effect of this difference on the evaluation of children, a correlation was computed and from the result it was found that parents' educational status was related significantly in case of urban and rural children at 0.01 level.
Thirdly, income of the family might be one of the factors causing low rating of rural and slum children. As stated earlier income of the urban families was higher than rural and slum families for which children of urban areas might be getting better facilities and scopes to improve their potentialities than rural and slum children. This was proved by a correlation between these two variables given in Tables 28, 29 and 30, which show positive trend in respect to all the areas but significant relation at 0.01 level in both urban and rural children.

Fourthly, children's evaluation might also be dependant on number of children in the family. Urban families had less children than rural and slum, which had its impact on students' evaluation, where both were inversely related but for slum children it was significant at 0.01 level.

Number of members in the family was also related with evaluation of children. Number of members in slum families were more than rural and urban families, but even though number of members in urban families were more than rural families it did not show its effect as much as in rural and slum families. It might be because of parents' better educational status and economic condition. To show its relation with children's evaluation, correlations were obtained which indicated that there was an inverse relationship and it was significant at 0.05 level for slum children.

Fifthly, students' academic potentialities might have been affected by the educational facilities at their homes. Educational facilities had three factors, such as, parental interest in child's study, physical facilities provided at home for study, and educational provisions at home for study.
All these facilities in urban families had got more scores than families of rural and slum children. These were also correlated with evaluation of the children to prove their impact. These were related significantly at 0.01 level, except for rural and slum families where parental interest did not show any such significant effect on evaluation of children.

There was very little difference between the evaluation scores of children of different age groups but only in 6 years of children evaluation scores were comparatively less which might be due to their inadequate calorie intake or other factors as discussed earlier. It was also found that in all the age groups students' evaluation scores were correlated significantly at 0.01 level proving its impact on children's potentialities to which studies of Pollitt, Cabak and Najdanvic, Cravioto et al., Devdas, et al., and Devadas support. Other factors might be responsible for poor scores of the children of rural and slum areas as discussed earlier. In Tables 31, 32, 33 and 34 it is given that all factors were significantly related at 0.01, and 0.05 level with students' evaluation proving their impact. Only in case of 6 years, 8 years and 9 years the correlations were not significant between students' evaluation and number of members in the family.

In regard to both the sexes, it was also found that boys were rated better (36.13) than girls (33.91). This might be due to the above said factors. As Table 27 shows calorie status was significantly related at 0.01 level with students' evaluation scores for both the sexes. Other environmental factors earlier discussed in case of different areas, were also significantly related at 0.01 level which might be responsible for poor scores; only in case of girls number of members was not significantly related.
Academic Achievement (AA):

Academic achievement is another indicator of educational status of the children. As has been observed, academic achievement of urban children were better (51.60) than rural (35.03) and slum children (28.37). There might be several explanations as discussed in case of teacher evaluating inventory (TEI). Firstly, nutritional status might have its impact on the academic achievement of the children. Calorie intake of urban children was more than others. To see its effect, it was correlated with academic achievement where significant correlation at 0.01 level was found, which showed an impact of the calorie on academic performance in the classroom which corroborates with studies of Pollitt, Cabak and Najdanvic, Cravioto et.al., Devadas and Devdas et.al.

Secondly, as parents' education might have its effect on academic achievement as found from Table 1 that in urban areas parents were more educated than the parents of rural and slum children. To show its effect on school marks, it was related with examination marks, given in Tables 28, 29 and 30 where there was positive correlation for all areas but in case of urban area it was significant at 0.01 level. The study of Rath et.al. (1979) agrees to this finding.

Thirdly, income of the family might be explained as another factor for achievement in examination. Urban children were from richer families than rural and slum children. So this factor was correlated with examination marks to see its effect and it was found that in all the families there were positive correlations but in urban families this relation was significant at 0.01 level.
Studies of Pollitt, Cabak and Najdanvic, Cravioto, Devdas et al. are in agreement with the present findings. Also studies of Ghosh et al. (1979, pp. 161-62), Mohanty et al. (1988 p. 44), Devdas et al. (1972) and Devdas (1973) showed that children of well-to-do families showed better academic records than children from low economic status.

Fourthly, number of children in the family might be another factor which was less in urban families than rural and slum families. It was found from Tables 28, 29 and 30 that there were inverse relations between school marks and number of children in the family which were significant at 0.05 level for urban and slum areas but not for rural area.

Number of members in the family was also correlated with school performance to find out its effect. Number of members in the slum families were more than rural and urban families. Number of members and examination marks were inversely related and significantly at 0.05 level in case of urban areas.

Fifthly, educational facilities had direct effect on learning ability. In case of all areas, these factors were related positively and significantly but for rural families parental interest in the study of children did not show any such effect and in slum area this did not show any significant effect. To this finding reports of Rath et al. and Chowdhury (p. 152) agree.

In regard to different age groups also these factors were related with academic achievement to see their effects. As Tables 31 to 34 show, for 6 years children all the factors might be strongly affecting
as there were significant correlations at 0.01 level in case of all the factors except in case of number of members in the family. For 7 years of age also all the factors were related with academic achievement at 0.01 level showing their effects. In case of 8 years of children all the factors were significantly related at 0.01 level with academic achievement but in case of number of members no significant effect was found and number of children in the family also related at 0.05 level with academic achievement. There were also significant relationships between these factors and academic achievement at 0.01 level but in case of number of children and members in the family no significant relationships were established.

Both the sexes were also studied to find out the effect of these factors on examination marks. It was observed that all those factors were significantly related at 0.01 level with academic achievement but in case of girls number of members in the family did not show significant relation.

Correlation between the variables of physical development and educational achievement was also found to show the effect of health status on the educational achievement of the children which are presented from Tables 37 to 45.

In case of all the three areas it was found that the variables of physical development (height, weight, mac, tricep, chest and head circumference, deficiency diseases and haemoglobin) were correlated with TEI and AA. Except the correlation of tricep with TEI and tricep with AA, all others were significantly correlated.
In regard to different age groups also it was found that the variables of both physical development and educational achievement were correlated significantly. But for 6 years of age the correlations were not significant in case of chest and head circumference with the variables of educational achievement. For 7 years of children, chest circumference was not related significantly with AA. And for 8 years of children also chest circumference was not significantly correlated with the variables of educational achievement. In respect to 9 years of children, head circumference did not show any such relation.

In case of both the sexes also all the variables of physical development were related significantly with the variables of educational achievement.

So from the above correlation results it was found that the physical development status of the children had its impact on their educational achievement. The reports of Haldar (1969, pp.155-157) Guthrie and Tyag (1968) and Popkin and Lim (1976) agree to the present findings.

In summary, from the analysis of the results corresponding to educational achievement of the children, of both the sexes, belonging to three areas and across four age groups, it has been revealed that calorie intake and other environmental factors, which have strong influence over child's nutritional status and physical development, go a long way to influence child's educational achievement significantly.

Comparison of two educational attainment indices across three different areas have shown expected results, with hardly any deviation,
which strongly establishes that educational attainment of the children are very much influenced by their nutrition, parental as well as home environmental conditions.

Similarly, influence of aforesaid factors were critically analysed across four age groups which further indicated that throughout the developmental span, at least from 6 to 9 years of age, such influences persist. Furthermore, comparision in boy vs. girl dimension, also indicated very expected result establishing the fact that the influence of nutrition, parental and home environment factors remains equally well for both boys and girls.

Besides analysing the above dimensions, researcher went a step ahead to find out the extent of interrelationship between physical development and educational achievement which was critically analysed across area, age and sex. Comparision across three different areas showed largely expected results and only for AA and tricep the correlation was contrary to expectation. However, it is quite pertinent to point out that there was a strong relationship between physical development and educational achievement of the children living in urban, rural and slum areas. Across four different age groups rather more strong relationship was obtained between educational achievement and physical development. And for both the sexes the strong relationship was holding good.

Concluding Remarks:

An overview of the findings of the present study pertains to:

1) Nutritional status of the children was found to be very significantly influenced by environmental factors and this holds
true for children living in urban, rural or slum areas; and this persists for the entire developmental sequence, at least from 6 to 9 years of age, equally well for boys and girls.

ii) Physical development of the children was also found to be affected by their nutritional status and environmental conditions, irrespective of their place of living, age and sex. However, physical space at home, particularly for the urban children, was found not to be affecting children's physical development, while it is true for rural and slum children.

iii) Educational achievement of the children in general was also found to be very strongly influenced by their nutritional intake, parental and home environment conditions.

iv) The relationship between educational achievement and physical development was found to be strong and effective. When boys and girls of three different areas, and across four different age groups were compared, the analysis revealed that better the state of physical health better is the educational achievement in schools.

v) The findings of the present study was very much in conformity with the findings of the earlier studies undertaken by several notable institutions and authors both in India and abroad.