CHAPTER VI

SUMMARY AND CONCLUSIONS

1. Summary

2. Conclusions

3. Limitations and Suggestions

4. Applicability
SUMMARY AND CONCLUSIONS:

Summary

The purpose of the present investigation was to study the effect of protein energy malnutrition on level of intelligence and emotional maladjustment. This effect was mainly studied in relation to different nutritional levels (Normal, First, Second and Third Malnutritional grades), sex difference (Male and Female), and educational status (School going and Non-school going).

122 hypothesis were formulated to study these effects.

Total sample of 300 was selected through a house to house visit with incidental approach. The sample consisted of 6 to 12 year old children belonging to the predominantly backward socio-economic strata in urban background (Jamnagar city, Gujarat State).

To measure the level of intelligence (I.Q.) and emotional maladjustment (Score on CBCL) of children differing in nutritional status, sex difference and educational status, the Binet Komat Intelligence Scale (BKIS) and Child Behaviour Check List (CBCL) were used. BKIS is based on the revisions of Stanford Binet and is a standardized verbal and performance scale that measures general intelligence as well as I.Q.
eleven factors of specific abilities. CBCL, developed by Prof. T. Achenbach, is a standardized paper pencil measure of emotional maladjustment in terms of the child's behavioural problems, which consists of 113 items covering 12 emotional behaviour characteristics, differing in boys and girls. These characteristics were rated on a three point scale of 'Yes', 'Sometimes' and 'No'.

Means ($\overline{x}$), SD, 't' ratio, 'f' ratio, and difference between two mean percentages of items on CBCL and correlation coefficient 'r' between I.Q. as an indicator of level of intelligence and CBCL score as an indicator of emotional maladjustment, were carried out to study these effects statistically. Graphic profiles were drawn for a better visual perspective of the interactional effects.

Conclusions

Above mentioned statistical analysis have led to the following conclusions:

1. Children in normal grade of nutrition have significantly higher I.Q. than children in first grade of malnutrition.
2. Children in normal grade of nutrition have significantly higher I.Q. than children in second grade of malnutrition.
3. Children in normal grade of nutrition have significantly higher I.Q. than children in third grade of malnutrition.
4. Children in first grade of malnutrition have significantly higher I.Q. than children in second grade of malnutrition.

5. Children in first grade of malnutrition have significantly higher I.Q. than children in third grade of malnutrition.

6. Children in second grade of malnutrition have significantly higher I.Q. than children in third grade of malnutrition.

7. Male and female children do not differ in their level of general intelligence.

8. School going children have significantly higher I.Q. than non-school going children.

9. Children in normal grade of nutrition score significantly higher in their ability of Speed of Response than children in first grade of malnutrition.

10. Children in normal grade of nutrition score significantly higher in their ability of Speed of Response than children in second grade of malnutrition.

11. Children in normal grade of nutrition score significantly higher in their ability of Speed of Response than children in third grade of malnutrition.

12. Children in first and second malnutritional grade do not differ in their ability of Speed of Response.

13. Children in first grade of malnutrition score significantly higher in their ability of Speed of Response than children in third grade of malnutrition.
14. Children in second grade of malnutrition score significantly higher in their ability of Speed of Response than children in third grade of malnutrition.

15. Male and female children do not differ in their ability of Speed of Response.

16. School going children score significantly higher in their ability of Speed of Response than non school going children.

17. Children in normal grade of nutrition score significantly higher in their ability of Memory than children in first grade of malnutrition.

18. Children in normal grade of nutrition score significantly higher in their ability of Memory than children in second grade of malnutrition.

19. Children in normal grade of nutrition score significantly higher in their ability of Memory than children in third grade of malnutrition.

20. Children in first and second grade of malnutrition do not differ in their ability of Memory.

21. Children in first grade of malnutrition score significantly higher in their ability of Memory than third grade of malnutrition.

22. Children in second grade of malnutrition score significantly higher in their ability of Memory than third grade of malnutrition.
23. Male and female children do not differ in their ability of Memory.

24. School going children score significantly higher in their ability of Memory than non school going children.

25. Children in normal grade of nutrition score significantly higher in their ability of Perception of Form than children in first grade of malnutrition.

26. Children in normal grade of nutrition score significantly higher in their ability of Perception of Form than children in second grade of malnutrition.

27. Children in normal grade of nutrition score significantly higher in their ability of Perception of Form than children in third grade of malnutrition.

28. Children in first and second grade of malnutrition do not differ in their ability of Perception of Form.

29. Children in first grade of malnutrition score significantly higher in their ability of Perception of Form than children in third grade of malnutrition.

30. Children in second grade of malnutrition score significantly higher in their ability of Perception of Form than children in third grade of malnutrition.

31. Male and female children do not differ in their ability of Perception of Form.
32. School going children score significantly higher in their ability of Perception of Form than non school going children.

33. Children in normal grade of nutrition score significantly higher in their ability of Comprehension than children in first grade of malnutrition.

34. Children in normal grade of nutrition score significantly higher in their ability of Comprehension than children in second grade of malnutrition.

35. Children in normal grade of nutrition score significantly higher in their ability of Comprehension than children in third grade of malnutrition.

36. Children in first and second grade of malnutrition do not differ in their ability of comprehension.

37. Children in first grade of malnutrition score significantly higher in their ability of Comprehension than children in third grade of malnutrition.

38. Children in second grade of malnutrition score significantly higher in their ability of Comprehension than children in third grade of malnutrition.

39. Male and female children do not differ in their ability of Comprehension.

40. School going children score significantly higher in their ability of Comprehension than non school going children.
41. Children in normal grade of nutrition score significantly higher in their ability of Sensation than children in first grade of malnutrition.

42. Children in normal grade of nutrition score significantly higher in their ability of Sensation than children in second grade of malnutrition.

43. Children in normal grade of nutrition score significantly higher in their ability of Sensation than children in third grade of malnutrition.

44. Children in first and second grade of malnutrition do not differ in their ability of Sensation.

45. Children in first grade of malnutrition score significantly higher in their ability of Sensation than children in third grade of malnutrition.

46. Children in second grade of malnutrition score significantly higher in their ability of Sensation than children in third grade of malnutrition.

47. Male and female children do not differ in their ability of Sensation.

48. School going children score significantly higher in their ability of Sensation than non school going children.

49. Children in normal grade of nutrition score significantly higher in their ability of Similarities than children in first grade of malnutrition.
50. Children in normal grade of nutrition score significantly higher in their ability of Similarities than children in second grade of malnutrition.

51. Children in normal grade of nutrition score significantly higher in their ability of Similarities than children in third grade of malnutrition.

52. Children in first grade of malnutrition score significantly higher in their ability of Similarities than children in second grade of malnutrition.

53. Children in first grade of malnutrition score significantly higher in their ability of Similarities than children in third grade of malnutrition.

54. Children in second grade of malnutrition score significantly higher in their ability of Similarities than children in third grade of malnutrition.

55. Male and female children do not differ in their ability of Similarities.

56. School going children score significantly higher in their ability of Similarities than non school going children.

57. Children in normal grade of nutrition score significantly higher in their ability of Reasoning than children in first grade of malnutrition.
58. Children in normal grade of nutrition score significantly higher in their ability of Reasoning than children in second grade of malnutrition.

59. Children in normal grade of nutrition score significantly higher in their ability of Reasoning than children in third grade of malnutrition.

60. Children in first and second grade of malnutrition do not differ in their ability of Reasoning.

61. Children in first and third grade of malnutrition do not differ in their ability of Reasoning.

62. Children in second and third grade of malnutrition do not differ in their ability of Reasoning.

63. Male and female children do not differ in their ability of Reasoning.

64. School going children score significantly higher in their ability of Reasoning than non school going children.

65. Children in normal grade of nutrition score significantly higher in their ability of Practical Judgement than children in first grade of malnutrition.

66. Children in normal grade of nutrition score significantly higher in their ability of Practical Judgement than children in second grade of malnutrition.

67. Children in normal and third grade of nutrition do not differ in their ability of Practical Judgement.
68. Children in first and second grade of malnutrition do not differ in their ability of Practical Judgement.

69. Children in first and third grade of malnutrition do not differ in their ability of Practical Judgement.

70. Children in second and third grade of malnutrition do not differ in their ability of Practical Judgement.

71. Male and female children do not differ in their ability of Practical Judgement.

72. School going children score significantly higher in their ability of Practical Judgement than non school going children.

73. Children in normal grade of nutrition and first grade of malnutrition do not differ in their ability of Vocabulary.

74. Children in normal grade of nutrition and second grade of malnutrition do not differ in their ability of Vocabulary.

75. Children in normal grade of nutrition and third grade of malnutrition do not differ in their ability of Vocabulary.

76. Children in first and second grade of malnutrition do not differ in their ability of Vocabulary.

77. Children in first and third grade of malnutrition do not differ in their ability of Vocabulary.
Children in second and third grade of malnutrition do not differ in their ability of vocabulary.

Male and female children do not differ in their ability of Vocabulary.

School going and non-school going children do not differ in their ability of Vocabulary.

Children in normal grade of nutrition and first grade of malnutrition do not differ in their ability of Imagery.

Children in normal grade of nutrition and second grade of malnutrition do not differ in their ability of Imagery.

Children in normal grade of nutrition and third grade of malnutrition do not differ in their ability of Imagery.

Children in first and second grade of malnutrition do not differ in their ability of Imagery.

Children in first and third children of malnutrition do not differ in their ability of Imagery.

Children in second and third grade of malnutrition do not differ in their ability of Imagery.

Male and female children do not differ in their ability of Imagery.

School going and non-school going children do not differ in their ability of Imagery.
89. Children in normal grade of nutrition and first grade of malnutrition do not differ in their ability of Ideational Judgement.

90. Children in normal grade of nutrition and second grade of malnutrition do not differ in their ability of Ideational Judgement.

91. Children in normal grade of nutrition and third grade of nutrition do not differ in their ability of Ideational Judgement.

92. Children in first and second grade of malnutrition do not differ in their ability of Ideational Judgement.

93. Children in first and third grade of malnutrition do not differ in their ability of Ideational Judgement.

94. Children in second and third grade of malnutrition do not differ in their ability of Ideational Judgement.

95. Male and female children do not differ in their ability of Ideational Judgement.

96. School going and Non-school going children do not differ in their ability of Ideational Judgement.

97. Interaction within four levels of nutritional status is significant at 0.01 level regarding level of intelligence.

98. Interaction between nutritional status and sex difference is not significant at accepted level, regarding level of intelligence.
99. Interaction between nutritional status and educational status is significant at 0.01 level regarding level of intelligence.

100. Interaction between sex difference and educational status is not significant at accepted level regarding level of intelligence.

101. Interaction between nutritional status, sex difference and educational status is significant at 0.01 level regarding level of intelligence.

102. Children in normal nutrition are emotionally well adjusted compared to children in 1st grade malnutrition.

103. Children in normal grade nutrition are emotionally well adjusted compared to children in 2nd grade malnutrition.

104. Children in normal grade nutrition are emotionally well adjusted compared to children in 3rd grade malnutrition.

105. Children in 1st grade malnutrition are emotionally well adjusted compared to children in 2nd grade malnutrition.

106. Children in 1st grade malnutrition are emotionally well adjusted compared to children in 3rd grade malnutrition.

107. Children in 2nd grade of malnutrition are emotionally well adjusted compared to children in 3rd grade of malnutrition.
Male and female children do not differ in their emotional adjustment.

School going children are emotionally well adjusted than non-school going children.

Interaction within four levels of nutritional status is significant at .01 level regarding emotional maladjustment.

Interaction between nutritional status and sex difference is not significant at accepted level regarding emotional maladjustment.

Interaction between nutritional status and educational status is not significant at accepted level regarding emotional maladjustment.

Interaction between sex difference and educational status is not significant at accepted level regarding emotional maladjustment.

Interaction between nutritional status, sex difference and educational status is significant at .01 level regarding emotional maladjustment.

Level of intelligence and emotional maladjustment correlate significantly in normal grade of nutrition.

Level of intelligence and emotional maladjustment correlate significantly in first grade of malnutrition.
117. Level of intelligence and emotional maladjustment correlate significantly in second grade of malnutrition.

118. There is no correlation between level of intelligence and emotional maladjustment in third grade of malnutrition.

119. Level of intelligence and emotional maladjustment correlate significantly in males.

120. Level of intelligence and emotional maladjustment correlate significantly in females.

121. Level of intelligence and emotional maladjustment correlate significantly in school going children.

122. Level of intelligence and emotional maladjustment correlate significantly in non-school going children.
Limitations and Suggestions:

1. The sample studied was confined only to the urban slum areas of Jamnagar city in Gujarat. The rural areas have not been included, therefore the remarks are not applicable to rural areas. It is possible therefore that a similar study carried out in different state may provide different results.

2. Actual intake of protein in each child is difficult to judge, and calculate, therefore we have taken weight for age as a criteria to group the malnutritional grades. A study with a different criteria such as height, head circumference may give differing results.

3. The total sample of study has not been matched with the control group nor any variable has been controlled. Such control and comparison may give different results.

4. It was difficult to eliminate the cultural homogeneity and bias since the sample is also belonging to same homogenous and cultural base, the conclusions of the present study may contain this margin of doubt in its application. The influence on level of intelligence and emotional maladjustment cannot be totally attributed to the nutritional level. The role of homogenous cultural environment is the point to be considered while interpreting the results.
5. School itself being in the same cultural environment may vary the result and interpretation in comparison to school situated in proper city.

6. Although initial try out was made in Indian culture setting by Dr. Pratiksha H. Raval and results were found to be satisfactory for our culture, a systematic standardization of CBCL for Gujarati population and also in group and sub-group norms for different cultural strata is recommended as it might provide different interpretation.

7. Present sample involved no particular community or religion. Samples taken from a particular community may give different results specifically in relation to sex difference.

8. Pattern Analysis can be done on the basis of Child Behaviour Check List for all the sub-groups under consideration.

Applicability:

With time and studies it has been proved that malnutrition is one of the biggest handicaps for a developing country. It has been emphasized that the poor nutrition of a large section of population is reflected in a high scale of childhood mortality, poor longevity, poor psychological development and decreased productivity. If we can reverse this trend national wealth can be expected to increase. This in turn will improve the economic status of the people.
Malnutrition not only taxes the physical growth, but also the general intelligence and emotional adjustment (behaviour) thus crippling the whole personality of an individual.

This research is applicable to prevent the possible physical and psychological hazards at prenatal and neonatal level.

The conclusions of the present study are applicable for nutritionists, paediatrics, sociologists, psychologists, general consultants, child psychiatrics and above all the most important application of the research conclusion is for the parents to provide a guide line in the child rearing practice.

It is also necessary that the mother during pregnancy should not be deprived of adequate nutrition, with a view to prevent low birth-weight, low I.Q., maternal and infant mortality.

At present many Government schemes exist with main objective to reach the victims of malnutrition with some supplementary nutrition and health services. Policies of such schemes are based on latest research and studies, thus advocating the correct information and knowledge.

In conclusion, the eradication of nutritional deficiency is crucial for the success of our programmes for national development.
Community Awareness:

India is a developing country with a very large and major proportion of population residing in rural areas where illiteracy is rampant. In the present state of affairs, powerful attempts by Government and other Voluntary organizations and individual attempts in the form of nutrition and health schemes, for the community are required. One can advocate the knowledge of right and affordable nutrition, thus giving a back seat to the misconception that "quantity of food brings health." Parents who are concerned about the growth and development of their child should realize the importance of right nutrition in the development of intelligence and emotional behaviour of their child. Besides the poorer classes who are ignorant, illiterate and lack purchasing power, there are some upper class people also who due to faulty living habits and faulty nutritional knowledge fall prey to diseases like diabetes, obesity and heart disease.

In brief, community awareness regarding importance of nutrition would bring in the realization that malnutrition is a dreadful condition which leads to deficits in growth, intelligence and emotion. Awareness slogans like "A healthy mind resides in a healthy body" conveys the message of interactions between good nutrition and sound mental development.
Consciousness and realization of the dreadfulness of malnutrition would take the affected child to the clinician who in turn can adopt and prescribe dietary measures to deal with the intellectually backward and emotionally maladjusted children, rather than embarking on drugs alone as therapy.

Survey of the school children can be undertaken on the basis of their height, weight, intellectual level and emotional maladjustment. Psychological counselling may be provided to the needy or relevant students.

Mental health professionals should be aware of the effect of protein energy malnutrition on mental health and make use of this for their therapeutic effects. Otherwise individuals with intellectual and emotional problems based on nutritional deficits may not be effectively treated.