GROWTH AND BEHAVIOR DEVELOPMENT IN RURAL INFANTS IN RELATION TO MALNUTRITION AND ENVIRONMENT

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ABSTRACT

A group of 224 children from a rural cohort of 625 children registered from 1981 to 1983 in 10 villages of KV Block, Varanasi was assessed for morbidity, physical growth, and behavior development (Gesell's developmental schedule). By first birthday children of normal nutrition grade were reduced to one fourth and numbers in Grade II and III malnutrition doubled. This deterioration in nutritional status was probably due to high morbidity, i.e., gastrointestinal, respiratory infections, etc. The skull circumference was 43 cm at the age of one year, being lower by 3 cm than the average size. Children having Grades II and III malnutrition showed poor development in all the areas of behavior, i.e., motor, adaptive, language and personal social. Besides malnutrition, environmental factors like mother's involvement in teaching, encouraging the child, talking to him or being within the visual range; the parental education, their caste and the child's birth order contributed significantly to the development of the child during infancy.

Key words: *Growth, Development, Infant.*

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During the past two decades evidence has accumulated to show that severe early malnutrition can affect brain structure and its function(1). Besides nutrition the importance of family characteristics including economic resources, and socio-cultural characteristics of parents, family structure and stimulation at home are all associated with nutritional status and mental development of the child(2). The present study was undertaken to find out the pattern of growth, behavior development, and morbidity during infancy in rural areas which can be of help in understanding (*i*) risk of developing malnutrition, its age of onset and severity, (*ii*) common morbidities and causes of mortality, and, whether malnutrition and/or other environmental factors affect behavior development. The recognition of such factors will help in developing strategies to build programmes or alter existing maternal-child-health programmes, so that, effective support is timely provided for better child development.

Material and Methods

A cohort of 625 children born during the period November, 1981 to March, 1983 in 10 villages of Kashi Vidyapeeth block, District Varanasi was registered and followed for physical growth and development at monthly intervals during first year. Besides studying the growth parameters, the children were divided into various grades of malnutrition at 4, 16, 28, 40 and 52 weeks of age, using Indian Academy of Pediatrics weight for age per cent classification (NCHS 50th centile as reference point(3); weight≥80% normal, <80-70% Grade I, <70-60% Grade II and <60% Grade III malnutrition). Gesell's developmental schedule(4) was administered at 4, 16, 28, 40 and 52 weeks to all the children. However, the data are analyzed for 224 children

who were continuously available for at least 4 age points out of 5. Since the development during first year of life is faster thus it was considered worthwhile to take those children who were not available only for one assessment out of five.

An environmental schedule was developed to obtain information on home characteristics likely to be associated with favorable development during the early years of life. This schedule included items from Caldwell Home Inventory Part I(5), on infant feeding practices and parent's general health. Following items were selected from Caldwell Home Inventory and most of these items, were checked as present or absent through direct observation:

1. Mother tends to keep the child in visual range.
2. Mother talks to child doing her work.
3. Mother consciously encourages developmental advances.
4. Mother tries to teach the name of the objects in immediate environment.
5. When mother is away care is provided by others.
6. Child is taken regularly to a doctor.
7. Play material available to the child.

Besides, information was also collected on per capita income, parental educational and occupational status, type and size of family, birth order and caste.

Sample Characteristics

The general characteristics of these villages are almost representative of rural population of this part of the country. This block has 112 villages spread over an area of 147 sq miles, with a population of 120,000 (1981 census). The male-female ratio in this block is 1,000 : 939. An earlier survey carried out in 1982 has shown that infant and neonatal mortality rates are 133 and 64 per 1000 live births, respectively. Over 26% of infants are born with weight less than 2,500 g; 13% preschool children are suffering from severe and 50% of mild to moderate forms of malnutrition(6). Parental literacy status showed that 79.4% of the mothers were illiterate and only 5.7% were educated beyond primary level. One third (35.7%) of the fathers were high school or intermediate and 21.2% were illiterate. Regarding occupational status, 34.5% of the mothers were housewives and 56.7% were working as agricultural laborers. Though the main occupation of this area is agriculture, 33.5% of the fathers were in service class and 19.6% were skilled laborers. Nearly half (56%) of the families had per capita income less than Rs. 100/-.

Growth Assessment

The anthropometric measurements for weight and height, head, chest and mid-arm circumferences for each child were taken using standard techniques(7).

1. *Length/height (cm):* Crown heel length was measured with an infantometer and was taken to the nearest millimeter.
2. *Body weight (kg):* Weight of the child was taken with minimal clothing using a lever balance. Measurement was made accurately to the nearest 50 g.
3. *Mid-arm circumference (cm):* It was measured with a fibre glass tape at the mid point of the left arm.
4. *Chest circumference (cm):* It was measured with a fibre glass tape, at

the level of nipples in front and the inferior angle of the scapula on the back.

5. *Head circumference (cm):* It was measured with the same tape encircling the occipital protuberance on the back and the glabella in front.

The readability of various anthropometric measurements was done as per method suggested by Zefras(8).

Development Assessment

Developmental quotient (DQ) for each area as well as overall developmental quotient was calculated by the formula given below:

$$DQ = \frac{\text{Developmental}}{\text{Chronological}} \times 100$$

Statistical Methods

Percentiles were calculated for various anthropometric parameters at different age points. Mean and SDs, Students 't' and unweighted means of analysis of variance(9) was calculated to find out the difference for various attributes. Chi Square test was applied to find out the difference in the distribution of children in different measures of socio-economic status and home environment.

Results

Growth

The percentiles for weight and height in the present study (rural) and data in relation to the NCHS(3) and the affluent class urban children of Varanasi are presented in *Figs. 1 & 2*. As compared to the NCHS upto 3rd month boys and girls (rural) remained around 20th centile, at 6th month boys entered in 10th and girls in 5th centile. Thereafter, the rural children could maintain themselves below 3rd centile of NCHS, only. As compared to urban affluent children of Varanasi (*Fig. 1*), the rural children were near 3rd centile at 3, 6, 9 and 12 months, respectively.

For height also in relation to the NCHS both boys and girls maintained around 20th centile upto 4 months (*Fig. 2*). Thereafter, from 9 months onwards the 50th centile values of the rural children corresponded to 3rd centile of the NCHS. The rural children as compared to affluent urban Varanasi children were in 5-10 centile at 6 months of age.

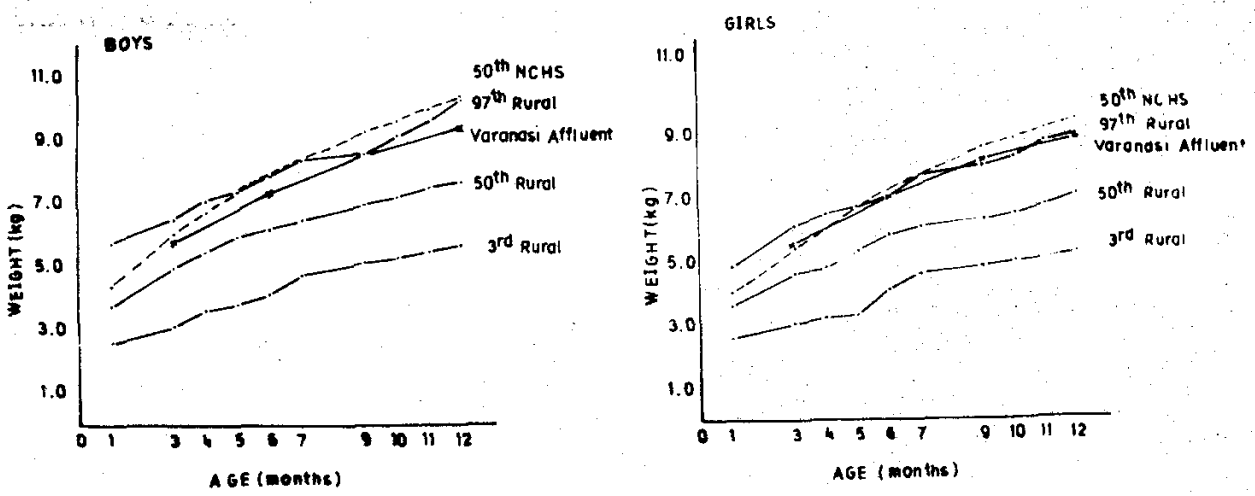

Fig. 1. Weight Percentile for Rural Boys and Girls. Scale : X-axis : 1 cm square = 1 month of age. Y-axis : 1 cm square = 1 kg of weight.

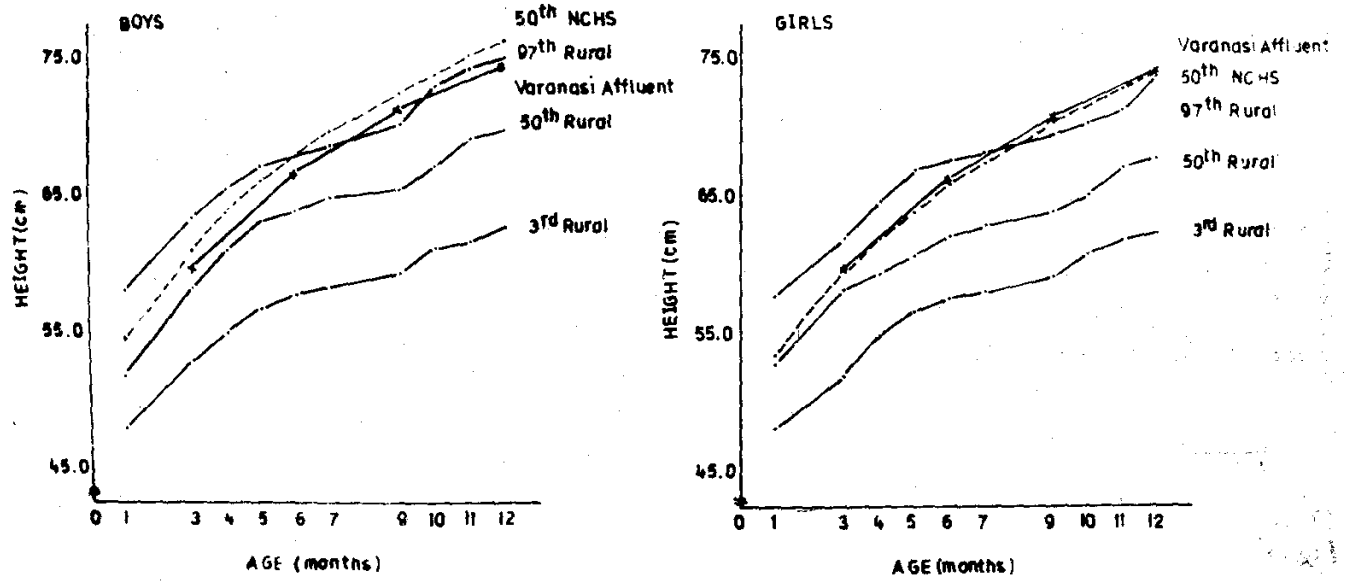

Fig. 2. Height Percentiles for Rural Boy and Girls. Scale: X-axis : 1 cm square = 1 month of age, Y-axis: 1 cm square = 2.5 cm of height.

In *Table I*, distribution of rural children showed that those in normal nutrition were moving to lower grades with age, indicating progressive deterioration in nutritional status. Children in normal nutrition grade were 30.0% at 16 weeks and 7.6% by 52 weeks. In contrast the percentage of children in Grades II and III malnutrition rose two folds during this period.

The mean values for head, chest and mid-arm circumferences for rural children are significantly lower than the corresponding affluent group values at 3, 6, 9 and 12 months (*Figs. 3 & 4*). The other observations were that at 12 months of age (*i*) chest circumference was lower than the skull circumference, and (*ii*) mid-arm circumference was 12.5 cm or below, both parameters indicating moderate to severe undernutrition (*Fig. 4*). This was also supported by the fact 49% had moderate to severe degree of malnutrition according to weight for age criteria around first birthday (*Table I*).

TABLE I–*Distribution of Children According to Nutritional Status at Different Age Points*

Age (weeks)	Nutritional status				
	Normal	Grade I	Grade II	Grade III	
16	67	106	44	7	
	(29.9)	(47.3)	(19.6)	(3.1)	22.7
28	25	110	75	14	
	(11.2)	(49.1)	(33.5)	(6.3)	
40	18	99	87	20	
	(8.0)	(44.2)	(38.8)	(8.9)	
52	17	97	94	16	
	(7.0)	(43.3)	(41.9)	(7.1)	49.0

Figures in parentheses indicate percentage of children at that age.

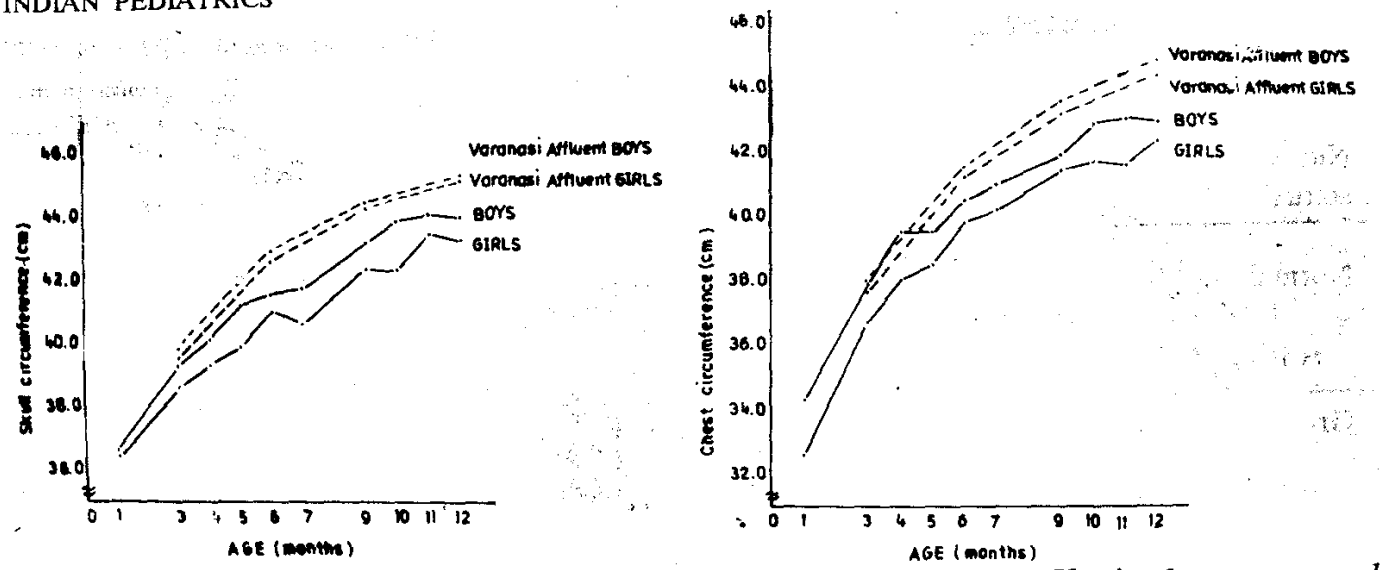

Fig. 3. Mean Head and Chest Circumference in Rural Boys and Girls. Scale : X-axis : 1 cm square = 1 month of age, Y-axis : 1 cm square = 1 cm of skull circumference or 1 cm of chest circumference.

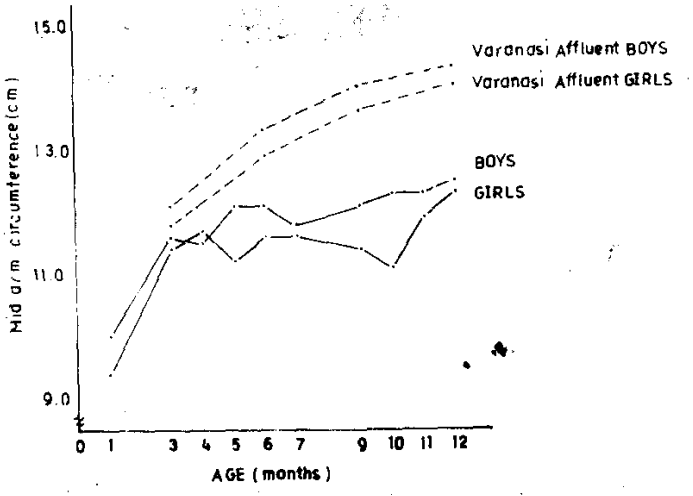

Fig. 4. Mean Mid Arm Circumference in Rural Boys and Girls. Scale X-axis: 1 cm Square = 1 month of age, Y-axis : 1 cm square = 0.5 cm of mid arm circumference.

Therefore, it was important to study the influence of progressive malnutrition on (*i*) the common morbidities suffered and (*ii*) the behavior development

Morbidity

On an average each child suffered 5.9 sickness episodes per year with 9.9 days duration per episode. An analysis of sickness episodes showed that diarrheal diseases contributed 39.7%, respiratory infections 18.7%, eye infection 16.3%, skin infection and fever in 10.9% each, of the total sickness episodes. This showed that the rural children, on an average, are sick for almost 52 days in a year. The cohort infant mortality was 133.7 per thousand, the common causes of death being tetanus (30.7%), acute respiratory infection (29.5%) and acute gastroenteritis (28.4%). The observation on 3 common morbidities experienced by the children in various nutritional grades are presented in *Table II*. Percentage of children having diarrheal episodes and number of episodes/100 children/year increased progressively from normal to Grade III malnutrition. There was also trend for increased duration of episode as

TABLE II–*Morbidity Experience of Study Children in Relation to their Nutritional Status*

Nutritional status		Diarrhea	URI	Fever
Normal	% children suffered	57.2	43.0	25.6
	Attack/100 children/year	199.7	126.6	73.2
	Duration	6.8	12.2	6.3
Grade I	% children suffered	68.5	44.6	27.1
	Attack/100 children/year	229.9	130.6	74.5
	Duration	7.6	12.7	6.7
Grade II	% children suffered	75.7	49.8	29.7
	Attack/100 children/year	260.8	128.2	75.5
	Duration	7.8	11.7	6.8
Grade III	% children suffered	71.7	48.0	29.7
	Attack/100 children/year	302.3	111.9	72.5
	Duration	8.3	13.0	6.7

the nutritional status deteriorated. The observation on attacks of URI and fever also showed the same trend.

Figure 5 shows the relationship of growth of children with their initial birth weight. Infants with birth weight >2500 g were consistently having better weights at all ages compared to infants whose birth weight was <2500 g. This difference was maintained till one year of age.

Development

The observations for overall development in different weight groups at the age of 4 weeks and in relation to nutritional status at 16, 28, 40 and 52 weeks are presented in *Table III*. Student 't' test was applied to find out the differences between the means of the two groups. The mean overall DQ at 4 weeks in weight group 4.0-

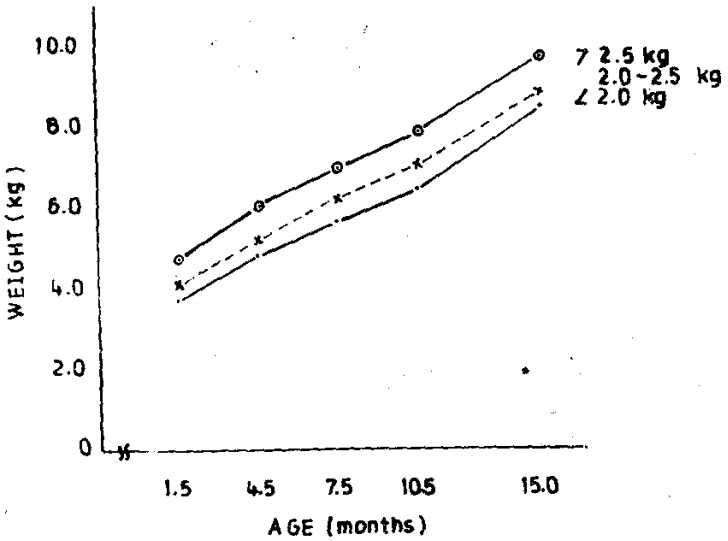

Fig. 5. Growth in Relation to Birth Weight. Scale : X-axis : 1 cm square = 1.5 month of age, Y-axis : 1 cm square = 1 kg of weight.

TABLE III—*Mean scores for Overall, Motor, Adaptive, Language and Personal Social Fields Relation to Nutritional Status at Different Age Points*

Age (weeks)	Nutritional status	n	Developmental areas				
			Overall	Motor	Adaptive	Language	Personal social
4	4.0-5.0 kg	67	96.9 ±10.2	104.8 ±16.9	78.1 ±10.1	98.5 ± 6.1	106.5 ±22.7
	3.1-3.9 kg	126	92.6 ± 8.2	100.2 ±10.1	76.7 ± 8.8	97.8 ± 6.8	95.7 ±21.0
	<3.0 kg	31	89.2 ± 9.9	97.2 ± 6.1	77.9 ±11.7	97.6 ± 7.4	85.2 ±23.9
	Total	224	93.4 ± 9.5	101.2 ±12.3	77.3 ± 9.7	97.9 ± 6.7	97.5 ±23.2
16	Normal	67	94.8 ± 7.6	103.6 ± 9.5	93.3 ± 8.9	83.7 ±19.3	98.8 ± 8.2
	Grade I	106	92.2 ± 8.8	102.4 ±10.0	91.1 ±10.2	76.8 ±19.7	95.2 ± 8.7
	Grade II	44	85.1 ±10.3	96.5 ±14.1	84.4 ±13.9	67.4 ±14.3	89.9 ±15.6
	Grade III	7	84.9 ± 7.2	98.4 ±92	86.0 ± 9.9	67.4 ±16.6	87.9 ±12.7
	Total	224	91.4 ± 9.5	101.5 ±11.2	90.3 ±11.2	76.7 ±19.6	95.0 ±11.0
28	Normal	25	98.8 ± 5.4	101.2 ± 8.3	103.7 ± 9.3	100.1 ±12.5	90.1 ± 8.0
	Grade I	110	97.0 ± 4.9	100.9 ± 7.2	100.3 ± 9.4	99.2 ± 4.3	87.2 ± 8.2
	Grade II	75	94.3 ± 7.8	97.9 ± 8.9	95.4 ±13.3	98.7 ± 7.9	83.9 ±10.9
	Grade III	14	85.3 ±13.3	86.2 ±16.6	80.5 ±14.7	96.5 ±18.7	78.1 ±14.3
	Total	224	95.6 ± 7.5	99.0 ± 9.5	97.8 ±12.5	98.9 ± 8.4	85.9 ±10.1
40	Normal	18	95.6 ± 7.8	100.2 ±12.5	100.8 ± 8.0	96.8 ±12.1	83.7 ±19.3
	Grade I	99	89.9 ± 8.2	97.4 ± 8.6	100.6 ± 5.7	86.1 ±15.5	76.1 ±10.1
	Grade II	87	87.1 ± 7.8	95.8 ± 8.9	96.7 ± 9.5	82.8 ±15.1	72.7 ±10.1
	Grade III	20	77.0 ± 9.8	86.6 ±15.1	81.2 ±16.8	74.7 ±11.27	65.3 ± 6.8
	Total	224	88.1 ± 9.2	96.0 ±10.4	98.7 ±10.6	84.7 ±15.6	74.4 ±11.7
52	Normal	17	100.3 ±10.9	100.9 ±13.9	105.3 ±11.7	97.9 ±11.6	96.6 ±14.3
	Grade I	97	93.9 ± 7.0	94.5 ±11.7	99.9 ± 7.4	87.3 ±11.2	94.6 ± 8.8
	Grade II	94	87.2 ± 9.7	85.3 ±12.7	95.0 ± 8.7	80.8 ±13.7	87.9 ±15.8
	Grade III	15	78.6 ± 9.5	75.9 ±11.9	86.5 ±11.2	73.4 ±14.0	76.7 ±17.6
	Total	224	90.5 ±10.2	89.8 ±13.9	97.3 ± 9.7	84.4 ±13.8	90.7 ±13.4

n = number of children.

5.0 kg was significantly higher in comparison to lower weight groups. The observations at 16, 28, 40 and 52 weeks in relation to nutritional status showed that developmental quotient decreased progressively with the severity of malnutrition at all the points. The deterioration in scores was more marked from 28th week onwards and in nutritional Grades II and III children. These findings on DQ correlated well with the entry of rural children in 3rd percentile of NCHS standards at 9 months.

The mean values of adaptive behavior at the age of 4 weeks are very low irrespective of the nutritional status of children. The reason being that the children were not able to pass the item 'follows to midline with dangling ring' at the age of 4 weeks. Similarly, for language development at 16 weeks, and personal social development at 40 weeks the poor scores were due to their inability to pass the item 'laughs aloud' for language behavior and 'waves bye bye' or equivalent for personal social behavior, respectively. Besides nutrition, the home environment is very important factor which influences the growth and development of children. An

unweighted means of two way analysis of variance was calculated to find out whether nutrition and environment alone or in interaction with each other determines the behavior development during infancy (*Table IV*). The results showed that 'F' values obtained at 4 weeks of age for environment and nutrition were non-significant for overall, motor, adaptive, language and personal social behavior. However, with increasing age the 'F' ratio for nutrition was significant at all the ages except for motor development at 16 weeks and language behavior at 28 weeks. The effect of environment became apparent from 40th week onwards, except for motor development at 28 weeks. At 40 to 52 weeks the observed scores for overall, motor and adaptive behavior differed significantly in varying environments. However, for language and personal social behavior it was true only at the age of 52 weeks.

The relation of various environmental factors with development was studied to identify the important variables. Father's education, mother's teaching the objects in immediate environment and keeping the child within visual range and talking to child while doing work, availability of play materials and of the caretaker while the mother is away, are the environmental factors which significantly enhance the development of the child (*Table V*). The influence of caste on development could be due to better educational status/in higher caste group. There was better motor, language, and personal social development in infants of first and second birth order, and personal-social development if their mothers were healthy. The small family size was associated with better motor development while infant feeding practices did not show any definite relationship.

Discussion

During infancy the number of children maintaining the normal nutrition grade reduced to one fourth, the percentage in Grad I malnutrition did not change (7%), and the numbers in Grades II and III malnutrition doubled. Thus, in rural areas within the first year of life 49% children (only 22.7% at 4 weeks of age) entered the pocket of moderate to severe malnutrition. This degree of malnutrition was observed in 40% at 6 months of age. In a recent survey in 1988-89(10) it was observed that at one year of age 4.8, 40.0 and 55.2% children were in normal, Grade I and Grade II + III malnutrition. The high morbidity particularly gastroentritis, acute respiratory infections, *etc.* may have been responsible for deterioration in nutritional status besides underfeeding. The skull circumference was >36 cm at 1 month and increased by 5 cm during 1-6 months of age (normal increase, birth to 3 month 6 cm, 3-6 months 3 cm). On first birthday skull circumference was >43 cm, being nearer to the size of 6 months old wellnourished child and lesser by 3 cm than the normal one year old size. Besides the skull circumference, behavior development assessed by Gesell's developmental schedule(4) showed that the scores for overall, motor adaptive language and personal social behavior were significantly related to child's nutritional status. This was evident as early as 4 weeks of life.

In *Table VI* comparison of normal *vs* Grade II malnutrition for overall, motor, adaptive, language and personal social scores showed that the malnourished children performed poorly. On the first birthday difference being ≥10 scores for all except personal social scores. Language development was affected most from 40

TABLE IV—*Summary of Unweighted Means Analysis of Variance of Different Fields of Behavior in Relation to Nutrition and Environment*

Age (weeks)	Nutrition			Source of variation environment			Nutrition + environment		
	SS	MS	F-ratio	SS	MS	F-ratio	SS	MS	F-ratio
Total DQ									
4	456.96	152.32	1.77	87.72	41.86	0.49	944.51	48.90	0.57
16	1331.96	443.99	6.01**	410.95	205.57	2.77	301.78	50.29	0.68
28	2121.07	707.02	15.18**	210.23	105.11	2.67	378.26	63.04	1.35
40	2534.36	844.78	12.85**	672.45	336.22	5.11**	169.77	28.29	0.43
52	6419.46	2139.82	35.52**	1478.30	739.15	12.27**	344.09	57.35	0.95
Motor									
4	298.35	99.45	0.61	34.44	17.22	0.11	96.26	19.25	0.12
16	473.27	157.74	1.39	564.69	282.34	2.49	500.10	83.35	0.74
28	3108.30	1036.10	13.86**	596.60	248.30	3.32**	326.92	54.49	0.73
40	855.45	285.15	3.23*	297.51	493.76	5.59**	1918.95	319.82	3.63**
52	7702.18	2567.39	20.75**	2614.83	1307.42	10.57**	149.73	24.96	0.20
Adaptive									
4	66.88	22.29	0.23	51.52	25.76	0.26	79.91	15.98	0.16
16	1266.64	422.21	3.90**	224.49	112.25	1.04	606.21	101.03	0.93
28	7092.37	2364.12	19.12**	132.18	66.09	0.53	622.53	103.75	0.84
40	3571.37	1190.46	15.36**	473.76	236.88	3.06**	459.49	76.58	0.99
52	4638.93	1546.31	22.20**	524.62	262.31	3.77**	372.55	62.09	0.89
Language									
4	34.16	11.39	0.24	9.26	4.63	0.10	17.31	3.46	0.73
16	2791.20	930.40	2.67*	955.91	477.96	1.37	612.85	102.14	0.29
28	77.88	28.96	0.50	77.88	38.94	0.75	694.39	115.73	2.22*
40	5030.35	1676.78	7.84*	483.32	211.66	0.99	490.43	81.74	0.99
52	6126.06	2042.02	15.06**	3021.70	1510.85	11.14**	441.69	73.61	0.54
Personal Social									
4	1940.00	646.67	1.33	38.00	19.00	0.04	1159.28	31.85	0.07
16	1635.90	545.30	5.02**	34.03	17.02	0.16	279.92	46.65	0.43
28	1447.28	482.43	5.14**	358.52	179.96	1.91	210.96	35.16	0.70
40	1604.66	534.89	3.48*	812.48	406.24	2.64	887.32	147.89	0.96
52	6530.36	2176.79	14.38**	990.01	495.06	3.27*	1547.32	257.89	1.70

df = Nutrition : 3
Environment : 2
Nutrition + environment: 6
Error : 212

SS = Sum of squares
MS = Mean sum of squares
* $p<0.05$
** $p<0.01$

TABLE V—*χ^2 Values and Significance Levels of Overall, Motor, Adaptive, Language and Personal Social Development at 12 Months of Age in Relation to Environment*

Environment variable	Total DQ	Motor	Adaptive	Language	Personal social
Type of family	5.62**	6.77**	0.76	2.42	1.31
Family size	14.33**	12.08*	8.6	6.61	16.65**
Occupation of mother	4.99**	0.95	4.5	0.80	3.9
Occupation of father	10.53	20.87***	11.8*	9.8	5.9
Per capita income	17.27***	9.46	4.36	7.6	9.9
Father's education	28.53***	44.30***	16.99***	28.3***	15.9**
Mother's education	21.99***	20.18***	6.0	9.7	8.4
Father's general health	1.86	3.03	3.01	1.8	0.8
Mother's general health	3.87	7.25	3.75	3.3	8.5*
Personal habit of father	3.43	1.16	0.33	0.9	3.0
Caste	13.59***	31.48***	15.52***	15.5***	15.5***
Birth order	6.67	15.41*	8.71	45.4***	17.5**
History of breast feeding	2.86	6.72	10.14	3.9	8.6
Introduction of liquid	6.39	16.75***	2.55	3.2	2.3
Introducing of semi-solid	2.64	3.22	3.54	0.5	2.3
Introduction of solid	1.16	8.25	12.76**	5.5	4.3
Mother tends to keep the child into visual range	6.93	17.23***	10.51**	18.9***	2.2
Mother talks to child doing her work	8.91**	10.92**	6.41	12.66***	3.7
Mother consciously encourages developmental advances	10.01**	8.17	16.88***	16.54***	9.1*
Mother tries to teach the name of the objects in immediate environment	15.31***	14.45***	13.26***	16.43***	15.8***
When mother is away care is provided by others	9.59**	14.52***	7.40	11.5**	8.9
Child is taken regularly to a doctor	7.58	9.84**	1.22	7.1	5.9
Play material available to the child	4.09	19.39***	10.03**	7.7	4.2

*$p<0.10$; **$p<0.05$; ***$p<0.01$.

weeks onwards, *i.e.*, at the beginning of the process of learning to integrate words and phrases. The data also showed that nutrition had significant influence on development particularly, after 4 weeks of age. Patel *et al.*(11) had demonstrated that malnourished children had lower DQ and were apathetic, irritable and had disturbed mother-child interaction, poor food habits, *etc*. Similarly, in Nepalese children, Graves(12) demonstrated lower levels of exploratory, attachment behavior and need for more physical closeness in malnourished infants. Jesudasen *et al.*(13) demonstrated that in infants undernutrition was associated with low mental age and motor age; further maternal undernutrition affected child's nutritional status. Chavez

TABLE VI—*Showing Difference in DQ Scores (Normal-Malnutrition Grade II) During Infancy*

Age (weeks)	Overall	Motor	Adaptive	Language	Personal social
16	9.7	7.1	9.0	6.3	8.9
28	4.5	3.3	8.3	1.3	6.2
40	8.5	4.4	4.1	14.0	11.0
52	13.1	15.6	10.3	17.1	8.7

and Martinez(14) using the similar Gesell Schedule(4) showed clear difference in motor development by 4 months, language 8 months, consistently poor adaptive and personal social behavior in infancy. The language development is related to thinking, and adaptive development to the level of intelligence.

In this study besides nutrition, environment influenced development mainly in later infancy, *i.e.,* overall DQ, motor and adaptive around 40-52 weeks; language and personal social at 52 weeks. Out of the environmental variables at 52 weeks most significant was mother's involvement in terms of teaching, encouraging and talking. In addition, parental education, their caste and child's birth order also played important role. In contrast, Powell and Grantham(2) in preschool children developmental studies showed that housing, maternal education, working status contributed significantly to the variance in nutritional status but not in development.

To conclude, the study highlights that malnutrition and environment are synergistically contributing to the poor development of the child in rural areas, the major future human resource of the country. Therefore, improving nutrition in infancy and training the mother for providing developmental stimulus are likely to contribute significantly to better development. These inputs should be given priority in all child development programmes of the country.

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