



Nutritional Status Along With Morbidity and Mortality of Under Five Children - A Follow up Study of Registered Infants up to 5 Years of age in Jodhpur District of Rajasthan

KEYWORDS

Morbidity, mortality, Underweight, Wasting, Desert

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Road, Jodhpur**ABSTRACT** Objective: Estimation of nutritional status, morbidity, mortality, their causes, in under five children

Method: Earlier registered 277 infants were followed up to five years and clinically examined for morbidity, mortality, and nutritional status at interval of six months

Results: Underweight showed an inclining trend from 12 months (24.2%) up to 48 months (42.5%). Wasting showed an inclining trend from 18 months (6.9%) up to 60 months (18.5%). Main morbidities were fever, acute respiratory infection (ARI), Gastroenterological (GIT), Eye, Ear Disease and skin infection. Fever showed declining trend from 12 months (28.3%) up to 60 months (12.5%) both in case of boys and girls. GIT also showed declining trend from 12 months (25.3%) up to 60 months (4.0%). ARI showed declining trend from 12 months (31.0%) up to 60 months (14.7%). Discoloration of hair, sign of protein calorie malnutrition was observed high i.e. 55.3 percent (12 month) to 71.2 percent (60 months) which needs attention. Angular stomatitis, Chelosis, Glossitis and Bitot spot were other nutritional deficiencies observed.

Conclusion : Results revealed growth retardation in desert area. The results will help in developing a package for pre-school children, which will be useful to State Health Department Functionaries in the management of malnutrition.

Introduction

Child health, which forms basis of prospective health scenario of a particular population group, carries high dependence proportion on parental environmental and genetic stock factor. As a research priority it is visualized that due to lack of expression, under immunity and varied parental care associated with neonates and infants, determination of causes of their morbidity and mortality is the first line research to be pursued. It reflects the immediate environment including economic and cultural characteristics of the family. Mortality in this age group no longer depends on prenatal hazards and other endogenous factors which often cause loss of life during the first year. In the 1-5 age group, the second year is the period when the young child runs the highest risk of dying. Death rates in the 1-5 year age group vary considerably [1,2]. In developing regions of the world malnutrition makes its principal impact on young children. These children are at a stage of life when growth is rapid, nutrient requirement are high, and the diets likely to be given are inadequate, because of poverty, lack of suitable foods, parental ignorance of fallacies in the form of food prejudices and restrictive taboos. It is also a period of continuous stress from bacterial, viral and parasitic infections. About two thirds of these deaths are due to pneumonia, diarrhoea, measles, malaria, neonatal causes, or malnutrition. Death often results from a combination of these conditions, which typically account for three out of four sick children seeking care at a health facility. Nutrition plays a vital role in the community. In desert area, conditions are very harsh. Desert population face high temperature, lower rainfall and experience frequent droughts affecting their economic status which in turn affects their

nutritional status as reported earlier [3-5]. But longitudinal studies are very few.

This is a longitudinal study in continuation of the earlier Neonate Project study [6] in desert areas. This study aimed to study the morbidity and mortality pattern and their nutritional status of earlier registered infants followed up to 5 years of age group at the interval of six months in desert population of Rajasthan.

Material and Methods

This is a longitudinal study in continuation of the earlier Neonate Project study in desert areas which have been carried out on earlier registered 300 neonates [6] from 28 villages belonging to Luni Panchayat Samiti of Jodhpur District which were followed up to one year of age group at the interval of one month in Neonate project. Out of 300 neonates registered earlier, 13 died up to the age of one year and 10 were not available/ not co-operated. The children followed up to the age of 12 months (infant) were 277. In the present study same infants registered earlier were followed up to 5 years of age group at the interval of 6 months.

All the subjects were examined clinically for morbidity, mortality and nutritional status from one year to five years at interval of six months. Information regarding mortality along with clinical examinations for morbidities viz. Fever, Acute Respiratory infection (ARI), Gastroenterological (GIT), Eye and Ear diseases along with nutritional deficiency signs and socio-cultural / economic causes responsible for mortality were recorded. Anthropometric measurements

i.e. height and Weight were taken on each child following standard techniques of WHO [7].

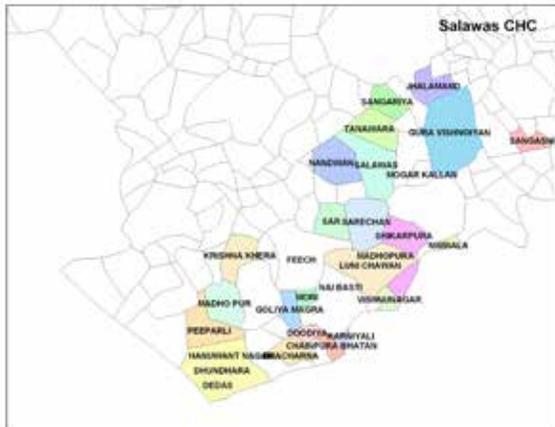


Fig. 1. Map of study villages

Table 1. List of Villages from where the earlier registered infants were covered

S. No.	Villages	S. No.	Villages
1	Tanavda	15	Shikarpura
2	Sangaria	16	Jhalamand
3	Salawas	17	Nimbla
4	Nandvan	18	Guda Bishnoi
5	Sarecha	19	Sangasani
6	Sar	20	Bacharna
7	Mogarkalla	21	Chainpura Bhatan
8	Feach	22	Karnayali
9	Dhundhara	23	Modi
10	Hanwant Nagar	24	Golia Magra
11	Piparli	25	Madopur
12	Dedas	26	Dudia
13	Luni	27	Nai Basti
14	Vishnu Nagar	28	Krishna Kheda

Results

The extent of different types of malnutrition viz. under nutrition (Weight for age), wasting (Weight for Height), stunting (Height for age) were computed by adopting standard deviation classification using WHO standards from one year to five years age group at interval of six months (Fig. 2-3). All the children with any of the above anthropometric measurement less than Median-2SD of WHO values were considered as undernourished.

Underweight (Weight for age) showed an inclining trend from 12 months (24.2%) up to 48 months (42.5%) and then declines at 54 and 60 months of age (Fig. 2). Underweight both in boys and girls showed similar trend. Underweight observed higher in males than females though statistically insignificant ($p>0.05$). The proportion of severe underweight also showed inclining trend i.e. from 5.5% (12 months) to 9.9% (42 months). The proportion of under five children suffering from moderate underweight category was higher in boys than girls though statistically insignificant ($p>0.05$). Overall the percentage of underweight was higher in boys (Mean 36.9%) than girls (Mean 31.5%) though statistically insignificant ($p>0.05$). Overall the percentage of boys suffering from moderate under nutrition was higher in boys (Mean 29.4%)

than girls (Mean 24.1%) whereas the percentage of severe under nutrition was not higher in girls (Mean 7.3%).

Stunting (Height for age) showed an inclining trend from 12 months (15.4%) up to 48 months (81%) and then declines at 54 and 60 months of age. Stunting was significantly higher in males than females ($p<0.05$). Overall the percentage of stunting was higher in boys (Mean 57.8%) than girls (Mean 48.4%) statistically significant ($p<0.05$). Overall the percentage of boys suffering from moderate stunting was higher in boys (Mean 23.2%) than girls (Mean 20.4%) whereas the percentage of severe stunting was also higher in boys (Mean 34.5%) than girls (Mean 27.9%).

Wasting (Weight for Height) showed an inclining trend from 18 months (6.9%) up to 60 months (18.5%) whereas wasting was low at 24 and 30 months of age. Severe wasting ranges from 1.1% to 5.1% which was significantly higher in boys than girls ($p<0.05$). Overall the percentage of wasting was higher in boys (Mean 8.9%) than girls (Mean 6.9%) though statistically insignificant ($p>0.05$) (Fig. 3). Overall the percentage suffering from moderate wasting was higher in boys (Mean 6.9%) than girls (Mean 5.5%) whereas the percentage of severe wasting was higher in girls (Mean 5.2%) than boys (Mean 2.1%).

Fig. 2. Weight for age in infants (12 months) followed up to 60 months of age

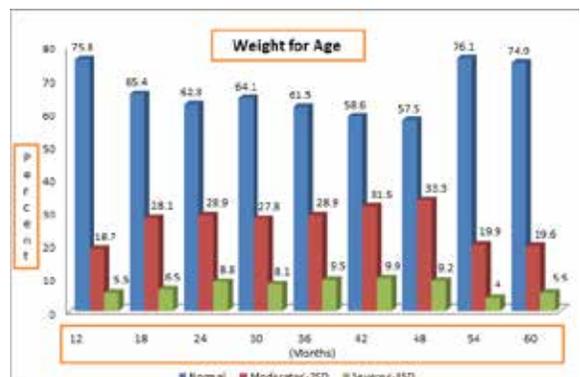
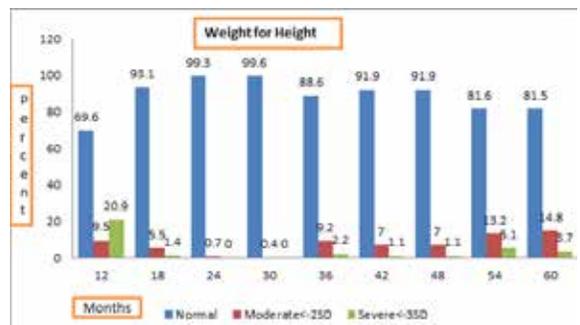


Fig. 3. Weight for Height in infants (12 months) followed up to 60 months of age



Main morbidities observed in population were fever, acute respiratory infection, GIT, Eye, Ear Disease and skin infection. Fever showed declining trend from 12 months (28.3%) up to 60 months (12.5%) both in case of boys and girls. Gastro-Intestinal Tract (GIT) infection also showed declining trend from 12 months (25.3%) up to 60 months (4.0%) both in case of boys and girls. Acute Respiratory Infection (ARI) also showed declining trend from 12 months (31.0%) up to 60 months (14.7%) both in case

of boys and girls. Eye Diseases showed an inclining trend from 12 months (1.7%) up to 24 months (2.6%) both in case of boys and girls and there after decline was observed up to 60 months (0.4%). Ear Diseases also showed an inclining trend from 12 months (5.0%) up to 24 months (7.7%) both in case of boys and girls and there after decline was observed up to 60 months (2.6%). Skin infection showed an declining trend from 12 months (3.0%) up to 60 months (2.6%) both in case of boys and girls. Gender difference was statistically insignificant ($p>0.05$) in all the morbidities (Table 2).

Table. 2. Prevalence of Morbidities in infants (12 months) followed up to 60 months of age

Morbidities		Age in months								
		12	18	24	30	36	42	48	54	60
N.A.D.	M	51.0	54.5	51.8	69.6	87.5	85.7	83.0	75.9	100.0
	F	45.8	55.2	51.6	76.4	88.2	91.9	82.6	75.8	98.8
	T	48.3	45.1	51.6	73.6	87.9	89.4	82.8	75.8	99.3
Fever	M	26.2	20.5	19.6	11.6	6.3	6.3	5.4	6.3	16.1
	F	30.3	13.5	25.5	10.6	5.0	0.6	6.2	6.8	9.9
	T	28.3	16.4	23.1	11.0	5.5	2.9	5.9	6.6	12.5
GIT	M	21.4	12.5	21.4	11.6	1.8	1.8	1.8	2.7	6.3
	F	29.0	17.2	24.2	9.9	1.9	0.0	2.5	1.2	2.5
	T	25.3	15.3	23.1	10.6	1.8	0.7	2.2	1.8	4.0
ARI	M	30.3	22.3	29.5	18.8	3.6	8.0	9.8	11.6	15.2
	F	31.0	20.9	14.3	11.8	3.7	4.3	11.2	13.0	14.3
	T	31.0	21.5	20.5	14.7	3.3	5.9	10.6	12.5	14.7
Eye Dis-ease	M	2.1	2.7	2.7	0.0	0.0	1.8	0.9	1.8	0.0
	F	1.3	1.2	2.5	1.2	0.6	0.6	0.6	0.0	0.6
	T	1.7	1.8	2.6	0.7	0.4	1.1	0.7	0.7	0.4
Ear Dis-ease	M	9.0	2.7	9.8	5.4	1.8	0.9	3.6	5.4	2.7
	F	1.3	5.5	6.2	0.6	0.0	0.0	1.2	2.5	2.5
	T	5.0	4.4	7.7	2.6	0.7	0.4	2.2	3.7	2.6
Skin Infec-tion	M	1.4	0.0	1.8	0.9	0.0	0.9	2.7	1.8	0.9
	F	4.5	0.6	1.2	0.0	3.1	2.5	1.2	2.5	3.7
	T	3.0	0.4	1.5	0.4	1.8	1.8	1.8	2.2	2.6

M vs F - $p>0.05$

Regarding nutritional deficiency signs, mainly discoloration of hair, a sign of protein calorie malnutrition was observed to be high i.e. ranging from 55.3 percent (12 month) to 71.2 percent (60 months) which very high and needs attention. Marasmus was observed only in 18 months of age (0.4%). Angular stomatitis, a sign of Vitamin B complex deficiency, showed an inclining trend from 12 months (0.7%) up to 24 months (12.5%) both in case of boys and girls and there after decline was observed from 30 months (9.5%) up to 60 months (2.9%). Other signs of Vitamin B complex deficiency were Chelosis and glossitis observed mainly in 12 months of age i.e. 8.8 and 0.3 percent respectively. Vitamin A deficiency i.e. Bitot spot was observed mainly in 12 months (1.5%). Bleeding of gums, sign of Vitamin C deficiency, was observed mainly in girls in 36 months age (0.3%). Gender difference was statistically insignificant ($p>0.05$) in all the nutritional deficiencies.

Out of 300 neonates registered earlier in neonate project (6), 13 died up to the age of one year and 10 were not available/ not co-operated. The children followed up to

the age of 24 months were 273, out of which 1 died between 1-1/2 year and 2 years age. No mortality was observed between two and five years. Mortality between one & half year – two years age group was 03.3/1000 whereas Mortality up to five years age (0-54 months) was 56.7/1000 (Table 3). Main causes of mortality reported were fever and accident.

Table 3. Distribution of Under five children according to mortalities rate

Types	Age	No.	Per 1000's
Mortality between one year and one & half year age group	1 year- 1-1/2 year	3	10.8/1000
Mortality between one & half year and two years age group	1-1/2 year - 2 years	1	03.3/1000
Mortality between two year and five years age group	2 years - 5 year	0	-
Total Mortality from neonate to five years age group (13 died up to 1 year)	0-54 months	17	56.7/1000

Discussion

Malnutrition is a burning problem in preschoolers in developing countries. In the 1-5 age group, the second year is the period when the young child runs the highest risk of dying. Death rates in the 1-5 year age group vary considerably [1,2]. In developing regions of the world malnutrition makes its principal impact on young children. These children are at a stage of life when growth is rapid, nutrient requirement are high, and the diets likely to be given are inadequate, because of poverty, lack of suitable foods, parental ignorance of fallacies in the form of food prejudices and restrictive taboos. Nutrition plays a vital role in the community. In desert area, conditions are very harsh. Desert population face high temperature, lower rainfall and experience frequent droughts affecting their economic status which in turn affects their nutritional status as reported earlier [3-5]. But longitudinal studies are very few.

The results revealed growth retardation. Underweight showed an inclining trend from 12 months (24.2%) up to 48 months (42.5%) and then declines at 54 and 60 months of age whereas it was 44 percent in the earlier study reported of NFHS III [8]. Overall the percentage of boys suffering from moderate under nutrition was higher in boys (Mean 29.5%) than girls (Mean 24.1%) whereas the percentage of severe under nutrition was not higher in girls (Mean 7.3%) which needs attention. Overall the percentage of stunting was significantly higher in boys (Mean 57.8%) than girls (Mean 48.4%) which were found higher than NFHS III (33.7% - up to 3 years) and NNMB (49.3%) studies [8-9] reported in literature.

Wasting showed an inclining trend from 12 months (6.9%) up to 60 months (18.5%) and Severe wasting was significantly higher in boys than girls ($p<0.05$). In another study reported from desert area Stunting (malnutrition of long duration) was observed in 53% of children and underweight in 60%. Wasting, an indicator of short-duration malnutrition, was present in 28% of children during drought conditions [4].

Main morbidities observed in population were fever, acute respiratory infection, GIT, Eye, Ear Disease and skin infection. Fever, Gastroenterological (GIT) and Acute Res-

piratory Infection (ARI) showed declining trend from 12 months up to 60 months both in case of boys and girls whereas Eye and ear diseases showed an inclining trend from 12 months up to 24 months both in case of boys and girls and there after declined up to 60 months. Earlier study on under five children in desert area reported that 10.7% suffered from skin morbidities, 8.9% from eye morbidities and 7.2% from fever also reported that Eye morbidity also increases up to 1+ year age group and then declines [10].

Regarding nutritional deficiency signs, mainly discoloration of hair, a sign of protein calorie malnutrition was observed high i.e. ranging from 55.3 percent (12 month) to 71.2 percent (60 months) which is very high as compare to earlier study reported Rajasthan where the relative percentage prevalence of the various signs related to protein calorie malnutrition (PCM) were discoloration of hair (21.6%) [10]. This needs attention. Other nutritional deficiency signs reported were Angular stomatitis, a sign of Vitamin B complex deficiency, showed an inclining trend up to 24 months and there after declined up to 60 months. Other signs of Vitamin B complex deficiency were Cheilosis and glossitis and Vitamin A deficiency i.e. Bitot spot was observed mainly in 12 months of age. This may be due to early child marriage existing in this area, high illiteracy, traditional feeding practices, lower prevalence of immunization along with frequently occurrence of drought in desert area which in turn, affects their economy which have its impact on the nutritional status of the population as reported earlier [3,6].

Conclusion

Results revealed growth retardation in desert area. This study will be helpful in formulation of simple interventional plan for under five children for reduction of under nutrition, morbidity and mortality among pre-school children. The research output of this project will also help in developing a package for pre-school children, which will be useful to State Health Department Functionaries in the management of malnutrition.

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