Section: Pediatrics

Original Research Article

PREVALENCE AND CORRELATES OF MALNUTRITION, ACUTE RESPIRATORY INFECTIONS AND DIARRHEA IN CHILDREN BELOW 24 MONTHS OF AGE AT A TERTIARY CARE CENTRE

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ABSTRACT

Background: Malnutrition leads to repeated episodes of illnesses like acute respiratory infections (ARI) and diarrhea. Thus, child may get trapped in this vicious circle. Simple preventive measures can avoid this trap. Hence, identification of risk factors of malnutrition, ARI and diarrhea is important.
Objective: To study prevalence and correlates of malnutrition, ARI and diarrhea in children<24 months of age.
Materials and Methods: Hospital-based cross-sectional study was carried out among 300 children<24 months. Detailed history, thorough clinical examination was done. World Health Organization guidelines were used for diagnosis of ARI. Nutritional status was determined using anthropometric measurements. IAP Classification of Malnutrition (1972) was used to assess nutritional status.
Results: Girls (57.7%) were more than boys (42.3%). Most children belonged to age <1 month (30.7%) followed by 7-12 months (27.6%). Prevalence of malnutrition, ARI and diarrhea was 43.7%, 29.7% and 32.7% respectively. Grade-I malnutrition was more common (28.3%) than other two grades. Delayed initiation of breast feeding after birth (>1 hour), child given pre-lacteal feed, bottle feeding and formula feeding, support not provided to mother for breast feeding, not given exclusive breast feeding and weaning not started at 6 months of age were all significantly associated with malnutrition, ARI and diarrhea ($p<0.05$).
Conclusion: prevalence of malnutrition, ARI and diarrhea is very high. We have documented slightly higher prevalence compared to National Family Health Survey-5 due to hospital-based nature of the study. Factors found to be significantly associated are easily preventable and hence more awareness and motivation is required to prevent these risk factors.
Key words: prevalence, diarrhea, malnutrition, ARI.

INTRODUCTION

First two years of life including about 270 days in the uterus are critical as optimal growth and development occurs during this period. Nutrition during first two years of life is very important for complete growth and development. It also decreases the risk of diseases.[1]

There are multiple risk factors for undernutrition in the children below two years of age. They may range from improper feeding, repeated infections, inadequate immunization, lack of availability of food, improper care of the children etc.[2] World Health Organization (WHO) and United Nations International Children's Emergency Fund (UNICEF) have placed emphasis on certain important practices like exclusive breast feeding for

first six months, no pre-lacteal feeding, no bottle feeding, no formula feeds, initiate breast feeding as soon as possible after birth, initiate weaning at the age of six months and continue breast feeding.[3]

Around 45% of deaths (2.7 million) in the children are linked to undernutrition. Worldwide in the year 2019, it was estimated that the number of children with stunting, wasting was 144 million and 47 million respectively. The rate of exclusive breast feeding was only 44%. Very few children received adequate nutrition. Dietary diversity was seen in only 25% of the cases. Optimal breastfeeding can save more than 820000 lives of children every year. Child survival and adequate growth and development are linked to the appropriate feeding.[4]

In India, malnutrition among children of age below two years is an important public health problem and has been associated with morbidity and mortality in this age group. As per National Family Health Survey-5 (NFHS), there is slow but steady improvement in the nutritional indicators of children. Compared to NFHS-4, there was a slight decline in the prevalence of stunting from 38.4% to 35.5%. The wasting was 21% in the NFHS-4 which came down to 19.3% and the underweight was 35.8% which is now 32.1%.[5]

Mucosal and epithelial integrity is affected by the malnutrition condition. It also affects the clearance at the mucociliary level. There is decreased formation of the immunoglobulins. The differentiation of the lymphocytes is also affected. All these problems lead to the decline in the defence system. Impaired immunity is associated with the repeated infections which in turn causes the weight loss and malnutrition. Thus, the child gets trapped into this vicious circle of malnutrition and infections.[6]

Therefor it is important to carry out research again and again and document that even after availability of the best medical science, the children still suffer from malnutrition. Hence, present study was carried out to study the prevalence and correlates of malnutrition, acute respiratory infections and diarrhea in children below 24 months at a tertiary care centre.

MATERIALS AND METHODS

A hospital based cross sectional study was carried out over a period of two years among 300 children presenting to the outpatient department of Pediatrics.

Institution Ethics Committee permission was obtained vide letter number MNRMCH/EC/INST/1169. Child assent was obtained from the parents or guardian whoever were available after explaining the nature of the study. Data confidentiality was maintained.

Children of age below the age of two years of either gender were included in the present study. Critically ill children, those with malabsorption syndrome were excluded from the present study.

As per NFHS-5, the prevalence of malnutrition in Telangana was 31.8%. 5 Based on this prevalence of 95% of confidence level and 5% absolute precision and design effect of one, the sample size came out to be 334. But given the time constraint and other resources issues, we were able to include 300 children in the present study. Convenience sampling technique was used to enrol the children in the present study.

Detailed history, thorough clinical examination was done for all children in the pre designed, pre tested, semi structured study questionnaire. World Health Organization guidelines and criteria were used for the diagnosis of acute respiratory infections (ARI). 7 Height/length and weight were measured with standard equipment and guidelines. The tools used in the collection of anthropometric data collection are Beam scale and Infantometer. The nutritional status was determined using anthropometric measurements. IAP Classification of Malnutrition (1972) 8 was used to assess the nutritional status of children. Weight for age and Height for age was taken in centiles as per IAP growth charts. Children were classified as per the grades of malnutrition. Modified Kuppuswamy socioeconomic scale updated for the year 2020 was used for socio economic status of children.

The data was entered in Microsoft Excel 2007 and statistical analysis using SPSS (Statistical Package for Social Science) Version 27 (IBM Corp. Released 2020. IBM SPSS Statistics for Windows, Version 27.0. Armonk, NY: IBM Corp). The data collected was recorded in a master chart and analysed. Chi-square test was used to compare variables. Online Chi Square calculator was used for calculation of 2×2 tables. All the Statistical results were considered significant at P value ≤ 0.05.

RESULTS

Table 1: Age and Sex wise distribution of Children

Age in months	Boys	Girls	Total
< 1	46 (50%)	46 (50%)	92 (30.7%)
2-6	21 (39.6%)	32 (60.4%)	53 (17.7%)
7-12	36 (43.4%)	47 (56.6%)	83 (27.6%)
13-24	24 (33.3%)	48 (66.7%)	72 (24%)
Total	127 (42.3%)	173 (57.7%)	300 (100%)

Girls (57.7%) were more than boys (42.3%). Most children belonged to age group of less than one month (30.7%) followed by 7-12 months (27.6%) (Table 1).

Table 2: Prevalence of Malnutrition as per Indian Academy of Pediatrics (IAP) classification

Malnutrition	Number	%
Normal	169	56.3
Grade 1	85	28.3
Grade 2	36	12
Grade 3	10	3.3
Total	300	100

The prevalence of malnutrition was 43.7%. As expected, grade I malnutrition was more common followed by grade II and grade III malnutrition was least in 3.3% of the cases. (Table 2)

Table 3: Association of various factors with malnutrition

Factors		Malnourished	Normal	Chi square	P value
Time of breast feeding	> 1 hour	88	82	9.713	0.0018
	< 1 hour	43	87		
Pre-lacteal feed	Yes	75	51	22.56	0.0000
	No	56	122		
Formula feed	Yes	58	16	46.26	0.0000
	No	73	153		
Bottle feeding	Yes	73	50	19.78	0.0000
	No	58	119		
Support to mother for breast feeding	No	52	21	28.34	0.0000
	Yes	79	148		
Exclusive breast feeding	Not given	63	37	21.63	0.0000
	Given	68	132		
Weaning at six months	No	12	4	5.856	0.0155
	Yes	60	90		

Delayed initiation of breast feeding after birth (>1 hour), child given pre-lacteal feed, bottle feeding and formula feeding, support not provided to mother for breast feeding, not given exclusive breast feeding and weaning not started at 6 months of age were all found to be significantly associated with malnutrition ($p<0.05$). (Table 3)

Table 4: Association of various factors with acute respiratory infection (ARI)

Factors		ARI	No ARI	Chi square	P value
Time of breast feeding	> 1 hour	70	100	23.65	0.0000
	< 1 hour	19	111		
Pre-lacteal feed	Yes	59	63	32.94	0.0000
	No	30	148		
Formula feed	Yes	47	27	51.8	0.0000
	No	42	184		
Bottle feeding	Yes	49	74	9.526	0.00202
	No	40	137		
Exclusive breast feeding	Not given	45	56	15.12	0.00010
	Given	44	155		
Weaning at six months	No	65	75	10.76	0.00010
	Yes	44	116		

Delayed initiation of breast feeding after birth (>1 hour), child given pre-lacteal feed, bottle feeding and formula feeding, support not provided to mother for breast feeding, not given exclusive breast feeding and weaning not started at 6 months of age were all found to be significantly associated with ARI ($p<0.05$). (Table 4)

Table 5: Association of various factors with diarrhea

Factors		Diarrhea	No diarrhea	Chi square	P value
Time of breast feeding	> 1 hour	70	104	3.852	0.04969
	< 1 hour	36	90		
Pre-lacteal feed	Yes	52	70	8.519	0.0035
	No	46	132		
Formula feed	Yes	54	20	70.14	0.0000
	No	44	182		
Bottle feeding	Yes	63	60	31.21	0.0000
	No	35	142		
Exclusive breast feeding	Not given	147	52	22.21	0.0000
	Given	46	55		
Weaning at six months	No	62	98	5.191	0.0227
	Yes	36	104		

Delayed initiation of breast feeding after birth (>1 hour), child given pre-lacteal feed, bottle feeding and formula feeding, support not provided to mother for breast feeding, not given exclusive breast feeding and weaning not started at 6 months of age were all found to be significantly associated with diarrhea ($p<0.05$). (Table 5)

DISCUSSION

The children in the study were 57.66% girls and 42.34% boys. 81.6% of children were started on Breastfeeding on Day-1 and 18.4% were started after Day-1. This finding was similar with Edmond KM study (40 71%).[9] A study with Hanif HM 10 showed 65.5% children were breastfed on Day 1. In 81.6% who were breastfed on Day 1, 18.3% were started on breastfeeding within half an hour of life, 25% were started on breastfeeding within one hour of life. This finding was more or less similar with a study by Silva JLP,[11] and Hanif HM et al.[10]

Delayed initiation of breast feeding after birth (>1 hour), child given pre-lacteal feed, bottle feeding and formula feeding, support not provided to mother for breast feeding, not given exclusive breast feeding and weaning not started at 6 months of age were all found to be significantly associated with malnutrition, ARI as well as diarrhea ($p<0.05$).

Upadhyaya R et al,[12] carried out a community based cross sectional study among 242 children. They found that 25.2% of the children were stunted and 12.2% were wasted. The ARI was reported in 60% of the cases. Diarrhea was seen in 24.8% of the cases. Treatment seeking behaviour was similar for boys and girls. The author concluded that there was a considerable burden of malnutrition, ARI and diarrhea in the population studied.

Purnama TB et al,[13] analysed 289631 children from 514 districts of Indonesia from a cross-sectional study. They found that the prevalence of ARI and diarrhea was 5.7% and 6% respectively. This is much lower that what we observed in the present study. They found that use of cooking fuel which produced lot of smoke was associated with an odds of 1.53 for the development of diarrhea. Even the shared toilet facilities were also found to be significantly associated with diarrhea. Those who do not have social protection support were susceptible for diarrhea. These risk factors were not studied in the present study.

Reddy VB et al,[14] conducted a community based cross sectional study in 500 houses having 669 children. They found that the girls were slightly more than boys which is similar to the present study findings. The 21.4% of the children had one episode of diarrhea in the past one month and 51.6% had one episode of ARI. 32.7% of the cases had underweight which is lower than what we have seen in the present study. 18.3% of the cases had wasting and 38.3% of the cases had stunting. There was a positive treatment seeking behavior as most of the families opted for modern medicine.

Owusu DN et al,[15] analysed the results from demographic and health survey from west African countries to study the prevalence of ARI and diarrhea. 13.7% of the cases had diarrhea and 15.9% had diarrhea. They found that the risk factors of diarrhea were younger age<2 years, younger mothers<30 years, illiterate mothers, poverty, malnutrition, wasting and underweight. They also found that the risk factors of ARI were lack of vaccination, not using the smokeless fuel, and underweight.

Limitations

Present study was hospital-based study and hence the findings may not be applied to the community settings. Being a cross-sectional study, the risk factor association lacks causal relation and hence indicate only the possible associations. However, all these associations are already well proven and hence reinforce the associated factors.

CONCLUSION

Even today, the prevalence of malnutrition, ARI and diarrhea is very high. As per National Family Health Survey-5, it is showing decline but it is very slow. We have documented slightly higher prevalence due to hospital-based nature of the study. Factors found to be significantly associated are easily preventable and hence more awareness and motivation is required to prevent these risk factors.

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