

Epidemiological Profile of Children with Malnutrition at Child Malnutrition Treatment Center (CMTC) in Saurashtra Region

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Abstract:

Introduction: Adequate Nutrition is important for optimum growth, immunity, neurological and cognitive development of the child. Malnutrition leads to illness and mortality among under 5 children. Nearly 40% under 5 children are malnourished in Gujarat despite many nutritional programmes. **Objectives:** To assess the epidemiological factors of malnourished children at Child Malnutrition Treatment Centre (CMTC) and to find out the association between epidemiological factors and nutritional status of study participants. **Method:** A cross-sectional study was conducted on Children admitted at CMTC at Narayan Nagar Urban Health Center, the only one and newly established CMTC in Rajkot city in year 2015. Study duration was 14 months. Interview of mothers of 120 children was conducted to know epidemiological factors of malnourished children. Weight on admission was noted from register. Pre-formed, semi-structured proforma used. **Results:** Out of 120 children, 5.8%, 55.8%, 34.2% and 4.2% were from <1, 1-3, 3-5 and >5 year age groups respectively. Nearly 40% children belonged to Socioeconomic Class IV. The proportion of Low Birth Weight children was 40%. Current feeding practice was appropriate in 10.8% children according to IMNCI guideline. Upper Respiratory Tract Infection occurred in 76.7% children with average 4.5 episodes. High birth order of children is statistically significant with severity of malnutrition. Birth weight and feeding practices of children were not associated with grade of malnutrition. **Conclusion:** Need based education of mothers for preventing low birth weight, exclusive breastfeeding, complementary feeding, quantity and type of routine diet etc. should be given.


Keywords: Child Malnutrition Treatment Center, Low Birth Weight, Malnutrition

Introduction:

Nutrition is an input to and a foundation for health and development.^[1] Adequate nutrition is essential for ensuring healthy growth, proper organ formation and function, a strong immune system and neurological and cognitive development in early childhood. Malnutrition during childhood impacts

cognitive function and contributes to poverty by impeding individuals ability to lead productive lives.^[2]

Nutrition of the children between 1 to 6 years of age is of prime importance as they are most vulnerable to deficiencies or malnutrition.^[1] An estimated 40% of worlds severely malnourished

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under-5 children live in India and one in every 3 malnourished children in the world lives in India.^[3] As per National Family Health Survey-V (year 2019-20), 35.5% of children under 5 years of age are stunted, 32.1% are underweight and 19.3% are wasted. Among them, 7.7% children are severely wasted in India.^[4] And in Gujarat, 39.0% of children under 5 years of age are stunted, 39.7% are underweight and 25.1% are wasted. Among them, 10.6% children are severely wasted.^[5]

Protein Energy Malnutrition (PEM) remains an important public health problem in all the states of India even after nearly sixty five years of independence.^[1] Children with PEM are at an increased risk of mortality and often require intensive feeding in a hospital or clinic.^[6] Maternal and child under nutrition contributes to more than one third of child deaths.^[7]

Lack of food is not the sole cause of malnutrition. There are many socio-demographic factors which seem to be important contributory factors in determining the nutritional status of children.^[1]

Two important interventions by the Government to improve nutritional status of children are Integrated Child Development Services (ICDS) and Gujarat State Nutrition Mission (GSNM). GSNM was launched on 18th September 2012 with an aim to combat malnutrition across the state. In this initiative, there is a three tier approach for the management of malnourished children.^[8] Child Malnutrition Treatment Center (CMTC) is the second level Institutional care for inpatient management and treatment of severely malnourished children with complications at CHCs.^[9]

Rajkot is the 35th- largest metropolitan area in India, with a population of more than 2 million as of 2021.^[10] According to Census 2011, the total population of Rajkot city is 12,86,678. Total children between 0-6 years are 1,38,052 in Rajkot city so the children forms 10.73% of total population of Rajkot City.^[11]

There was only 1 functional CMTC in Rajkot Municipal Corporation area in year 2015 which was situated at Narayan Nagar Urban Health Centre. All malnourished children of <6 years of Rajkot city who needed admission were admitted there for treatment. So the study was conducted with the objectives to assess the epidemiological factors of malnourished children admitted at CMTC and to correlate various epidemiological factors with nutritional status.

Method:

The Cross-sectional study was conducted on malnourished Children of 0-6 years of age admitted at CMTC, Narayan Nagar Urban Health Center, Rajkot city. Data collection period was from May 2015 to May 2016. All malnourished children fulfilling the inclusion/exclusion criteria were included. Total number of malnourished children who attended CMTC was 120 during entire study period. The convenience sampling technique was used.

Inclusion criteria were the children between 0-6 years of age, newly admitted children in the study period and the children who had failed the appetite test and stayed for 14 days at the center. Written consent of the guardian was taken at the time of interview. Children whose guardian didn't give consent were excluded. Guardian were mostly mothers and in some case grandmothers also.

Pre-designed, pre-tested, semi-structured questionnaire was used for primary data collection by oral interview of guardian. Questionnaire included information regarding children's socio-demographic profile, information regarding birth history; breast feeding history; diet history before admission; immunization status; history of past illness since last 6 months of admission and history of utilization of ICDS services by admitted children.

Guardians were asked about current feeding practices of children. The appropriateness of current feeding practices assessed based on IMNCI feeding recommendations from Chart booklet. For Socio-

economic classification, Modified Prasads classification for May 2015 of Rajkot city was used. Its calculation is based on Consumer Price Index (CPI). It was 248 for Rajkot city in May 2015 i.e. starting month of study.^[12] Secondary data were collected from the registers maintained at the center which included weight of children on admission and grade of malnutrition.

The data entry was done in Microsoft Office Excel 2007 and analysis was done using both- the Microsoft Office Excel and Epi info software 7. The final study protocol was approved by the Institutional Ethics Committee of P.D.U. Government Medical College, Rajkot. Permission from Medical Officer of Health of Rajkot Municipal Corporation was obtained before starting the study.

Chi-square test was applied for association of Epidemiological factors with malnutrition status.

Results:

Education and Occupation:

Out of 120 studied children, fathers of 20 (16.7%) children were illiterate. Mothers of 15 (12.5%) children were illiterate. Primary school education was found in 59 (49.2%) childrens mothers. Out of total studied, 69 (57.5%) childrens fathers were labourers and 2 (1.7%) childrens fathers were unemployed. Mothers of 109 (90.8%) children were housewives and 9 (7.5%) childrens mothers were working as housemaids.

Birth history:

There was hospital delivery in case of 108 (90.0%) children. Out of 120 children, 48 (40.0%) children were low birth weight (LBW) and 7 children had birth weight of more than 4 kg. Birth weight ≥ 2.5 to 4 kg was considered as normal birth weight. According to Abubakari et al^[13] weight was classified as Normal birth weight ≥ 2.5 to < 4 , Low birth weight (< 2.5 kg) and Too heavy (≥ 4 kg). Out of 48 low birth weight studied children, 16 (33.3%) children born before 37 weeks of gestation. Out of total studied children, 53 (44.2%) children were having first birth

Table 1: Socio-demographic profile of Study participants (N=120)

Socio-demographic variable	n (%)
Age groups (Years)	
<1	07 (05.8)
1-3	67 (55.8)
3-5	41 (34.2)
> 5	5 (04.2)
Gender	
Male	52 (43.3)
Female	68 (56.7)
Area of Residence	
Slum	76 (63.3)
Non-slum	44 (36.7)
Religion	
Hindu	94 (78.3)
Muslim	26 (21.7)
Caste	
General	35 (29.2)
Socially and Economically Backward Class (SEBC)	69 (57.5)
Scheduled Caste (SC)	16 (13.3)
Type of family	
Nuclear family	55 (45.8)
Joint family	02 (01.7)
Three generation family	63 (52.5)
Total family members	
Up to 5 members	67 (55.8)
6-10 members	47 (39.2)
>10 members	06 (05.0)
Socio-economic class (n=119)*#	
Class I	02 (01.7)
Class II	10 (08.4)
Class III	35 (29.4)
Class IV	48 (40.3)
Class V	24 (20.2)

(*1 guardian did not know the family income)

as per modified B G Prasad classification

Table 2: Breastfeeding history of Study Participants (N=120)

Variables	n (%)
Breastfeeding given (N=120)	
Yes	116 (96.7)
No	04 (03.3)
Initiation of breastfeeding (n=48)*	
Initiation within an hour	13 (27.1)
Initiation after one hour	35 (72.9)
Exclusive breastfeeding (n=48)*	
Yes	27 (56.3)
No	21 (43.7)
Age of initiation of Complementary feeding (n=47)**	
Initiated immediately after 6 months	33 (70.2)
Delayed initiation	14 (29.8)
Appropriateness of complementary feeding (n=47)**	
Appropriate	20 (42.6)
Inappropriate	27 (57.4)
Duration of breastfeeding (2-6 year group) (n=62)	
<6 months	02 (03.2)
6-12 months	08 (12.9)
12-24 months	35 (56.5)
Continued after 24 months	17 (27.4)
Current feeding practices before admission (n=120)	
Appropriate and adequate to age	13 (10.8)
Inappropriate and inadequate to age	107 (89.2)

(*For babies <2 year of age, †Breastfeeding was stopped before 4 months in 1 child.)

order and 19 (15.8%) children were having third or more than third birth order. Out of 61 studied children who had ≥2nd birth order and whose data on preceding birth interval available, 4 (6.6%) children had birth interval of <1 year, 76 (63.3%) children had birth interval of 1-2 years and 45 (73.8%) children

had preceding birth interval >2 years. Out of total, 51 (42.5%) children had 1 sibling and 7 (5.8%) children had more than 2 siblings.

Out of total studied, 102 (85.0%) children were completely immunized to age. Any kind of past illness within last 6 months before admission was present in 114 (95.0%) children.

Out of total studied children, 108 (90.0%) children were registered at Anganwadi Centers and out of those registered, 95 (88.0%) children had utilized the services regularly. Annaprashan was given to 10 (22.7%) children out of 44 registered children of less than 2 years of age.

Out of total 120 participants, 75 children belonged to 0-3 year age group. Out of them more than half i.e., 40 (53.3%) children were moderately malnourished and 35 (46.7%) children were severely malnourished. and 45 children were from 3-6 years age group. Out of total 120 participants, 45 children belonged to 3-6 year age group. Out of them, 27 (60.0%) children were moderately malnourished and 18 (40.0%) children were severely malnourished.

Discussion:

In this study, majority 55.8% children belonged to toddler age group. Similar findings are observed in Ahmad et al^[14] in which majority 49.6% children belonged to toddlers which was conducted at tertiary care center. Less number of toddlers in that area as compared to present area may be the reason for difference in proportion. In this study, 56.7% children were females and in study by Ahmad et al^[14] 37.8%. which was conducted in a city of Uttar Pradesh. Reason for that may be that a high number of male proportion in that area. In present study, 40.3% children belonged to Socio-economic Class IV and only 2 children belonged to Socio-economic class I. In study by Ahmad et al^[14] majority i.e. 48.7% belonged to Upper lower and 35.7% children belonged to Lower Middle Socio-Economic class. In present study, modified Prasad's classification was used and in Ahmad et al^[14] Modified Kuppusswami classification was used.

Table 3: Distribution of Study Participants according to Past Illnesses and Hospitalization (N=120)

Type of Past illness (n=120)	No. of malnourished children n (%)	Average no. of episodes within 6 months before admission	Hospitalization required n (%)	Average duration of hospitalization (days)
Fever	62 (51.7)	2	04 (06.5)	1
Diarrhoea	38 (31.7)	2.5	03 (07.9)	3
Vomiting	01 (00.8)	1	00 (00.0)	—
Upper Respiratory Tract Infection (URTI)	92 (76.7)	4.5	03 (03.3)	1
Worm infection	04 (03.3)	1	00 (00.0)	—
Febrile convulsions	05 (04.2)	1	05 (100.0)	3
Malaria	01 (00.8)	1	01 (100.0)	3
Dengue	01 (00.8)	1	00 (00.0)	—

Table 4: Association of Epidemiological Determinants with Grade of Malnutrition

Determinants	Grade of malnutrition		Chi-square Value	p value
	Severe n (%)	Moderate n (%)		
Birth order (n=120)*	53 (100.0)	67 (100.0)	5.385	0.0203
More than 2	13 (24.5)	06 (09.0)		
Less than or equal to 2	40 (75.5)	61 (91.0)		
Birth weight (n=113)	51 (100.0)	62 (100.0)	0.798	0.3717
Low birth weight	24 (47.1)	24 (38.7)		
Normal birth weight	27 (52.9)	38 (61.3)		
Complementary feeding (n=111)	50 (100.0)	61 (100.0)	0.363	0.5468
Inappropriate and inadequate	25 (50.0)	34 (55.7)		
Appropriate and adequate	25 (50.0)	27 (44.3)		
Current feeding practices before admission (n=120)	53 (100.0)	67 (100.0)	0.554	0.4567
Inadequate	46 (86.8)	61 (91.0)		
Adequate	07 (13.2)	06 (9.0)		
Immunization status (n=120)	53 (100.0)	67 (100.0)	0.292	0.5889
Incomplete to age	09 (17.0)	09 (13.4)		
Complete to age	44 (83.0)	58 (86.6)		
Past illness since last 6 months (n=120)	53 (100.0)	67 (100.0)	0.016	0.8993
Present	51 (96.2)	63 (94.0)		
Absent	02 (03.8)	04 (06.0)		

(*Significant association between higher birth order and severe malnutrition)

In this study, 4 (6.6%) children had birth interval of <1 year, 76 (63.3%) children had birth interval of 1-2 years and 45 (73.8%) children had preceding birth interval >2 years. In study by Ahmad et al^[14] 43% children had preceding birth interval \geq 2 years and 27% children had preceding interval of < 2 years. In present study, the data of under 6 children are observed but in Ahmad et al^[14] children <3 years were observed.

In this study, 61.7% mothers were illiterate or having more than primary education. Similar finding was observed in study of Sudha kumari et al^[15] in which 68.3% mothers were illiterate or having more than primary education. Here, the participants of same age group of children were included.

In this study, 40.0% children were low birth weight (LBW) babies and 7 children had birth weight of more than 4 kg. Similar results were found in study by Sudha Kumari et al^[15] in which 41.5% children were LBW. Which was also the institution based study and Shukla et al^[16] in which 39.1% children were LBW. Age group of children was similar to present study. Out of total children, 53 (44.2%) children were having first birth order and 19 (15.8%) children were having third or more than third birth order. Similar finding was observed in study of Aprameya et al^[17] in which 15 (16.5%) children were having birth order third or more.

Out of the studied children, 48 (40.0%) children were of less than 2 years of age. Breast feeding was initiated within one hour of birth in only 13 (27.1%) children out of these 48 children. Similar finding was observed in study by Aprameya et al^[17] and Kalathia et al^[18] which showed that breast feeding was initiated within one hour in 31.9% and 32.7% children respectively. Exclusive breastfeeding was given in 27 (56.3%) children. Similar finding was observed in study of Amsalu et al^[19] in which exclusive breast feeding was given in 52% children. In this study, complementary feeding was started immediately after 6 months in 33 (70.2%) children. Similar finding was found in Amsalu et al^[19] in which complementary feeding was started immediately

after 6 months in 77% children. In this study, complementary feeding was appropriate in only 20 (41.7%) children out of 48 malnourished children.

In this study, 102 (85.0%) children were completely immunized to age. In Shukla et al^[16] 68.3% children were completely immunized. The difference might be because the children from rural area also get admitted in NRC and Aprameya et al^[17] in which 77% children were completely immunized to age respectively.

There were some study limitations. Only one CMTC was studied. The findings cannot be generalized to all. Recall bias may have occurred as some questions in the proforma depended on the memory of guardian. The study also included secondary data from the center. Information biases-like bias in abstracting records, misclassification bias and reporting bias may have occurred.

Conclusion:

Out of total malnourished children, majority were in toddler age group. Exclusive breast feeding was not given in almost half of children. Current feeding practices before admission were appropriate and adequate in very less number of children. Majority of children had suffered from any kind of past illnesses before admission. URTI, fever and diarrhoea were common infections among children and having higher episodes and requiring more hospitalization which may contribute to malnutrition. Children who had birth order more than 2 have more chances of becoming severely malnourished.

Recommendations:

Need based education sessions of mothers for preventing low birth weight, minimum birth interval between 2 children, suitable family planning methods for target couples, exclusive breast feeding, appropriate age of starting complementary feeding, type of complementary feeding, quantity and type of routine diet especially for toddler age group as per IMNCI guideline should be given.

Education regarding ways to maintain hygiene to prevent infections in children especially for those living in slum area, prevention of URTI, health seeking to avoid hospitalization and maintain good nutritional status, regular weight monitoring, and completeness of immunization should be given.

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Declaration:

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Conflict of Interest: Nil

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