

A Cross-Sectional Study to Measure Children's Morbidity Experience and Assess Dietary Intake during One Year Post-discharge from Nutritional Rehabilitation Center of Bhavnagar District of Gujarat

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Abstract :

Introduction: Malnutrition is responsible for the high incidence of morbidity in children and vice versa. This study has been conducted to assess the progress of the children after their discharge from Nutritional Rehabilitation Centre (NRC) by measuring the episodes of the common morbidities, they experienced during last one year and also to assess their current routine dietary intake. **Objectives:** To evaluate morbidity experience and assess dietary intake of the children after one year of their discharge from NRC, Bhavnagar **Method:** It was a community-based cross-sectional study carried out on all children who were discharged from NRC Bhavnagar between 1st April-2015 and 31st March-2016, conducted during the period between July 2016 and August 2017. The parents/guardians were interviewed by using the pre-tested, semi-structured questionnaire to collect the information regarding dietary practices and prevalence of childhood morbidities during last one year. **Results:** Total 1071 episodes of illnesses were experienced during last one year by 152 children, who were discharged from NRC, Bhavnagar during the period under study. The most common morbidities found among the children were cough, cold and fever. Average number of episodes of morbidities among the normal children was 7.5 episodes/child/year, among malnourished children, it was 5.9 episodes/child/year among moderately malnourished children, it was 6.7 episodes/child/year. Average protein and calories intake of SAM and normal children across all age-groups were found almost equal to or more than the requirement according to their age. **Conclusion:** Average number of episodes of morbidities experienced by the normal children, were higher than the number of episodes experienced by the malnourished children in the year following their discharge from NRC, Bhavnagar.

Key words: Morbidity, Nutritional Rehabilitation Centre, Severe Acute Malnutrition (SAM)

Introduction :

Globally, it is estimated that there are nearly 20 million children who are severely acutely malnourished and most of them live in south Asia and in sub-Saharan Africa. ^[1] According to NFHS-4 survey, 7.5% children under five years of age are suffering from SAM in India. ^[2] According to WHO, children suffering from severe acute malnutrition are at 5–20 times higher risk of death compared to well-nourished children. Current estimates suggest that about 1 million children die every year from severe acute malnutrition. ^[1]

Severe acute malnutrition puts the children at a greater risk of dying from common infections, increases the frequency and severity of such infections and contributes to delayed recovery. In addition, the interaction between severe acute malnutrition and infections can create a potentially lethal cycle of worsening illness and deteriorating nutritional status.

Nutrition Rehabilitation Centers (NRC) were started by Government of Gujarat at each district headquarters under Mission Balam Sukham in 2013 in order to get back the SAM children on track of

recovery. There was no data available regarding the status of these children once they were discharged from the NRC. This study was conducted among the children after one year of their discharge from NRC, Bhavnagar to evaluate their morbidity experience and assess their routine dietary intake.

Method:

It was a community-based cross-sectional study, which was carried out between July 2016 to August 2017. Study subjects consisted of all the children who were discharged from NRC, Bhavnagar between 1st April-2015 and 31st March-2016. After receipt of permission from in-charge of NRC, Bhavnagar for conducting the study, a list of the children, who were discharged from NRC, Bhavnagar between April 1, 2015, and March 31, 2016 was obtained.

A semi-structured questionnaire was designed in English and vernacular language. A pilot study was conducted and the questionnaire was corrected accordingly. Ethical clearance was obtained from Institutional Review Board of Government Medical College, Bhavnagar.

All the parents/guardians of the participants were contacted telephonically and were requested to participate in the study. They were visited at their convenient time and place. The participants were to be considered non-respondent, if they could not be interviewed after 2 such attempts.

After obtaining informed consent from each of the respondents (i.e. mothers/caregivers of the children), an interview was conducted and data were collected with a pre-tested and semi-structured questionnaire. The respondents were asked about the various common morbidities; the child had experienced during last one year.

They were also asked about the food intake of the child by using 24 hour recall method. The information thus obtained was then converted into the amount of protein and calories consumed, by using nutritive value tables from the book, Nutritive Values of Indian Foods, published by NIN, ICMR.^[3]

Data entry and statistical analysis was done by using EPI Info 7.0 software.

Ethical approval: The study were approved by the Institutional Review Board of Government Medical College, Bhavnagar

Results:

There were 161 children discharged from NRC, Bhavnagar between 1st April-2015 and 31st March-2016. Nine of them could not be interviewed after 2 scheduled attempts. So they were excluded from the study and final analysis was carried out from the data collected from total 152 (94.4%) respondents.

Table 1: Sex wise average number of episodes of different morbidities in the children during Last One Year.

Type of Morbidity	Average No. of Episodes/ Child/Year		
	Total N=152	Boys N=77	Girls N=75
Cough and cold	2.5	2.4	2.5
Pneumonia	0.1	0.1	0.1
Breathlessness	0.1	0.0	0.1
Earache	0.5	0.5	0.5
Fever	2.0	2.0	2.0
Diarrhea	1.8	1.8	1.7
Measles	0.1	0.1	0.1
Other illnesses	0.1	0.1	0.1
Total	7.0	7.0	7.1

It was found that during last one year on an average, a male child suffered from 7 episodes of common morbidities whereas a female child suffered from 7.1 episodes of common morbidities per year. For any of the morbidity in the table-1, difference in the average number of episodes between boys and girls was not found statistically significant. (t- test, $p > 0.05$, $df=150$).

It was found that on an average each child (of any age group) suffered from around 7 (Range- 6.7 to 7.2) episodes of common morbidities during last year. For any of the morbidity in table-2, difference in the average number of episodes between the children of <36 months and >36 months of age (groups in the table 2 were merged accordingly for the calculation of the t test) was not found statistically significant (t test, $p > 0.05$, $df=150$).

Table 2: Age-group wise average number of episodes of different morbidities in the children during last one year

Type of Morbidity	Average No. of Episodes/ Child/Year				
	<24 month N=3	24-35 month N=39	36-47 month N=46	48-59 month N=33	>60 month N=31
Cough and cold	2.7	2.4	2.6	2.5	2.4
Pneumonia	0.0	0.1	0.1	0.2	0.1
Breathlessness	0.0	0.0	0.1	0.0	0.0
Earache	0.3	0.5	0.6	0.5	0.5
Fever	2.0	2.2	1.9	2.1	2.0
Diarrhea	1.7	1.9	1.7	1.7	1.8
Measles	0.0	0.1	0.1	0.1	0.1
Other illnesses	0.0	0.1	0.1	0.2	0.1
Total	6.7	7.2	7.0	7.2	6.8

Table 3: Average number of episodes of morbidities during last one year in the children according to their malnutrition status.

Type of Morbidity	Average No. of Episodes/ Child/Year			
	Total N=152	SAM N=15	MAM N=52	Normal N=85
Cough and cold	2.5	2.1	2.4	2.5
Pneumonia	0.1	0.2	0.1	0.1
Breathlessness	0.1	0.0	0.1	0.0
Earache	0.5	0.2	0.2	0.7
Fever	2.0	1.8	2.0	2.0
Diarrhea	1.8	1.5	1.6	1.9
Measles	0.1	0.1	0.0	0.1
Other illnesses	0.1	0.1	0.1	0.1
Total	7.0	5.9	6.7	7.5

Table 4 : Age-group wise mean protein and calories intake by the children

Age group (years)	Requirement* of protein(gms)	Requirement* of Calories(kcal)	Malnutrition Status based on W/A	Mean Protein intake(gms)	Mean Calories intake(kcal)
1-3 (N=42)	16.7	1060	SAM	17.5	1191
			MAM	14.6	932
			NORMAL	16.5	1086
4-6 (N=79)	20.1	1350	SAM	22.8	1448
			MAM	18.0	1155
			NORMAL	20.0	1299
7-9 (N=31)	29.5	1690	SAM	32.5	1750
			MAM	20.0	1290
			NORMAL	27.0	1596

*According to guidelines of NIN, ICMR.^[3]

It was found that during last one year on an average, 5.9 and 6.7 episodes of common morbidities were experienced by SAM and MAM children (at the time of the visit) respectively as against 7.5 episodes by the children, who were normal at the time of the visit.

For all of the morbidities in table-3, except diarrhea and earache, the difference in the average number of episodes between the malnourished children(SAM+MAM children) and normal children (groups in the table 3 were merged accordingly for the calculation of the t test) was not found statistically significant. (t - test, $p > 0.05$, $df = 150$). However, for diarrhea and earache, the difference was found statistically significant (t-test, $p < 0.05$, $df = 150$)

As shown in table 4, the mean protein intake of SAM children in the age group of 1-3 years was 17.5 grams in comparison to the normal requirement of 16.7 grams. In the age group of 4-6 years, mean protein intake of SAM children was 22.8 grams in comparison to their normal requirement of 20.1 grams Also and mean protein intake of SAM children in the age group of 7-9 years was 32.5 grams in comparison to their normal requirement of 29.5 grams. Thus, the protein intake of the SAM children was more than the minimum requirement according

to their age. However, the protein intake of MAM and normal children was found less than the minimum required amount according to their age. Similarly, the calorie intake of SAM children was also found more than their minimum requirement for all the age groups.

Discussion:

It was found that 152 studied children suffered from 1071 episodes of common morbidities during last 1 year. Among the morbidities, average number of episodes of cough and cold was highest (2.5 episodes/child/year) followed by fever, diarrhea and earache (2, 1.8 and 0.5 episodes/child/year respectively) in the children under study. It was also observed that on an average, a female child suffered from 7.1 episodes of common morbidities during last year, whereas a male child suffered from 7 episodes of common morbidities during last year. Chowdhary et al and Oqbeide O^[4,5] had reported higher morbidity rates among female children. However, Tendai (2014) et al^[6] in their study observed that male children had experienced higher number of episodes of morbidities as compared to females whereas Datta Banik et al^[7] and Amrita N (2015) et al^[8] had found no difference in the incidence of sickness between male and female children.

It was observed that more or less the children of all age-groups have experienced similar number of episodes of common illnesses i.e. around 7 episodes/child/year (Range – 6.7 to 7.2 episodes/child/year). Mean number of episodes of cough and cold experienced by the children across all age groups were around 2.5 episodes followed by around 2 episodes of fever. No clear age-trend could be observed regarding the experience of common morbidities in these children.

It was found that during last one year, average numbers of episodes of common morbidities experienced by the SAM, MAM and normal children were 5.9, 6.7 and 7.5 respectively. Except for diarrhea and earache, the difference in the morbidity rates between underweight (SAM and MAM) and normal children was not found statistically significant.

Arun. A, et al (2014) in their hospital based prospective observational study in Kanpur, found that 36.5% of the malnourished children suffered from acute gastroenteritis and 26.5% suffered from acute respiratory infections. Tuberculosis was also present in 21.5% cases.^[9]

It can be observed from the study that the average energy and protein intake by SAM children were comparatively higher than MAM and normal children. This may be due to either increased requirement of energy and protein in SAM children or probably because SAM children were being cared more. This result can also be because of the effect of other confounding factors like age, sex, etc.

Result of the study showed that protein and calories intake of MAM children in all age-groups were less than their normal requirement according to their age. Being a MAM child, he/she should have had more intake than normal child. So these children were (even after more than a year of their discharge from NRC) still not on track of good nutrition.

Conclusion:

Male and female children who were discharged from NRC, Bhavnagar experienced similar number of episodes of common morbidities on an average. It was also concluded that there was no statistically significant difference found between the children of <36 months and 36 or >36 months of children for the

experience of the number of episodes. Normal children had experienced more number of episodes of common morbidities as compare to malnourished children. However, the difference was not found statistically significant for any of the morbidities except diarrhea and earache. Average energy and protein intake of MAM children was comparatively lower than the SAM and normal children and also lower than the recommended required intake for their age.

Declaration:

Funding: Nil

Conflict of Interest: Nil

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