Malnutrition among Under five Children belonging to an Underprivileged Community as per the ABCDEF –'ELIZ Modified IMPACT' Approach

Elizabeth KE*
Department of Pediatrics, MGR Medical University, India

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Corresponding Author :

Elizabeth KE, Department of Pediatrics, MGR Medical University, Mangalathumannil, Nalanchira, Thiruvananthapuram, Kerala-695015, India,
Email: drelizake@gmail.com

ABSTRACT

Background: Malnutrition is a man-made disease of multi-deprivation that hinders growth, development, survival and quality of survival of children. It is more rampant among children belonging to underprivileged communities, especially in developing countries like India. As per the Indian Academy of Pediatrics (IAP) President's Action Plan on Nutrition Education Program, 2015, a holistic ABCDEF approach using Anthropometric, Biochemical/Labs, Clinical, Dietary, Ecological/ Environmental and Functional parameters, namely IAP's Malnutrition Proactive Assessment-A Comprehensive Tool (IMPACT) and ELIZ Modified IMPACT, was developed.

Objective: To assess malnutrition by the ABCDEF approach, using the tool- ELIZ Modified IMPACT among under five children belonging to an underprivileged coastal community.

Methods: Under-five children belonging to a coastal fishermen community included in the village adoption program of IAP, from South India, attending Outreach camps and Catch up immunization sessions were evaluated. Relevant data, and measurements as per the ABCDEF approach, were collected using a structured questionnaire.

Results: Among the 293 children, 29.7% were born as Low Birth Weight (LBW) babies and majority (73.3 %) was above one year of age. The Male to Female ratio was comparable. Anthropometric assessment showed that the proportion of under five children with underweight was 43.1%, stunting 37.2% and wasting was 59.7%. Out of them, 6.6% were severely underweight, 5.1% severely stunted and 7.5% were severely wasted. In the 6-60 months age group, 3.4% had MUAC < 11.5 cm. As per Biochemical/Lab evaluation, from among the 42.3% of 6-60-month-old children with palmar pallor, anemia was documented in 35.5%,as per WHO Hemoglobin cut off level < 11 g/dl. No one had severe anemia with Hb<7 g/dl. Clinically, 2.7% had loose skin folds indicating wasting and 5.1% had Vitamin A or B deficiency signs. Dietary assessment showed that 68.9% had suboptimum IYCF practices. Environmental assessment as per Briscoe sanitary scale, revealed that majority (69.3%) had suboptimum score. As per functional assessment using developmental milestones, 18.5% had developmental delay.

Conclusion: Assessment of malnutrition using the 'ELIZ Modified IMPACT' based ABCDEF approach ledto a holistic and complete evaluation. Among under five children, belonging to underprivileged community, the proportion of children with LBW, severe underweight, stunting, wasting, anemia, clinical evidence of wasting and vitamin deficiency signs and developmental delay were high. The IYCF practices and sanitary conditions were suboptimum. Hence, a holistic approach in assessment and optimum Behavioral Change Communication (BCC) are recommended, in view of the public health importance.

INTRODUCTION

Malnutrition is a man-made disease of multi-deprivation that hinders growth, development, survival and quality of survival of children [1]. Recently a change in the profile of malnutrition is observed with edematous Severe Acute Malnutrition (SAM), occurring among young infants due to faulty Infant and Young Child Feeding (IYCF) practices [2]. Malnutritionis more rampant among children belonging to the under privileged sections like slum, coastal and tribal communities, especially in developing countries like India. As per the Indian Academy of Pediatrics (IAP) President's Action Plan on Nutrition Education Program, 2015, a holistic ABCDEF approach using Anthropometric, Biochemical/Labs, Clinical, Dietary, Ecological/ Environmental and Functional parameters, namely IAP's Malnutrition Proactive Assessment-A Comprehensive Tool (IMPACT) was developed [3]. Later, it was modified asthe 'ELIZ Modified IMPACT' [4]. A village adoption program was undertaken, as a strategy under the crusade against malnutrition and a study was undertaken to assess malnutrition including the 6 components of the tool.

METHODS

Consecutive under-five children, belonging to coastal fishermen community included in the village adoption program of IAP from South India, attending Outreach camps and Catch up immunization sessions were enrolled in the study. Relevant data were collected using a structured questionnaire.

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SCIENTIFIC LITERATURE

Parental consent was obtained prior to the study. Anthropometric measurements included weight, height and Mid-Upper Arm Circumference (MUAC) using standardized procedures [5]. The WHO Z Score charts were used for comparison. Biochemical/Lab assessment included colorimetric determination of hemoglobin content using Sahli's hemoglobin meter, in 6-60-month-old children with palmar pallor. Hemoglobin was estimated in 42.3% of 6-60-month-old children. Clinical assessment included loose skin folds, bilateral pitting edema, skin and hair changes and features of vitamin A, B, C or D deficiency. Dietary factors included IYCF practices, like exclusive breast feeding till 6 months of age, complementary feeding in the form of semisolids after 6 months, family pot feeding by one year of age and continued breastfeeding till 2 years of age. Environmental assessment was done using the Briscoe Sanitary Scale [6], including water source and storage, defecation habits of under five children, hand washing practices and cleanliness of mother's hands. Functional evaluation included assessment of developmental mile stones in comparison with age appropriate mile stones available in the Mother Child Protection (MCP) Card and any delay was noted. Analysis of data was done using SPSS Version 16. Descriptive statistics was used for participant characteristics.

RESULTS

Among the 293 children evaluated, majority (73.3 %) were above one year of age. The Male to Female ratio was comparable. Out of them, 29.7% were born as Low Birth Weight (LBW) babies. The baseline parameters in the study are summarized in Table 1.

Table1: Baseline Parameters in the Study		
Parameter	**No**	**%**
Age Group		
0-1 year	78	26.7
1-5 years	215	73.3
Sex		
Male	154	52.6
Female	139	47.4
Birth Weight		
Normal	206	70.3
LBW	87	29.7
Birth Order		
1-2	181	61.8
3 or more	112	38.2
Mother's Education		
Illiterate	5	1.7
Literate/Primary	177	60.4
Secondary	60	20.5
Higher Secondary/College	51	17.4

Anthropometric assessment using WHO Z Score charts showed that 56.9% had normal weight, 62.8% had normal height and 40.3% had normal weight for height and the rest had varying grades of malnutrition. The proportion of under five children with underweight was 43.1%, stunting was 37.2%, wasting was 59.7% and 6.6% were severely underweight, 5.1% severely stunted and 7.5% were severely wasted. In the 6-60 months age group, 3.4% had MUAC <11.5 cm, indicating severe acute malnutrition. As per Biochemical/Lab assessment, hemoglobin was estimated in 42.3% of 6-60-month-old children with palmar pallor and anemia was documented in 35.5%, as per the WHO hemoglobin cut off level <11 g/

dl. No one had severe anemia with Hb<7 g/dl. Clinically, 2.7% had loose skin folds indicating wasting and 5.1% had clinical evidence of Vitamin A or B deficiency signs. Dietary evaluation showed that in the majority (68.9%), the IYCF practices were suboptimum. Environmental assessment as per the Briscoe sanitary scale revealed that majority (69.3%) had suboptimum score. Functional assessment showed that 18.5% had developmental delay, mostly gross motor delay. The ABCDEF parameters are depicted in Table 2.

Table 2: The ABCDEF Parameters in the Study.		
Parameter	**No**	**%**
A. Anthropometry		
Weight for Age		
Normal	167	56.9
< 2 Z Score	107	36.5
< 3 Z Score	19	6.6
Height for Age		
Normal	184	62.8
< 2 Z Score	94	32.1
< 3 Z Score	15	5.1
Weight for Height		
Normal	118	40.3
< 2 Z Score	153	52.2
< 3 Z Score	22	7.5
MUAC (6-60 mo.):n=265		
Normal	139	52.5
11.5-13.5 cm	117	44.2
< 11.5 cm	9	3.4
B. Biochemical/Labs* (6-60 mo.) n=265		
Palmar pallor	112	42.3
Hb< 11 g/dl- Anemia	94	35.5
C. Clinical Wasting:		
No	285	97.3
Yes	8	2.7
Vitamin A/ B/C/D Deficiency:		
No	278	94.9
Yes	15	5.1
D. Dietary IYCF practices:		
Optimum	91	31.1
Suboptimum	202	68.9
E. Ecological /Environmental Sanitary Conditions:		
Optimum	90	30.7
Suboptimum	203	69.3
F. Functional Developmental Mile Stones		
Normal:	239	81.5
Delay:	54	18.5

* Hemoglobinestimation done only in 6-60 month old with palmar pallor.

DISCUSSION

Malnutrition is a disease of multi-deprivation, with a high morbidity and mortality [7]. This study undertaken among under five children belonging

to an underprivileged community has shown a very high rate of malnutrition, with stunting and wasting. The higher proportion of LBW babies (29.7%) noted in the study indicates the very early onset of malnutrition, starting in utero.

Nutrition in the first 1000 days of life, including period in utero, from the time of conception to two years of age, is known to have influence on future growth and development of the child. The IYCF practices were suboptimum in these children. The sanitary conditions of the children were also suboptimum in the preset study. The Interactions of Water Sanitation and Hygiene (WASH) with malnutrition, infections and morbidity/mortality are of public health importance [8].

The proportion of underfive children with underweight (43.1%), stunting (37.2%) and wasting (59.7%) was high, compared to the National average. In the present study, severe stunting was 5.1% and severe wasting was 7.5%.Data as per the National Family Health Survey 4 (NFHS) data of 2016 were as follows; 0-6-month-old who are exclusively breastfed - 46.4%, 6-8-month-oldreceiving solid or semi-solid food and breast milk - 52.6%, under five children who are underweight - 42.5%, under five children who are stunted - 48.0%,underfive children who are wasted - 19.8 % and under five children who are severely wasted - 6.4% [9]. Among the anthropometric parameters, acute malnutrition as indicated by wasting was three times more than the national average.

The prevalence of under five children with anemia has been reported to be as high as 50-60% [10]. In the present study, due to feasibility issues, hemoglobin was estimated only in 6-60-month-old with palmar pallor and the proportion of children with anemia was 35.5%. This observation is of public health importance because, even mild to moderate anemia is known to cause physical, developmental and cognitive impairment with lifelong sequelae [11].

Developmental delay was noted in 18.5%, especially gross motor delay and poor interactions. Muscle wasting, micronutrient deficiency and electrolyte imbalances contribute to this. Malnutrition is a known risk factor for developmental delay [12]. Growth faltering and developmental delay in malnutrition has been previously highlighted and a comprehensive nutrition cum stimulation package has been proposed for optimum care [13,14].

The strength of the study was that it was a community based study on under five children, belonging to poor socio-economic status. The limitation was that the number of children in the different age groups was non-uniform. The laboratory tests were limited and were undertaken only on clinically evident cases with anemia and not as screening test in all cases.

CONCLUSION

Assessment of malnutrition using the 'ELIZ Modified IMPACT' based ABCDEF approach led to a holistic and complete evaluation. Among the under five children, belonging to underprivileged sections, the prevalence of LBW, severe underweight, stunting, wasting, anemia, clinical evidence of wasting and vitamin deficiency signs and developmental delay were very high. The IYCF practices and the sanitary conditions were suboptimum. Holistic assessment and optimum Behavioral Change Communication (BCC) are recommended in view of the public health importance.

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