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Original Research Article

Impact of supplementary nutrition on the nutritional status of children below six years of age registered under ICDS in Gandhinagar

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ABSTRACT

Background: Under nutrition has significant impact on morbidity and mortality of the children of age group 0-6 years. ICDS is working to combat under nutrition of these children since many years by providing supplementary nutrition. Objective of this study is to determine the progress in the nutritional status of the children of age group 0-6 years registered under ICDS who are taking benefit of supplementary nutrition from anganwadi.
Methods: To determine the progress in the nutritional status of the children of age group 0-6 years registered under ICDS who are taking benefit of supplementary nutrition from anganwadi.
Results: A cross sectional study was conducted at anganwadi centers under field practice area of urban health and training centre, Sector -24, GMERS Medical College, Gandhinagar in the month of November and December 2019. Total 200 children fit to inclusion and exclusion criteria were enrolled from 3 anganwadi centre. The structured baseline questionnaire was used to include basic socio-demographic detail, detail of anthropometry measurement and regularity in attendance etc. WHO growth chart V 3.2.2 was used to calculate the Z score for the weight for height (wasting), weight for age (underweight) and height for age (stunting).
Conclusions: High prevalence of Stunting and wasting in anganwadi children is alarming as may have overall developmental effect in future. Engagement of community and family members and focus on other socio demographic risk factors from childhood malnutrition is need of the ICDS program.

Keywords: Under nutrition, Supplementary nutrition**,** ICDS

INTRODUCTION

Children 0-6 years constitute a sizeable proportion of the population in India which is about 13.1% of the total population and therefore their health and nutrition is a matter of concern. Also healthy children mean healthy nation as they are the future generation.[1] Undernutrition in the children is the major public health problem of the India and has one of the astonishing magnitude. According to NFHS 4, in India, prevalence of Stunting, wasting and underweight in below 5 year children is 38%, 21% and 36%, respectively. As per as Gujarat is concern, 39% children are stunted, 27% are wasted and 40% are underweight which is above the national average. Percentage of severely under nurished children is also more than the national average in Gujarat.[2] Under nutrition contributed to various morbidity and mortality in children. WHO mentioned that more than forty five percent of all under five child deaths are contributed by the under nutrition, in spite of this, it is rarely listed as the

direct cause.[3] Overall under-five mortality rate of 74.3 per 1,000 live births which is alarming for India.[2] Under nutrition is not just a state, but it is a process, the consequences of which often extend not only into later life but also into future generations. In under-nutrition specifically stunting is associated with impaired mental development and poor school performance and matter of concern is 17% of under five children are severely stunted in Gujarat.[2,4,5]

Growth monitoring is very important aspect for measurement of child's well -being and undernutrition and for measurement of the undernutrition, various classifications are used in India. I.A.P. classification is most commonly used for measuring Weight-for-age. For other aspects like, Height-for-age and Weight-for-height classifications like McLaren, Waterlow's are less frequently used.[6] But major disadvantages of these classification is that none of them address to all the three indices of undernutrition stunting, wasting and underweight simultaneously. Z -scores is used to assess anthropometric measures to evaluate children's growth and nutritional status. It measures all the three indices simultaneously. Other advantages of the z score are that they are calculated based on the distribution of the reference population (mean and standard deviation), and thus reflect the reference distribution as standardized quantities, they are comparable across ages, sexes, and anthropometric measures. In addition, they can quantify extreme growth status at both ends of the distribution.[7] The WHO recommendation is to use the Z-Score or SD system to grade undernutrition.[8]

To combat the malnutrition in India, programs like mid-day meal program and integrated child development Services (ICDS) are running. The ICDS programme is India's primary response to the nutritional and developmental needs of the children below six years, pregnant women and nursing mothers. The scheme is running in India since 1975 to provide services like food, preschool education, immunization, health check-up, supplementary nutrition and health education to children aging 0-6 years, lactating and nursing mothers through anganwadi. As the name suggest, integrated approach is used in the program to tackle the various factors affect the under nutrition. Amongst them supplementary nutrition is the major component to fight against the malnutrition. Although the program is running since last four decade, various challenges like universalization of scheme, administrative issues, budget allocation, inadequate space for anaganwadi, low focus on growth monitoring, availability of Human resource, intersectoral convergence, training, monitoring and use of MIS are the major bottlenecks of the program.[9] Also World bank has found data that there is almost no association between the presence of ICDS in a community and achild's nutritional status.[10-12] It is possible that, in spite of being a long-standing scheme, unknown social factors are impacting familial perceptions and utilization of ICDS and rendering the scheme ineffective.

The matter of concern still remains the same since more amount of effort has been put up on increasing the coverage and delivering food rather than improving the quality of public delivery and changing family based caring and feeding behavior.[2,12] With the present back ground, the study is conducted to determine the progress in the nutritional status of the children of age group 0-6 years registered under ICDS who are taking benefit of supplementary nutrition from anaganwadi.

METHODS

Study type, location and duration

Present study is a cross sectional study conducted at anganwadi centers of field practice area of urban health and training centre (UHTC), Sector -24, GMERS medical college, Gandhinagar for a duration of two months from November to December 2019.

Sample size and study group

Anganwadi centers were selected by purposive sampling technique. All the children registered in this three anganwadi were enrolled. Total 443 children age upto 6 years and who were registered in these three anganwadi centres of UHTC, were enrolled in the study. Aim was to analyze demographic variables of all the registered children and also analyze the impact of demographic variable on nutritional status of children who fit into the inclusion criteria of the study. WHO Z score is applicable to 0-5 years of age children so 200 children of 0-5 years of age, fitted in to the inclusion criteria, were included for the study. Children registered in above mentioned anganwadi centres aged 0-6 years were included as study groups.

Inclusion criteria

Inclusion criteria for current study were; children who registered since last one or more year in the anganwadi centre on the date of conducting a survey. This inclusion criterion of atleast 1 year registration in anganwadi was set, so that effect of supplementary nutrition given in the anganwadi can be analyzed.

Exclusion criteria

Exclusion criteria for current study were; children registered in the anganwadi centre for period of less than a year on the date of conducting a survey and mother of the children did not give informed consent for the study

Method of data collection

Anthropometric measurements data of all children, from the date they registered to the date of survey, were collected from the records of anganwadi worker. WHO growth chart V 3.2.2 was used to calculate the Z score for the weight for height (wasting), weight for age

(underweight) and height for age (stunting). We did weight and height/ length of children in centre according to guideline of ICDS. We also did home visit of the children to collect the baseline demographic details and to know the education and socio economic status of the parents.

Study performa

The structured baseline questionnaire was used to include basic socio-demographic detail, detail of anthropometry measurement and regularity in attendance by participants in anganwadi centre etc. Modified Prasad classification was used to determine socio-economic status of the participant.

Study procedure

The age of the child was recorded from the Mamta card. Weight was measured with Salter weighing scale for children less than two years. We made the zero adjustment so that the needle points to zero before the child is weighed. Child's weight was measured with the minimum clothing and without shoes. Weight was recorded in kilograms and to the nearest 100 gm. For child more than two years of age, weight of children was measured with digital scale by removing outer clothing in order to obtain an accurate weight of child. A wet diaper, shoes and jeans, can weigh more than 0.5 kg.[13] Height was measured for children age more than two years with help of height measuring scale with accuracy of 0.1 cm. Height was taken in standing position without foot wear. For child less than two years of age, length was measured with the help of measure tape with child is in sleeping position. Permission from the in charge of UHTC was taken for initiation of study. Children who had severe under nutrition were refereed to nutritional rehabilitation centre (NRC) with help of the anganwadi worker.

Data entry and statistical analysis

Data entry and analysis has been done in software Epi info version 7.0. Data was cleaned and validated before analysis. We compared the current Z score of the children with that of last year Z score to know the effect of supplementary nutrition on physical growth of children during last one year. We also compared the first time Z score of the children with that of yearly Z score. Chi square test was used to find statistical significance of supplement nutrition and occurrence of wasting, stunting and underweight in the study population. The test was also used to find the association between socio-demographic variables with outcome variables named; wasting, stunting and underweight (Significance at 5% level, $p<0.05$)

RESULTS

The socio demographic details of the participants with the categories like gender, age and religion of child, age, education and occupation of mother; education and occupation of father and socio economic status is shown in (Table 1).

Table 1: Socio-demographic detail of the participants (n=200).

Variable	N (%)
Sex of the child	
Male	95 (47.5)
Female	105 (52.5)
Age of the child (years)	
1.5-2.5	27 (13.50)
2.5 -3.5	67 (33.5)
3.5 – 4.5	66 (33.0)
≥4.5	40 (20.0)
Religion	
Hindu	193 (96.50)
Muslim	7 (3.50)
Age of mother (years)	
<20	1 (0.50)
20-24	23 (11.50)
25-29	101 (50.50)
30-34	61 (30.50)
≥35	14 (7.00)
Education of mother	
Illiterate	106 (53.00)
primary education	50 (25.00)
secondary education	38 (19.00)
higher secondary and above	6 (3.00)
Occupation of mother	
Housewife	188 (94.00)
Working	12 (6.00)
Education of father	
Illiterate	38 (19.00)
Primary education	32 (16.00)
Secondary education	100 (25.00)
Higher secondary and above	30 (15.00)
Occupation of father	
Vendor	98 (49.00)
Laborer	80 (40.00)
Self employed	14 (7.00)
Employee	8 (4.00)
Socio economic status	
Class II	10 (5.00)
Class III	27 (13.50)
Class IV	104 (52.00)
Class V	59 (28.50)

Gender distribution is nearly equal that is 95 male and 105 female out of 200 participants. Majority (66.5%) of children were of age group between 2.5 to 4.5 years. 13.5% and 20% of children were of age below 2.5 years and age above 4.5 years, respectively. 92.5 % of mothers were from age group between 20 to 35 years whereas 7%

of mother were having age more than 35 years. 188 mothers were housewife and 12 were working women. More than 50% of mothers were illiterate (Figure 1) while only 19% of fathers were illiterate.

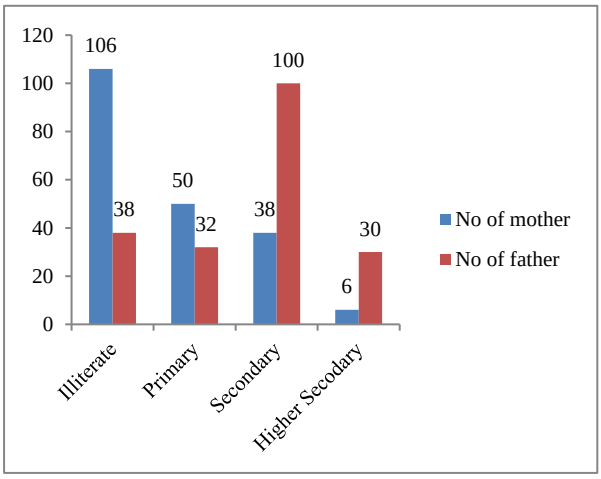

Figure 1: Education of parents.

Total 16% (32) participants are from the family were both mother and father are illiterate. Out of total 98 participant's father were vendors, 80 were labours, 14 were self employed and the remaining 8 are employees. As per the Modified Prasad Classification, 5% and 13.5% children were from Class II and Class III while 52% and 28.5% of children were from Class IV and Class V respectively. The nutritional status of the total 200 participants according to the weight for the respective age, weight for the respective height and height for the respective age is shown in (Table 2).

Table 2: Nutritional status according to weight for age, weight for height and height for age (n=200).

Nutritional status	Weight for age N (%)	Weight for height (wasting) N (%)	Height for age (stunting) N (%)
Above normal (≥+ 2 Z score)	0 (0.0)	27 (14.5)	4 (2)
Normal (≤-2 to +2 Z score)	140 (70)	136 (68.5)	80 (40)
Moderate (-2 to 3 Z score)	47 (23.5)	15 (7.5)	40 (20)
Severe (<-3 Z score)	13 (6.5)	24 (12)	76 (38)
Total	200	200	200

Total 140 (70%) and 136 (68.5%) of participants had normal weight for age and normal weight for height, respectively. Moderate to severe wasting was observed in 39 (19.5%) of children. (Z score <-2) Only 70 (40.0%) of participant were in the range of normal height for age, while 38 % of participants were severely stunted. (Z score <-2). Classification of the nutritional status of the participants according to weight for age is shown in (Table 3).

Table 3: Year wise nutritional status (weight for age) after supplementary nutrition of children registered under anganwadi centre (n=200).

Nutritional status	Weight for age at the time of admission N (%)	Weight for age after one year of supplementary nutrition N (%)	Weight for age after two years of supplementary nutrition N (%)	Weight for age after three years of supplementary nutrition N (%)	P value
Above normal (≤+2 Z score)	7 (3.5)	3 (1.5)	1 (0.5)	0 (0.00)	<0.0001* (90.823)
Normal (≤-2 to +2 Z score)	190 (95)	183 (91.5)	173 (86.5)	141 (70.5)	
Moderate (-2 to -3 Z score)	2 (1)	10 (5.0)	17 (8.5)	47 (23.5)	
Severe (<-3 Z score)	1 (0.5)	4 (2.0)	9 (4.5)	12 (6.00)	
Total	200	200	200	200	

*Chi square test (significance at 1% level)

There is statistically significant difference found in nutritional status of participants' weight for age ($p<0.0001$). There has been significant decrease in the number and percentage of participants with normal weight for their respective age from the time of admission to consecutive three year of the admission with supplementary nutrition. On the other side, increase in the proportion of Moderate and severe malnourish children from the year of admission to 3rd year of admission in anganwadi. The association of socio demographic variables to weight for age status of the participants is shown in (Table 4). Statistically there is no significance of nutritional status of the children with respect to gender, occupation of the mother, education of mother, education of father, occupation of father, birth weight and number of siblings as the χ^2 test value for each of these parameters is more than 0.05 ($p>0.05$) except for age of the mother which shows significance ($p<0.05$).

Table 4: Association of socio-demographic variables with weight for age status of participants (n=200).

Variable	Weight for age status		P value
	Normal	Below normal	
Sex of the child			
Male	66	29	0.774
Female	64	41	
Age of the child (years)			
1.5-2.5	37	12	0.189
2.5 -3.5	41	20	
3.5 – 4.5	40	22	
≥4.5	14	14	
Age of mother (years)			
<20	00	01	0.03
20-24	15	12	
25-29	68	30	
30-34	43	17	
≥35	14	00	
Education of mother			
Illiterate	69	32	0.254
Primary education	33	10	
Secondary education	33	19	
Higher secondary and above	04	00	
Occupation of mother			
Housewife	123	54	0.42
Working	7	5	
Education of father			
Illiterate	41	31	0.058
Primary education	1	0	
Secondary education	66	30	
Higher secondary and above	16	7	
Occupation of father			
Not working	2	0	0.382
Laborer	35	21	
Self employed	59	25	
Employee	9	01	
Job	8	06	
Birth weight			
≤1000	0	3	0.228
≤2000	96	45	
≤3000	27	19	
≤4000	7	3	
Number of sibling			
0	2	0	0.565
1	16	10	
2	47	23	
3	35	18	
4	22	7	
≥5	8	1	

*Chi square test (significance at 5% level)

DISCUSSION

Integrated child development scheme is one of the government run programs where along with the food at home, a child in the range of 0-6 years of age also gets supplementary nutrition from the anganwadis with an aim to improve the nutritional status of children. Program also focuses on preschool education of the children and nutritional and health education of mothers. Prevalence of moderately undernourished and severely undernourished (weigh for age) children was found 23.5% and 6.5% which was found 9.7% and 3.9% in urban Hyderabad in a study by Moluguri A et al.[14] In current study, Prevalence of severe stunting is observed much higher (38%) than rural Goa (8.7%) while prevalence of severe wasting is 12.0% which is similar to Goa (10.4%) as found in study by Pinto Silva et al.[15] Prevalence of moderate Wasting and Stunting was observed 52.8% and 47.2% in rural Vadodara, Gujarat which was much more higher than what is found in the current study (moderate wasting: 7.5%, moderate stunting: 20.0%).[16] This difference may be due to methods of classification of malnutrition, difference in sample size, geographic distribution of sample population and other socio economic background of participants. There has been increase in the number of moderately undernourished children after 3 years of the supplementary nutrition. The point of focus in the study was the significant rise in the number of the participants in the category of severe malnutrition i.e. the Z score is ≤3, which indicates that supplementary nutrition is not improving the nutritional status of the children registered under those anganwadi. A study by Prinka Dixit et al releases the finding that, children who received benefits from ICDS was having 1.4% higher chance of being stunted, 6.7% higher chances of being underweight, and 4.5% higher chance of being wasted as compared with children who did not get the services.[17]

Explainable reason for this could be the age of children during the enrolment in anganwadi. Enrolment age in anganwadi is generally after two to 3 years of age during which under nutrition already sets in.[18] Further, food supplied in the angawadi is taken by the children as an option of their daily food rather than supplementary food, so overall consumption does not increase or may not match with their daily requirement. To indentify underlying factors for under nutrition in the current study, social demographic factors and under nutrition (weigh for age) association was studied by Chi square test with 5% significance level. Investigators has found association of socio-demographic factors like Gender of child, birth order, complementary feeding, age of the mother, education of mother, socio economic class, hand washing (poor sanitation) and childhood infections with wasting and stunting in children which are the measures of under nutrition.[19-22] Not only formal education of the mother, but Nutritional education of the mothers of the children enrolled in anganwadi may improve the nutritional status of the children.[23] In this study, age of mother is significantly associated with under nutrition in children

with Chi Square is significant at 5% level ($p<0.05$) However, proportion of undernourished children are insignificantly higher when the child is female, children of illiterate mother and father and children of labourer. 53% of mother are illiterate and 35% of father are literate only upto primary education. More than 80% of children are from class IV and V. These are the determinants who may predispose to undernourishment in the children.

Limitations

Limitations of current study are; in the current study, sample size was small and other socio demographic factors like culture practices and episodes of infection in the children are need to be studied. Other than urban slums, similar kind of study with insight in cultural practices, disease and immunization history need to be conducted in rural and tribal setting.

CONCLUSION

High prevalence of stunting and wasting in anganwadi children is alarming as may have overall developmental effect in future.

Recommendations

Although integrated child development scheme is a government program for public welfare and having the good coverage, it largely focuses on serving supplementary food. Operational research is required to indentify operational bottleneck of the program. Evaluation of skill of agnawadi worker, cost effective analysis of program fund, effective mode of supervision, stringent evidence based protocol to deal under nutrition in less than 3 years children, engagement of community and family members and focus on other socio demographic risk factors from childhood malnutrition is need of the program.

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