Original Article

A CROSS SECTIONAL STUDY TO UNDERSTAND THE FACTORS AFFECTING INTAKE OF SUPPLEMENTARY NUTRITION AMONG CHILDREN REGISTERED WITH ICDS ANGANWADIS

MohamedAnas M Patni[1], Abhay Kavishwar[2], Mohmmedirfan H Momin[3], S L Kantharia[4]

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Author's Affiliation:
[1]Tutor; [2]Associate Professor; [3]Assistant Professor; [4]Professor & Head, Preventive and Social Medicine Department, Government Medical College, Surat

Correspondence:
Dr. Patni MohamedAnas M,
Email: dr.anas1985@gmail.com

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ABSTRACT

Introduction: Malnutrition a serious problem in India. ICDS anganwadis provide supplementary nutrition to its children beneficiaries.

Aims and objectives: 1) To study various factors affecting the intake of supplementary nutrition by children registered with anganwadis.2) To understand the mother's perception about supplementary nutrition provided at anganwadi centers.

Methods: It was a cross sectional study done during January and February 2011. All children of three to five years of 6 randomly selected anganwadis of Jhagadia block of Bharuch district were selected for study. The pretested and predesigned questionnaire was used for collection of data from the mother of the children at their home. Data for availing of supplementary nutrition by child was obtained from anganwadis.

Results: Out of 104 children, 70 (67.3%) received adequate and 34 (32.7) did not receive adequate supplementary nutrition. Among various factors, complementary feeding after 6 months of birth, birth weight, Vitamin A intake, diet at home, variety of food in diet at home and illness were found to have significant effect on attainment of supplementary nutrition by children from anganwadi. Also, mothers of children had good perception about supplementary nutrition in anganwadi, but considered it to be insignificant for growth of their child.

Conclusion: Illness of child, diet at home, birth weight was few of the many factors found to have impact on intake of supplementary nutrition by child at anganwadi.

Keywords: Supplementary nutrition, ICDS, Cross sectional study

INTRODUCTION

Protein energy malnutrtion is an important nutritional problem among preschool age children. This leads to various degrees of growth retardation. Many factors can cause malnutrition, most of which relate to poor diet or severe and repeated infections, particularly in underprivileged populations. Inadequate diet and disease, in turn, are closely linked to the general standard of living, the environmental conditions, and whether a population is able to meet its basic needs such as food, housing and health care. Malnutrition is thus a health outcome as well as a risk factor for certain diseases and exacerbated malnutrition and these diseases can increase the risk both of morbidity and mortality[1].

According to the National Family Health Survey (NFHS-3) carried out in 2005-06[1], Almost half of children under five years of age (48 percent) are stunted and 43 percent are underweight. Wasting is also quite a serious problem in India, affecting 20 percent of children under five years of age[1].

Launched on 2nd October 1975, today, ICDS Scheme represents one of the world's largest and most unique programmes for early childhood development. ICDS provides supplementary feeding through anganwadis. Children beneficiaries avail supplementary feeding support for 300 days in a year[2].

However, in spite of the expansion of ICDS, evaluation studies done by FORCES indicate that ICDS reaches out to only 30% of the children. Children from remote scattered hamlets and children living in new slum clusters are often out of the ambit of ICDS services[3]. Malnutrition has decreased only marginally from 47% in 1998-99 to 46% in 2005-06, as was revealed in the National Family Health Survey III (2006)[1].

So there is need to study factors affecting reach of ICDS services especially supplementary nutrition.

OBJECTIVES

Objectives of this study were to study factors affecting intake of supplementary nutrition by children registered with anganwadi centers and to understand the mother's perception about supplementary food provided at anganwadis.

MATERIAL & METHODS

It was a Cross sectional study conducted from January to February 2011. Verbal consent of mothers of all the children was taken prior to study. All children in the age group of three to five years in the six randomly selected anganwadis of Jhagadia block of Bharuch district during the period of January-February 2011 were included in the study. These age groups of three to five years were selected because; these were the children who came to anganwadi for availing supplementary nutrition.

As malnutrition is homogenously distributed, Jhagadia block is purposively selected for study. Jhagadia block is divided in to 2 units. 1st unit has 125 anganwadis and 2nd has 103 anganwadis. Three anganwadis from both units have been randomly selected by random table number method. All the children in these six anganwadis aged between three to five years were enrolled in this study.

The total number of children aged between three to five years in all these six anganwadis came out to be 111. But 104 children were recruited in the study due to absence of seven children at the time of data collection. Confirmation of their age was done by their birth certificates, and if their birth certificates were not available, then through the records from the anganwadi.

The pretested and predesigned questionnaire was used. The Performa had questions regarding child's socio-demographic profile which included his name, age, type of family, social status, expenditure per month, education of parents, illness in past few months, occupation of parents etc which was taken from the mother of each child at home. The children were considered to have received adequate supplementary nutrition if they attended anganwadi on an average for more than 14 days per month over last six months. This information was collected from anganwadi register which is compiled by anganwadi worker.

RESULTS

It was observed that about 70 children (67.3%) received adequate supplementary nutrition from the anganwadis (on an average more than 14 days per month over last six months). 34 children (32.7 %) did not receive adequate supplementary nutrition from the anganwadis (on an average up to 14 days per month over last six months). Further results are described by dividing the children in these two groups.

Table 1: Basic characteristics of children in Anganwadis

Characteristic (sample size)	Supplementary Nutrition		p- value
	up to 14 days	> 14 days	
Caste			
SEBC(n=15)	4 (26.7)	11 (73.3)	>0.05
ST(n=89)	30 (33.7)	59 (66.3)	
Religion			
Hindu(n=101)	33 (32.6)	68 (67.4)	>0.05
Muslim(n=3)	1 (33.3)	2 (66.7)	
Family Type			
Joint(n=5)	3 (60)	2 (40)	>0.05
Nuclear(n=46)	16 (34.8)	30 (65.2)	
3rdgeneration(n=53)	15 (28.3)	38 (71.7)	
Family Size			
≤4 members (n=20)	6 (30)	14 (70)	>0.05
>4 members (n=84)	28 (33.3)	56 (66.7)	
Vitamin A in last 6 months			
Received (n=91)	23 (25.2)	68 (74.8)	<0.05
Not received (n=13)	11 (84.6)	2 (15.4)	

Figure in parenthesis indicate percentage

The basic characteristics of the children include caste, religion, family type, family size, and vitamin A supplementation in last 6 months.

Majority of children belonged to ST class. Most of the children belonged to Vasava community. Also, almost all of the children were from Hindu families.

When family type was considered, it was found that almost half of all the children belonged to three generation family. It was observed that 35% of the children from the nuclear family did not receive adequate supplementary nutrition which was 28 % in three generation family.

When family size was taken in to account, a large number of children (80%) came from family which had more than four members. In the family which had up to four members in the family, 30 % children did not receive adequate supplementary nutrition which was 33 % in the children of the family which had more than four members.

In the children who reportedly received vitamin A in last 6 months, 25 % of them did not receive adequate supplementary nutrition. While, in the children who did not report to receive vitamin A in last 6 months, 85% of them did not receive adequate supplementary nutrition from the anganwadi.

It was found that only vitamin A supplementation had significant effect on intake of supplementary nutrition by children in anganwadi.

Table 2: Distribution of study population according to biological characteristics

Characteristic (sample size)	Supplementary Nutrition up to 14 days	> 14 days	p- value
Gender			
Girl(44)	16 (40.9)	28 (59.1)	(p>0.05
Boy(60)	18 (30)	42 (70)	
Age(months)			
36-41(25)	7 (28)	18 (72)	p>0.05
42-47(18)	7 (36.8)	11 (63.2)	
48-53(35)	9 (25.7)	26 (74.3)	
≥54 (26)	11 (42.3)	15 (57.7)	
Birth order			
1(37)	13 (35.1)	24 (64.9)	p>0.05
2(32)	8 (25)	24 (75)	
3(26)	9 (34.6)	17 (65.4)	
≥4(9)	4 (44.4)	5 (55.6)	
Reported age of starting of complementary feeding at home(months)			
≤6(49)	11 (22.4)	38 (77.6)	(p<0.05
>6(55)	23 (41.8)	32 (58.2)	
Birth weight (BW) (grams)			
Low BW (62)	27 (43.5)	35 (56.5)	p<0.05
Normal BW (42)	7 (16.7)	35 (83.3)	

Figure in parenthesis indicate percentage

The biological characteristics include age, sex, birth order, reported age of starting complementary feeding, number of siblings, and birth weight of the population under study.

The anganwadis had even distribution of boys and girls with almost 55% constituted by boys and 45% constituted by girls, which is in accordance to data of census 2011. It was observed that 41% of the girls did not receive adequate supplementary nutrition, which was 30 % for boys. And being boy or girl did not have any effect on availing supplementary nutrition from the anganwadi.

When age group was taken into account, there was no particular age group found to have majority of children in it. All age groups had almost even distribution of children. And being in any age group did not have effect on intake of supplementary nutrition from anganwadi.

When birth order was considered, it was found being of any birth order, be it be first or any, did not have significant effect on intake of supplementary nutrition from anganwadi.

Table 3: Economic profile of families and dietary intake of children at home

Characteristics (sample size)	Supplementary Nutrition up to 14 days	> 14 days	p- value
Economic status			
APL(37)	11 (29.7)	26 (70.3)	p>0.05
BPL(64)	22 (34.3)	42 (65.7)	
Not known(3)	1 (33.3)	2 (66.7)	
Families who reported borrowing money			
Yes (52)	18 (34.6)	34 (65.4)	p>0.05
No (52)	16 (30.7)	36 (69.3)	
Proportion of families who sold assets			
Yes(32)	14 (43.7)	18 (56.3)	p>0.05
No(72)	20 (27.7)	52 (72.3)	
Average expenditure (RS)/ month			
≤3000(50)	16 (32)	34 (68)	p>0.05
>3000(54)	18 (33.3)	36 (66.7)	
Kilocalories per day			
≤ 1000 kcal (47)	27 (57.4)	20 (42.6)	p<0.001
> 1000 kcal (57)	7 (12.2)	50 (87.8)	
Variety of food in diet			
Absent (57)	25 (43.8)	32 (56.2)	p<0.01
Present (47)	9 (19.1)	38 (80.9)	

Figure in parenthesis indicate percentage

When complementary feeding was taken into account, it was seen that in the children who received complementary feeding within 6 months of birth, 22 % of them did not receive adequate supplementary nutrition. While, in the children who received complementary feeding after 6 months, 42% of them did not receive adequate supplementary nutrition from the

anganwadi. And the difference between them was found to be significant.

It was observed that, in the children who were low birth weight at birth, 44% of them did not receive adequate supplementary nutrition. While in the children who had normal weight at birth, 16 % of them did not receive adequate supplementary nutrition. And the difference between them was found to be significant, though we expect that parents of low birth weight babies would be conscious enough to send their child to anganwadis.

The economic characteristics include economic status, proportion of families who borrow money, proportion of families who sold assets, average expenditure of family per year. Families reported to have BPL card were identified as BPL families, irrespective of their real economic status. Also impact of energy intake and variety of food in diet were checked to assess their impact on intake of supplementary nutrition in anganwadi.

More than 60% population in both the groups was below poverty line. In BPL families, 34 % of the children did not receive adequate supplementary nutrition, while in the APL families, 29% of the children did not receive adequate supplementary nutrition. But, being in BPL or APL did not have impact on availing of supplementary nutrition by children from anganwadi centers, though one would expect BPL families to send their children to anganwadis more because of their economic condition.

Half of the families of 104 children reported of borrowing money is past one year due to one or others reasons. Though it is expected that families who reported borrowing money would send their children to anganwadis, as free supplementary nutrition is provided there, it was not the case.

The family, which reported selling some of their assets, among them, 44 % of the children did not avail adequate supplementary nutrition from the anganwadi, which was 27 % for the children coming from the family, which did not report to sell any of their assets. But, it did not have any effect on receipt of supplementary nutrition from anganwadi.

When average expenditure of the families of the study group was considered, it was seen that whether the family's expenditure was up to three thousand per month or more than three thousand per month, about 30 % children in both the groups did not receive adequate supplementary nutrition.

Among the children who did not receive adequate calories at home (<1000 kcal), 57 % of the children received supplementary nutrition for only up to 14 days from the anganwadi. While in the children who received more than 1000 kcal at home, only 12 % of the children were exposed. And the difference was highly significant, which mean the children who were really in need of supplementary nutrition from anganwadi, did not get it.

When variety of food in the diet was considered, it was observed that, in 57 children who did not have variety in diet at home, about 44 % did not receive supplementary nutrition from anganwadi. While among 47 children, who had variety in diet at home, only 19 % of children did not receive adequate supplementary nutrition from anganwadi.

Table 4: Mother's working status, illness of children and status of availing supplementary nutrition from anganwadi

	Supplementary nutrition		χ^2 and P value
	up to 14 days/month (n=34)	> 14 days/month (n=70)	
Mother's working status			
Working	12	26	χ^2=0.03,
Housewife	22	44	p>0.05
Illness of children			
Present	24	18	χ^2=19.14,
Absent	10	52	p<0.001

The above table shows that even if mother of child was working, it did not affect a child from receiving supplementary nutrition from the anganwadi, contrary to the assumption that if the mother works as a laborer, it is expected from her to take child with her at her work place averting her child from going to anganwadi and receiving supplementary nutrition.

As one would expect that children who are ill would not go to anganwadi for receiving supplementary nutrition, the above table supported this assumption, with the result turning out to be highly significant. Out of 42 children who had some illness, 24 did not avail adequate supplementary nutrition from the anganwadi. And the out of 62 children, who were not sick, only 10 of them failed to avail adequate supplementary nutrition from the anganwadi.

Table 6: Perceptions of mother regarding supplementary nutrition at anganwadi

Perceptions	Yes	No	Do not know
Adequate quantity of supplementary nutrition in anganwadi	85(81.7%)	5(4.8%)	14(13.5%)
Good quality of food in anganwadi	70(67.3%)	19(18.2%)	15(14.5%)
Regular availability of supplementary nutrition in anganwadi	74(71.1%)	13(12.5%)	17(16.4%)
Good hygiene of food supplied in anganwadi	84(80.7%)	2(1.9%)	18(17.4%)

Mother's were asked a few questions about their perception of anganwadi. When inquired about quantity of food provided in anganwadi, 80% described quantity to be adequate. When asked about quality, about 63% were satisfied about the quality of food provided in anganwadi. About 67% told that the food was supplied regularly in anganwadi to their children. About 78% of mother told that hygiene is maintained in anganwadi. Also when asked about what supplementary nutrition is provided in anganwadi, there were multiple responses, with 73% mother knowing that sheera is provided at anganwadi followed by more than 50 % for Balbhog and fruits. Also, 75 % of the mother responded that supplementary nutrition has a positive impact on growth of their child.

DISCUSSION

One of the least talked about issues in the debate on India's demographic dividend is child malnutrition. India is home to about a third of the world's underweight and stunted children under the age of five. A child under five is almost twice as likely to be chronically underweight in India as in sub-Saharan Africa. Sadly, the impressive economic growth of the past decade has made only a modest dent into the obstinately high incidence of severe underweight and stunting of children in the country[4].

One of the limited programs for combating the problem of malnutrition in India is ICDS, in which supplementary nutrition amounting to provide one third of the energy requirement and one half of the protein requirement per day for the child is being provided through anganwadis. Malnutrition has been determined to a significant extent by supplementary nutrition available to pre-school children.

In the study done by Bhasin, Sanjiv K. et al, it was observed that total attendance at the anganwadi showed statistically significant relation with the degree of malnutrition. Overall, children who attended anganwadis were nutritionally better than their counterparts who did not attend anganwadi during their childhood. He pointed by univariate analysis that attendance in anganwadi is significantly associated with degree of malnutrition $p < 0.05$[42]. It signifies the impact of supplementary nutrition on malnutrition status of the child[5].

With this background in mind, this study was done to identify the factors which had impact on intake of supplementary nutrition provided in anganwadis. As proportion of malnutrition is almost similar in all areas of Gujarat, Jhagadia block of Bharuch district was selected for study. And six anganwadis were selected for study randomly. All children from three to five years of age were included in study from these six anganwadis. The total came out to be 111 children. Among them, 7 were excluded from study, as they were not available at the time of data collection. So, out of 104 children, when studied, it was found that 34 children did not receive adequate supplementary nutrition (i.e. up to 14 days of supplementary nutrition per month), while 70 children received adequate supplementary nutrition (i.e. more than 14 days of supplementary nutrition per month). Similarly, in study done in Madhya Pradesh by an NGO on ICDS, about 41 % of the children utilized supplementary nutrition services[8].

Supplementary nutrition can be influenced by variety of factors. Out of so many factors, this study could identify a statistically significant association between age at initiation of complementary feeding, consumption of vitamin A dose and birth weight with availing supplementary nutrition for more than half a days per month. This study suggested that earlier is the initiation of complementary feeding, the more are the chances for obtaining supplementary nutrition from anganwadi per month. Similarly, data suggested higher attendance and hence supplementary nutrition for more than 14 days a month among children who also consumed a dose of vitamin A and normal weight at birth.

The guidelines for ICDS suggest that the food available at ICDS anganwadi is only supplementary to a diet consumed by a baby at

home[6]. By providing supplementary feeding, the anganwadi attempts to bridge the caloric gap between the national recommended and average intake of children and women in low income and disadvantaged communities[2].

Two by two table has indicated that there is a statistically significant association between reported low calorie intake at home and inadequate supplementary nutrition at anganwadi. So the philosophy of providing supplementary nutrition over and above the routine calorie intake did not work in this study which means children who were really in need of supplementary nutrition did not avail this service to an expected level. Similar point was indicated by Gragnolati et al in their article that the states with the worst malnutrition have the lowest levels of ICDS programme coverage[7]. Presence of variety in diet has association with higher attendance at anganwadi for supplementary nutrition.

It is useful to study few variables which reflect the perception of caretakers about the supplementary nutrition and its role in the whole issue of protein energy malnutrition. Twenty to eighty percent awareness among mothers regarding variety of recipes served at anganwadi denotes possibility of extension education in the field of child nutrition. In a similar study done by Vinnarasan A. in Chennai, it was found that about 32 % of the mothers were about nutrition services provided at anganwadi[9]. In another study done by Das NC et al. in Orissa, It was found that supplementary feeding was usually given for 25 days in a month and was considered adequate by over 96% of the mothers of beneficiary children. 92% mothers mentioned that the quality of food was good[10].

CONCLUSION

In the present study, more than 30 % of children did not receive adequate supplementary nutrition which is quite high as through supplementary nutrition, a child receives half of protein and one third of caloric requirements.

Also, factors which hampered intake of supplementary nutrition by children from anganwadi were illness of child, diet of child and variety of his diet at home, birth weight, age of complementary feeding and vitamin A intake at anganwadi.

Also, mothers had positive perception about supplementary nutrition provided at anganwadi in growth of their child.

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