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Original Research Article

Study of prevalence of minimum acceptable diet and associated factors among children aged 6-24 months in rural Gurugram, Haryana, India

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ABSTRACT

Background: Infant and young child feeding (IYCF) is the key area to improve survival of child and promotion of growth and development of the child. For assessing the IYCF for children aged 6-24 months, minimum acceptable diet (MAD) is one of the core indicators. A community based cross sectional study was done to assess the MAD and its associated factors among children aged 6-24 months in rural Gurugram, Haryana.
Methods: A sample of 200 mother-child dyads were interviewed. Majority of children (90.1%) did not receive MAD.
Results: The proportion of children who has received minimum diet diversity (MDD) and minimum meal frequency (MMF) were 14% and 61% respectively. More than three fourth (77.5%) of children consumed junk food in last 24 hours dietary recall.
Conclusions: Counselling of mothers, encouraging involvement of fathers and extended family members in adequate feeding practices was done.

Keywords: Minimum dietary diversity, MMF, MAD, IYCF

INTRODUCTION

The initial 1000 days in the life span of children are considered a critical window determining the nutritional status of children. Consuming various food groups in adequate quantity by the infant and young children plays a pivotal role in their cognition, growth and development in later life. Inappropriate complementary feeding practices are stated to be one of the commonest reasons for malnutrition among young children. After 6 months, 200 kcal, 300 kcal, and 550 kcal of energy among children 6-11, 12-18, and 19-23 months have to be provided through complementary feeding as breast milk alone cannot meet the requirements. Similarly, after 6 months of age beside milk, 87% of iron, 67% of calcium, and 75% of zinc requirements have to be met through complementary foods. Diet diversity is positively linked to micronutrient availability among children and recognized as one of the simplest reliable indicators to assess dietary adequacy among infants and young children. It is being defined as the sum of food groups, consumed irrespective of the quantity consumed in the previous 24 hours.[1] Often cultural practices and food taboos prevailing in the community hamper the dietary diversity. Further socioeconomic factors, maternal occupation, education status of mother and number of family members also can affect the diet diversity. Most of the developing countries have MDD in range of 12-40%.

Infants and young children should be fed a MAD to ensure appropriate growth and development. Without adequate diversity and meal frequency, they are

vulnerable to undernutrition (especially stunting and micronutrient deficiencies) and to increased risk of morbidity and mortality.[2] Minimum dietary diversity means feeding the child food from at least four food groups. The cut-off of four food groups is associated with better-quality diets for both breastfed and non-breastfed children. The MMF is a proxy for a child's energy requirements. Breastfed children are considered to be consuming a MMF if they receive solid, semisolid or soft foods at least twice a day for infants of age 6-8 months and at least three times a day for children 9-23 months. Non breastfed children of age 6-23 months are considered to be fed with a MMF if they receive solid, semi-solid/soft foods at least four times a day.[2]

There are ample evidences on the prevailing IYCF practices and nutritional status of children.[3,4] However, the determinants of dietary diversity are largely unexplored, especially in the context of Indian children. In this back ground, this study aims to study the prevalence of MAD among children aged 6-24 months in rural Gurugram Haryana and to assess the factors associated with dietary diversity obtained through care giver perceptions.

METHODS

A community-based cross-sectional survey was conducted between May 2023 and December 2023, in a village under primary health center (PHC) Garhi Harsaru of rural Gurugram. There is total 14 villages covered under this PHC which sums up to the population of 45,729. Simple random sampling technique was used to recruit the participants. Out of the 14 villages under PHC Garhi Harsaru, the village Grahi having population nearly 17500 as per census 2011 was selected.

A literature search was done to get an existing prevalence of inadequate dietary intake among children aged 6-24 months. The prevalence for inadequate dietary intake among children aged 6-24 months was found to be 87.3% in Haryana (NFHS-5). The sample size was calculated using the formula following, where p is the prevalence of inadequate dietary intake among children aged 6-24 months. Taking absolute precision as 5%, at 95% confidence level, the sample size was calculated using the following formula:

$$N=[(Z^2\times p\times q)/d^2]$$

where, n=sample size Z=1.96 (95% CI), p=Prevalence of inadequate dietary intake among children aged 6-24 months. (87.3%) q=100-p, d=Absolute precision (which is taken as 5% in the current research).

$$N=(1.96)^2\times(87.3)\times(12.7)/5^2$$

N=170, 28 considering the non-response rate of 10%, the sample size came to be 187 and hence, the final sample size after rounding of was taken as 200.

Inclusion criteria

Mothers residing in the area for more than 6 months and having a child in the age group of 6-24 months and those who gave consent for participation were included in the study.

Exclusion criteria

Mothers who did not give consent to participate in study and eligible mothers who could not be contacted even after three consecutive visits were excluded.

A 24-hour recall method was used to elicit information on dietary diversity and meal frequency from mothers and/or caregivers. Dietary diversity score was assessed based on IYCF recommendation among eight food categories. MAD is the composite indicator which is calculated from the proportion of breastfed children aged 6-23 months who had at least the MDD and MMF during the previous day and the proportion of non-breastfed children aged 6-23 months who has received at least two milk feedings and the MMF during the previous day.

Ethics-before starting the study permission was obtained from institutional ethic committee of SGT university, Gurugram.

Statistical analysis

For data analysis, SPSS 26 was used. Descriptive statistics were computed for socio-demographic, maternal and child variables. Multivariate analyses were performed to identify the determinants of complementary feeding practices. P value <0.05 were considered statistically significant.

RESULTS

A sample of 200 mother-child dyads were included in this study. Table 1 shows the socio-demographic profile of the informants (mother). Approximately half of the mothers 47.5% (95) belonged to the age group 26-30 years and completed their secondary education 86 (43.0%). Only 3% had no formal education. Majority of the mothers (85%) were homemakers. More than two third (69%) of mothers age at marriage was between 21-25 years. Majority of the families have more than 4 members (94%) and only 6% had 4 or less than 4 members. 38% of the participant's families belonged to upper middle class, 20.5% belonged to middle class and 17.5% to lower middle class. 20% of the families belonged to upper class and 4.0% belonged to lower class.

Table 2 shows that only 14% of the children received a daily MDD and 86% did not receive the MDD. Table 3 shows the distribution of breastfed children receiving MMF, more than two third (67%) of 6-8 months old children received a daily MMF and only 21.7% of 9-24 months old children received an MMF.

Table 4 shows the distribution of non-breastfed children receiving MMF, 59.2% of the non-breastfed children received a daily MMF. Table 5 shows that among the breastfed children only 9.9% received a daily MAD and among the non-breastfed children none of the child received a daily MAD. Table 6 shows the distribution of children consuming unhealthy foods, 54.5% consumed packed sweet beverages and 77.5% consumed baked or fried confections, candies, chocolate and other sugar confections, chips etc in last 24 hours.

Table 1: Socio-demographic profile of the informants (n=200).

Characteristics		N (%)
Age (in years)	≤20	16 (8.0)
	21-25	76 (38.0)
	26-30	95 (47.5)
	>30	13 (6.5)
Education	No formal education	6 (3.0)
	Primary education	27 (13.5)
	Secondary education	69 (34.5)
	Higher secondary	40(20.0)
	Graduation and above	41(20.5)
Occupation	Working	30 (15)
	Homemaker	170 (85.0)
Age at marriage (in years)	≤20	46 (23.0)
	21-25	138 (69.0)
	26-30	16 (8)
No. of family members	≤4	7 (6.0)
	More than 4	193 (94.0)
Socio economic status*	I (Upper class)	40 (20.0)
	II (Upper middle class)	76 (38.0)
	III (Middle class)	41 (20.5)
	IV (Lower middle class)	35 (17.5)
	V (Lower class)	8 (4.0)

*Socio-economic status (Modified BG Prasad scale-2022).

Table 2: Distribution of children receiving MDD (24-hour recall) (n=200).

Characteristics	Yes, N (%)	No, N (%)
Children receiving MDD	28 (14)	172 (86)

Table 3: Distribution of breastfed children receiving MMF (24-hour recall) (n=172).

Number of complementary feeds received	Yes, N (%)	No, N (%)
6-8 months (2 or more), n=52	35 (67.3)	17 (32.7)
9-24 months (3 or more), n=120	26 (21.7)	94 (78.3)
Breastfed children receiving MMF	61 (35.5)	111 (64.5)

Table 4: Distribution of non-breastfed children receiving MMF (24-hour recall) (n=28).

Number of complementary feeds received	Yes, N (%)	No, N (%)
6-24 months (4 or more)	17 (59.2)	11 (40.8)

Table 5: Distribution of children receiving MAD (24-hour recall) (n=200).

Characteristics	Yes, N (%)	No, N (%)
Breastfed children	17 (9.9)	155 (90.1)
Non-breastfed children	0	0

Table 6: Distribution of children consuming unhealthy foods, (24-hour recall) (n=200).

Characteristics	Yes, N (%)	No, N (%)
Sweet beverages	109 (54.5)	91 (45.5)
Baked or fried confections, candies, chocolate and other sugar confections, chips etc	155 (77.5)	45 (22.5)

Multivariate analysis

Table 7 shows the association between inadequate feeding and sociodemographic profile of the mothers. Out of all the variables studied the education status of the mother (completed senior secondary education) was found to be statistically associated with adequate diet intake in children ($p<0.05$).

Table 8 shows the association between inadequate diet and obstetric history of the mothers. Children delivered at a private facility, had four or more ANC visits and at least 1-2 PNC visits were found to have the adequate diet intake.

Table 9 shows children whose mothers received counselling during perinatal period, received adequate diet compared to those whose mothers didn't receive any counselling. Similarly, children whose mothers followed any cultural guidelines regarding child feeding, received inadequate diet compared to those whose mothers do not follow any cultural guidelines. This association was found to be statistically significant at $p<0.05$.

Mothers who know how many feeds their children need as per their age fed their children the minimum adequate diet compared to those who did not know. This association was also found to be statistically significant at the p value <0.05.

Table 7: Association between inadequate feeding and sociodemographic status of the mothers (n=200).

Variables		Children receiving adequate diet		χ^2 value, (P value)
		Yes	No	
Age (in years)	≤ 20	0	16	3.21 (0.360)
	21-25	8	68	
	26-30	9	86	
	>30	0	13	
Education	No formal education	0	6	9.11 (0.048)
	Primary education	1	26	
	Secondary education	6	80	
	Higher secondary	8	32	
	Graduation and above	2	39	
Occupation	Working	0	30	2.12 (0.145)
	Not working	17	153	
Socio economic status	I (Upper class)	3	37	4.59 (0.332)
	II (Upper middle class)	8	68	
	III (Middle class)	5	36	
	IV (Lower middle class)	0	35	
	V (Lower class)	1	7	
Age at marriage (in years)	<20	2	44	3.5 (0.321)
	21-25	15	123	
	26-30	0	16	

Table 8: Association between inadequate diet and obstetric history of the mothers (n=200).

Characteristics		Children receiving adequate diet		χ^2 value, (P value)
		Yes	No	
Number of children	1	9	80	2.43 (0.297)
	2	6	94	
	3 or more	2	9	
History of last pregnancy				
Type of delivery	NVD	11	119	0.06 (0.806)
	LSCS	6	64	
Place of delivery	Public facility	0	111	23.17 (0.001)
	Private facility	17	72	
Total ANC visits	1-2	2	60	10.83 (0.004)
	3	1	48	
	4 or more	14	75	
Total PNC visits	0	0	62	70.35 (0.001)
	1-2	11	121	
	3	6	0	

Table 9: Association between mothers' knowledge and practices regarding child feeding and inadequate feeding of children (n=200).

Characteristics		Children receiving adequate diet		χ^2 value, (P value)
		Yes	No	
Mother received any counselling regarding child feeding during ANC visits, delivery time/PNC visits	Yes	17	58	7.59 (0.006)
	No	0	125	
Mothers use any media like TV/Radio or YouTube for child feeding guidelines	Yes	11	76	3.4 (0.065)
	No	6	107	
Mother receives any counselling regarding child feeding from Anganwadi centres	Yes	6	45	0.94 (0.332)
	No	11	138	
Mother discuss with other mothers regarding child feeding	Yes	9	63	2.31 (0.128)
	No	8	120	

Continued.

Characteristics		Children receiving adequate diet		χ^2 value, (P value)
		Yes	No	
Mother follows any cultural guidelines to omit some food items from child diet	Yes	6	120	6.12 (0.013)
	No	11	63	
Mother knows how many feeds her child needs everyday according to his/her age	Yes	11	44	12.3 (0.001)
	No	6	139	
Mothers who know the importance of feeding the required minimum amount, frequency and variety of feed to child	Yes	7	109	2.16 (0.142)
	No	10	74	

DISCUSSION

In the present study, majority of participants belonged to the age group 9 to 24 months, 136 (68%) and 64 (32%) were in the age group 6-8 months. Majority of mothers (informants) 95 (47.5%) belonged to age group 26-30 years. About 38% of the subjects' families belonged to upper middle class, 20.5% belonged to middle class, 20% belonged to upper class, 17.5% belonged to lower middle class and 4% belonged to lower class.

Majority of the informants had completed their secondary education 86 (43.0%), 20.5% were graduates and above and only 3% had no formal education. About 85% of the mothers were homemakers. Majority of mothers' age at marriage was between 21-25 years (69%), 23% mothers were less than or equal to 20 years at marriage. Most families have more than 4 members (94%).

In the present study, it was found that only 14% of the children received a daily MDD and 86% did not receive the MDD. A similar study by Jayakumar et al reported that only 12% children received the MDD and only 76.5% and 14.9% received MMF and MAD respectively.[5]

In the present study, it was found that children belonging to upper middle class socio-economic status received minimum adequate diet more compared to other socio-economic classes. Studies, such as that conducted by Menon et al highlight the impact of socioeconomic factors on complementary feeding practices.[6] Economic disparities, lack of resources, and limited access to nutritious food contribute to poor complementary feeding, hindering optimal child development.

The level of maternal education has been identified as a significant determinant of child feeding practices. In present study, education status of mother was found to be statistically associated with adequate diet intake in children. Children whose mothers had education at least upto senior secondary had more adequate diet compared to those whose mothers had lower education status. There was statistically significant association between child receiving inadequate feeding and mothers who received any counselling regarding child feeding during their ANC visits, delivery time/PNC visits. Mothers who know how many feeds their children need as per their age fed their children the minimum adequate diet compared to those who did not know. A study by Rai et al emphasizes positive correlation between maternal education and improved knowledge, leading to better child feeding practices.[7]

In the present study, it was found that children whose mothers follow any cultural guidelines regarding child feeding, received less adequate diet compared to those whose mothers do not follow any cultural guidelines. The influence of cultural practices on feeding habits has been extensively explored in the existing literature. A study by Rao et al delves into the impact of cultural beliefs and traditional feeding practices on the nutritional intake of children in India.[8]

In our study, it was found that there was a significant association between child receiving inadequate feeding and mothers who received any counselling regarding child feeding during their ANC visits, delivery time or PNC visits. Limited access to healthcare facilities and insufficient nutrition education are key contributors to inadequate feeding. The study by Kumar et al investigates the role of healthcare services and awareness programs in influencing feeding practices.[9] The findings underscore the need for improved healthcare access and targeted education initiatives.

In the present study that children whose mothers visited and received counselling at Anganwadi centres had received adequate diet more 19.6% compared to those 4.1% whose mothers did not receive any counselling regarding child feeding practices at Anganwadi centres. A comprehensive review by Nair et al critically examines existing policies related to child nutrition in India, highlighting areas of success and areas that require attention for improvement.[10]

Limitations

The dietary assessment in this study has been done using 24-hour recall method. This method is unable to account for day to day variation in the diet of participants. It fails to identify irregularly consumed food articles.

CONCLUSION

In the study the prevalence of minimum daily diet diversity was only 14%. Among the breastfed children only 9.9% children received a daily MAD and among the non-breastfed children none of the child received a daily

MAD. It is very important to focus on promotion of maternal and caregiver education, emphasizing the significance of exclusive breastfeeding during the first six months and appropriate complementary feeding thereafter. ASHA workers need to encourage mothers to visit a Anganwadi centres and counsel mothers regarding child feeding and local recipes and food items that can be included in children diet for better nutrition intake.

There is need to encourage the active involvement of fathers and extended family members in supporting and practicing proper feeding behaviours. Robust monitoring and evaluation mechanisms to assess the impact of interventions on child feeding practices and regularly collect data on nutritional status, feeding practices, and associated factors to inform evidence-based decision-making are some others ways to improve dietary intake among children.

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