Original Research Article

Determinants of minimum acceptable diet among young children in an urban slum: a community-based study

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ABSTRACT

Background: Child health and growth deteriorate as a result of inadequate quantities and frequencies of complementary feeding.

Methods: A community-based cross-sectional study was conducted in urban field practice area of a tertiary medical college hospital among 280 children by systematic random sampling method. Children belonging to 12-23 months were included while sick child, children whose mother/guardian did not give consent were excluded.

Results: The proportion of children who met the minimum dietary diversity (MDD) and minimum meal frequency (MMF) were 52.8 % (95% CI) and 52% (95% CI), respectively. Out of 280 children, 90 i.e. (32.1 %) children had achieved the recommended Minimum acceptable diet (MAD). Maternal education (Chi square value=11.2; CI 95%); socioeconomic status (Chi square value=57.4; CI 95%) were positively associated with dietary diversity. Higher percentage of male children (44.8 %) achieved minimum acceptable diet as compared to female children (20.5%); (chi square value=18.8, CI 95%). The percentage of children receiving MDD and MMF was more among children of higher socioeconomic class (p value 0.0001) and from nuclear family (p value=0.45). The birth order of the child was inversely related to the attainment of MAD. (p value=0.0001).

Conclusions: Results of the study strongly suggest that poor dietary diversity and meal frequency is associated with numerous factors and their interplay is a multitude of combinations rather than a single cause.

Keywords: Minimum dietary diversity, Minimum meal frequency, Minimum acceptable diet, Infant and young child feeding practices

INTRODUCTION

Adequate nutrition is essential for children's health and development. As per UNICEF (June2017), nearly half of all deaths in children under 5 are attributable to undernutrition. This translates into the unnecessary loss of about 3 million young lives a year. Undernutrition puts children at greater risk of dying from common infections, increases the frequency and severity of such infections, and contributes to delayed recovery from illnesses. Undernutrition is also a major cause of disability preventing children who survive from reaching their full development potential. The key findings of UNICEF/WHO/World bank group joint child malnutrition (2016 edition) states that 156 million under 5children around the world were stunted in 2015 and about 10%, or 50 million, were wasted.[1] The age of a child between 6 and 23 months is the critical window of opportunity to prevent childhood malnutrition, and is a period of growth faltering and malnutrition since children need more energy and nutrient dense foods to grow and develop. Longitudinal studies among cohorts of children from Brazil, Guatemala, India, the Philippines and South Africa confirmed the association between stunting and a reduction in schooling, and also found that stunting was a

predictor of grade failure.[2] There will be frequent childhood illness like diarrheal diseases and infections as well as high nutrient requirement in addition to breast milk to sustain normal development. Moreover, nutritional deficiencies during this period can lead to impaired cognitive development, growth retardation, smaller adult stature, and a consequence of compromised educational achievement and low economic productivity which become impossible to reverse later in life. Therefore, during this period, proper infant and young child feeding practice; that is, appropriate, safe, adequate and frequent child feeding is important for the optimal growth of a child, better health and development.

Minimum dietary diversity

Proportion of children 6-23 months of age who receive foods from 4 or more food groups of the seven recommended food groups namely: grains, roots and tubers; legumes and nuts; dairy products; flesh foods (meat, fish, poultry and organ meats); eggs; vitamin A rich fruits and vegetables, other fruits and vegetables.

Minimum meal frequency

Proportion of breastfed and non-breastfed children 6-23 months of age, who receive solid, semi-solid, or soft foods (but also including milk feeds for non-breastfed children) the minimum number of times or more. Hence this study is conducted to assess the MDD, MMF and its associated factors among young children aged 12-23 months.

Minimum acceptable diet

Composite indicator which includes both minimum dietary diversity and minimum meal frequency.[3]

METHODS

The present study has been conducted in the population served by one randomly selected health post of an urban slum area of a metropolitan city. The duration of the study was 3 months from April 2018 to June 2018. The study was a community based, and cross-sectional; where baseline characters and necessary dietary history were collected. Sample size was estimated with the help of Epi info version 7 by taking 23.6% as prevalence of minimum acceptable diet as per NFHS-4. Sample size derived was 277 with 95% confidence interval. The sample size was rounded off to 280. The households were sampled by a circular systematic random sampling method. Sampling unit was "a household in which young child ''(12 to 23 months of age)" was present. The sampling interval was calculated to be 57 (approx.). Written informed consent was taken from eligible children's caregiver, before including them into the study.

Inclusion criteria was considered to be as child who has completed 12 months of age and have not yet completed

their 2nd birthday (young child) in the study area, mother/guardian willing to participate in the study. Children found to be sick during the first contact, house found locked even after 3 repeated home visits were excluded from study. The proposal of the study was submitted as per the protocol given by institutional scientific review committee and ethics committee. The approval and ethical clearance were obtained before the study. Data were collected using a predesigned pretested semi structured questionnaire. A single interviewer collected data by conducting personal face-to-face interview of the eligible child's caregiver.

The caregivers were given information about the study using patient information sheet in their understandable language. If the respondent was illiterate, the sheet was read out to them

Data were collected and compiled using Microsoft Excel 2010 and then analyzed using SPSS 23.0 version (IBM's., Armonk, New York, USA) and open epi software Version 2.3 (Atlanta, Georgia) by calculating frequencies and percentages of various parameters. Chi square test was applied to test the significance of association wherever necessary. The WHO infant and young child feeding practices monitoring tool and guide was used for assessing the diet of children.

Structure of the interview schedule was as follows

Part I included the information of each respondent regarding, socio-demographic profile i.e. age, sex, religion, type of family, number of family members total family income, education of parents.

Part II birth history

Part III included dietary assessment of child by asking mother /guardian previous 24-hour dietary recall.

As per the WHO Infant and young child feeding practices monitoring tool and guide minimum dietary diversity (MDD); Minimum Meal Frequency (MMF) and Minimum acceptable diet (MAD) were assessed.

Minimum dietary diversity

Proportion of children with 6-23 months of age who received foods from four or more food groups of the seven food groups such as grains, roots and tubers; legumes and nuts; dairy products (milk, yogurt); Flesh foods (meat, fish, poultry and liver/organ meats); eggs; vitamin A rich fruits and vegetables; and other fruits and vegetables.

Minimum meal frequency

Proportion of breastfed and non-breastfed children 6-23 months of age, who receive solid, semi-solid, or soft foods (but also including milk feeds for non-breastfed

children). This indicator was defined as: three times for breastfed children 9-23 months, and four times for non-breastfed children 6-23 months.

Minimum acceptable diet

The minimum acceptable diet indicator combines standards of dietary diversity and feeding frequency by breastfeeding status. The numerator includes only those children who have received both the minimum dietary diversity and the minimum meal frequency for the child's breastfeeding status.

RESULTS

Statistical analysis was done by using epi.info 7.1 and SPSS version 23. P value<0.05 were considered as significant.

The proportion of children who met the MDD and MMF were 52.8 % (95% CI) and 52% (95% CI), respectively. The minimum acceptable diet MAD was achieved by 90 (32.1%) children.
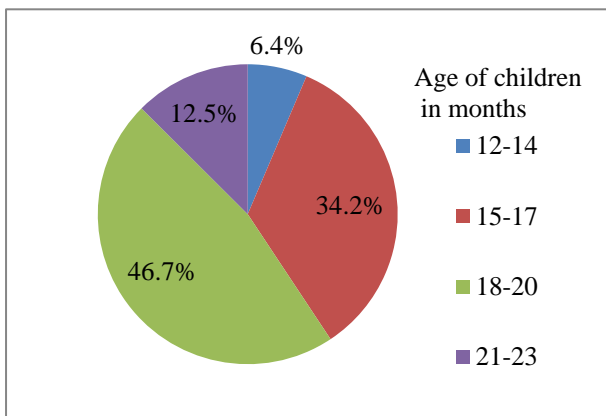
Figure 1: Age-wise distribution of children.

Maximum study subjects were from the age group 18 to 20 months i.e. 131 (46.7%) followed by 96 (34.2%) from the age group 15 to 17 months (Figure 1).
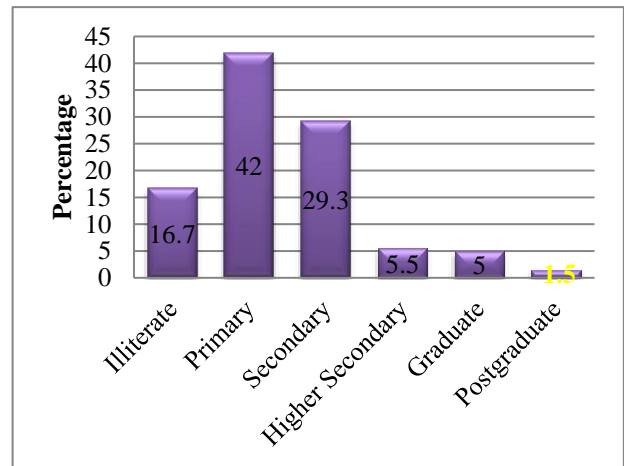
Figure 1: Distribution as per the mother's education.

Of the total, 200 (71.3%) of them had some formal education (primary 42% and secondary 29.3%) and only 18 (5.5%) respondents were educated beyond higher secondary level of education (Figure 2). The distribution of study subjects as per the factors mentioned in Table 1 were observed.

Maternal education (chi square value=11.2; CI 95%); socioeconomic status (chi square value=57.4; CI 95%) were positively associated with MAD. The percentage of children receiving MDD and MMF was more among children of higher socioeconomic class (p value=0.0001) and from nuclear family (p value=0.45), while higher percentage of male children achieved it than female children (p value=0.001). The birth order of the child was inversely related to the attainment of MDD and MMF (p value=0.0001).

Table 1: The distribution of study subjects as per various factors.

Variables	Category	Frequency N (%)
Sex of child	Male	134 (48)
	Female	146 (52)
Type of family	Nuclear	200 (71.4)
	Joint	65 (23.2)
	Extended	15 (5.4)
Working status of mother	Working	41 (14.64)
	Not working	239 (85.36)
No of antenatal care visits	>4	234 (83.6)
	< 4	46 (16.4)
Type of delivery	Full term normal delivery	206 (73.6)
	Caesarean delivery	74 (26.4)
Birth weight	>2.5 kg	220 (78.5)
	<2.5 kg	60 (21.5)
Birth Order	I	128 (45.7)
	II	79 (28.2)

Continued.

Variables	Category		Frequency N (%)
		III	46 (16.4)
		IV	24 (8.6)
		V	3 (1.1)
Age of initiation of complementary feeding	>26 weeks		176 (63)
	<26 weeks		104 (37)

Table 2: Distribution of study subject's various factors with respect to minimum acceptable diet.

Socio-demographic parameters	Minimum acceptable diet		P value
	Adequate N(%)	Inadequate N(%)	
Maternal Education			
Illiterate	9(19.2)	38(80.8)	Chi square=11.26 Degree of freedom=2 P value0.004 (significant)
Primary and secondary education	63(31.5)	137(68.5)	
Higher education	18(54.5)	15(45.5)	
Total	90 (100)	190 (100)	
Socioeconomic status (B. G. Prasad classification)			
I	20(86.9)	3(13.1)	Chi square =57.48 Degree of freedom =3 P value=0.0001(significant)
II	25(44.6)	31(55.4)	
III	35(33.9)	68(66.1)	
IV	10(10.2)	88(89.8)	
Total	90 (100)	190 (100)	
Birth order			
>3	60(44.8)	74(55.2)	Chi square=13.19 Degree of freedom=1 P value=0.0001(significant)
<3	30(20.5)	116(79.5)	
Total	90 (100)	190 (100)	
Sex of child			
Male	60(44.8)	74(55.2)	Chi square =18.11 Degree of freedom =1 Pvalue0.0001(significant)
Female	30(20.5)	116(79.5)	
Total	90 (100)	190 (100)	
No of antenatal care visits by mother			
>4	85(36.3)	149(63.7)	Chi square =18.8 Degree of freedom =1 Pvalue0.0001(significant)
<4	5(10.9)	41(89.1)	
Total	90 (100)	190 (100)	
Type of family			
Nuclear	68(34)	132(66)	Chi square =1.58 Degree of freedom =2 Pvalue0.453
Joint	19(29.2)	46(70.8)	
Extended	3 (20)	12(80)	

Higher percentage of male children (44.8 %) achieved MDD and MMF as compared to female children (20.5%); (chi Square value= 18.8, CI 95%). The percentage of children who achieved minimum acceptable diet whose mother had 4 or more antenatal care visits during pregnancy was 36.3 %. This was higher as compared to the children (10.9%) whose mother had less than 4 antenatal care visits during pregnancy. This difference was found to be statistically significant (chi square value=18.8, p value=0.001). It was observed that the percentage of children who had achieved minimum acceptable diet was higher (38.2%) i.e. 79 in children of birth order less than 3 as compared to children of birth order of more than and equal to 3 (15.1 %; i.e. 11). This difference was found to be statistically significant (chi Square value=13.19, p value=0.0001). It was observed that the percentage of children achieving minimum

acceptable diet was highest (34%) in nuclear type of family. This was followed by children belonging to joint type of family (29.2%) and nuclear families (20%). However, this difference was not found to be statistically significant (chi Square value=1.58, p value=0.453) (Table 2).

DISCUSSION

Out of 280 children, 90 i.e. (32.1%) children had achieved the minimum acceptable diet.

In study conducted by Sarkar et al, the minimum acceptable diet was achieved by 44.4 % children.[4]

In a study by Khan et al 19.7% children achieved the recommended minimum acceptable diet.[5]

Rao et al stated in their study that the association of literacy and initiation of complementary feeds at the recommended time was statistically significant (p=0.038).[6] A study titled 'maternal literacy, facility birth, and education are positively associated with better infant and young child feeding practices and nutritional status among ugandan children' by Ickes et al concluded the finding that maternal literacy was associated with a greater likelihood of feeding children the minimum frequency, dietary diversity, and minimum acceptable diet.[7] This was comparable to the finding of the present study. A study titled 'determinants of infant and young child feeding practices in Rupandehi, Nepal' conducted by Gautam et al stated that mothers who attained high school or higher education were more to provide minimum acceptable diets to their children in the last 24 h than their counterparts with lower level of education. This finding was comparable to present study.[8] Thus, maternal education plays a significant role in meeting the appropriate dietary diversity and meal frequency.

In a study by Kamran et al titled 'determinants of complementary feeding practices among children aged 6-23: a community-based Study', it was stated that proportion of male children (38 .1%) achieving the minimum acceptable diet was higher as compared to female.[9]

A study conducted by Aemro et al titled 'dietary diversity and meal frequency practices among infant and young children aged 6-23 months in ethiopia: a secondary analysis of ethiopian demographic and health survey 2011' stated that children born from the richest households showed better dietary diversity score (OR=0.256). This finding was comparable to the present study.[10]

A study conducted by Khanal et al titled 'determinants of complementary feeding practices among Nepalese children aged 6-23 months: findings from demographic and health survey 2011' stated that lower percentage of children of birth order 4 or more (11.4%) achieved minimum acceptable diet as compared to children of first and second birth order.[11] This observation was similar to the present study.

Khanal et al stated in their study that the children whose mothers had or more antenatal care visits had higher percentage (36.7%) of achieving the minimum acceptable diet.Among the children whose mother had less than 4 antenatal visit, 16.6% percentage received the recommended minimum acceptable diet (p<0.001).[11] This finding was comparable to the present study. Jain et al conducted a community based cross-sectional study. In this study total of 300 children less than 24 month of age were studied.[12] Majority 183(61%) belonged to 3rd generation family and 107(35.7%) belonged to nuclear family. The percentage of children belonging to nuclear family was higher (71.4%) in the present study.

Limitations

The quality of the food consumed was not taken into account for the child who met the requirement of minimum acceptable diet. The intervention comprised of information, education and communication; actual nutritional intervention was not incorporated in the study.

CONCLUSION

Results of the study strongly suggest that poor dietary diversity and meal frequency is associated with numerous factors and their interplay is a multitude of combinations rather than a single cause. This needs to be addressed right at its roots. The child whose mother was more educated had higher likeliness of intake of the recommended minimum acceptable diet.

The percentage of children receiving minimum acceptable diet was more among children of higher socioeconomic class. It is inferred from the result that the male child had more likelihood of attaining recommended minimum acceptable diet than female child. The percentage of children achieving minimum acceptable diet was higher in children belonging to nuclear family. The birth order of the child was inversely related to the attainment of minimum acceptable diet. The number of antenatal care visits was observed to be positively associated with the achievement of minimum acceptable diet.

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