Section: Pediatrics

Original Research Article

ASSESSMENT OF COMPLEMENTARY FEEDING PRACTICES AMONG MOTHERS OF CHILDREN OF 6-23 MONTHS OF AGE USING INFANT AND YOUNG CHILD FEEDING INDICATORS IN A TERTIARY CARE CENTRE IN KERALA

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ABSTRACT

Background: Objective: To assess the complementary feeding practices of children in the age group of 6-23 months using Infant and Young Child Feeding indicators. **Secondary objective:** To study the various factors affecting complementary feeding practices.

Materials and Methods: The study was a cross sectional study done using modified World Health Organization Infant and Young Child Feeding questionnaire in the Paediatric ward of a tertiary care centre in central Kerala. 85 consecutive samples within the age group of 6-23 months were taken. Children with chronic illnesses which could affect feeding pattern were excluded from the study. The outcome variable included the nine Infant and Young Child Feeding indicators related to complementary feeding in the World Health Organization Infant and Young Child Feeding 2021 update.[1]

Results: In the study, the percentage of children between 6-23 months getting Minimal acceptable diet was low at 22.4% but minimum meal frequency percentage was fair at 91%. The percentage of children consuming egg and flesh foods were only 35%. The unhealthy food habits was highly prevalent with 34% children consuming sweetened beverages, 34% consuming unhealthy food items and 50.6% children had zero consumption of fruit or vegetable in their diet.

Conclusion: The complementary feeding practices were unsatisfactory as reflected by the percentage of children getting minimal acceptable diet being only 22.4%.

Keywords: Complementary feeding, Feeding practices, IYCF 2021, Minimum Acceptable Diet.

INTRODUCTION

Malnutrition remains one of the important reasons for under five mortality all over the world. Nutrition during the first 1000 days of life is crucial for the overall development and growth of the individual and it includes the nutrition of mother during antenatal period followed by exclusive breastfeeding for first six months after birth and gradual transition to complementary feeding with continuation of breastfeeding .[2] Exclusive breastfeeding in the first six months is widely promoted and is widely practised. Breastmilk being a complete food takes care of all the nutritional needs of infant during first six months, but children in the age group of 6-23 months are most vulnerable for developing malnutrition due to poor complementary feeding practices. It is seen that most of the micro and macronutrient deficiencies are seen in children of this age group.[3] Thus evaluating the gaps in complementary feeding practices is essential to improve nutrition and overall wellbeing of children and ensure the productivity of next generation.

The complementary feeding practices can be assessed using different IYCF indicators as described in WHO IYCF 2021 update, of the total 17 indicators 9 are directly related to complementary feeding.[1] Out of these the most important indicator is the Minimal acceptable diet which includes both Minimal meal frequency and Minimal dietary diversity and Minimum milk feeds in non breastfed infants. Adequate meal frequency ensures adequate calorie intake and diversity in food groups is essential for getting micronutrients. In India according to NFHS 5 data around 33% of children under 5years are underweight and 35% are stunted, the reason for which is evident in poor IYCF indicator percentage, especially the percentage of minimal acceptable diet being as low as 11% in India.[4]

Kerala with better educational and socioeconomic conditions, the situation is similar with percentage of children getting minimal acceptable diet being only marginally higher at 14% indicating that many other social and demographic factors are influencing the feeding practices other than ignorance and poverty. Thus there is need to look out for factors which impede normal nutrition in formative years for formulating region specific strategies to improve IYCF practices.

MATERIALS AND METHODS

Study design: Cross sectional study .

Study setting: Paediatric ward of Tertiary care centre in Kerala.

Study period: Between December 2024 to February 2025.

Study subjects: Children of age group 6- 23 months admitted in Paediatrics ward

Inclusion Criteria: Children in the age group of 6-23 months admitted in Paediatric ward.

Exclusion Criteria: Children with congenital malformation, such as cleft palate, cerebral palsy, known chronic systemic diseases which could influence the feeding pattern were excluded

Sampling method: Consecutive subjects fitting within age criteria

Sample size: Calculated by using the formula n=4pq/d2

p=54 (based on Complementary feeding practices and their determinants among children 6- 23 months of age in an outpatient hospital setting in Central India conducted by Shikha Jain et al),[5]

q =(100 -p) =46

d (20 %of prevalence) = 10.8

n= 4PQ/d2=85

Data collection method: Modified WHO IYCF English questionnaire which was used to interview mothers about feeding practices in their own language. The pre illness 24 hour recall method was used to obtain data from caregivers

Statistical Analysis: Data collected from each patient is entered in MS Excel. The data was analysed using IBM SPSS version 22. The quantitative data was expressed as percentages. Pearson chi square test was used to study association between variables.

Operational Definition

Introduction of solid, semi solid or soft foods 6-8 months (ISSSF): Percentage of infants 6-8 months of age who consumed solid, semi solid or soft foods during the previous day

Minimum dietary diversity 6-23 months (MDD): Percentage of children 6-23 months of age who consumed at least five out of eight defined food groups during the previous day

Minimum meal frequency (MMF): Percentage of children 6-23 months of age who consumed solid, semisolid or soft foods (including milk feeds for non-breastfed children) minimum number of times or more during the previous day

Minimum milk feeding frequency for non breastfed children 6-23 months(MMFF): Percentage of non breastfed children 6-23 months of age who consumed at least two milk feeds during the previous day

Minimum acceptable diet 6-23 months(MAD): Percentage of children 6-23 months of age who consumed a minimum acceptable diet during the previous day

Egg and/ or flesh food consumption 6-23 months (EFF): Percentage of children 6-23 months who consumed egg/flesh foods during the previous day

Sweet beverage consumption 6-23 months (SwB): Percentage of children 6-23 months of age who consumed sweet beverage during the previous day

Unhealthy food consumption (UFC) : Percentage of children 6-23 months of age who consumed selected sentinel unhealthy foods during the previous day

Zero vegetable or fruit consumption 6-23 months (ZVF): Percentage of children 6-23 months of age who did not consume any vegetables or fruits during the previous day.

The **eight food groups** included for tabulation of MDD indicators are: Breast milk, Grains (including roots, tubers and plantains), Pulses (includes beans, peas, lentils, nuts and seeds), Dairy products (animal milk, infant formula, curd, cheese, butter, ghee),Flesh foods (Meat, poultry, fish), Egg, Vitamin A rich fruits and vegetables, Other fruits and vegetables

Minimum meal frequency (consumption of solid, semisolid or soft food) according to age group was taken as two feedings for breastfed infants aged 6-8 months, three feedings for breastfed infants aged 9-23 months ,four feedings of solid, semisolid, soft food or milk feeds in non breastfed 6-23 months of age where at least one feed should be solid semi solid or soft.

Selected sentinel unhealthy foods included in the study were Chocolates, candies and other sugar confections, Frozen treats like ice cream, popsicles, Cakes, pastries and sweet biscuits with at least a partial base of refined grain ,Chips, French fries ,puffs, instant noodles which are high in salt and fat and have refined grain as base ,Sweet beverages includes natural fruit juices, fruit flavoured drinks,

malt drinks, soda, sports drink or any home made drink with added sugar.

RESULTS

Eighty-five children between the age group of 6-23 months of age were included in the study, out of which 54 were males and 31 were females. Majority of the children belonged to 12-23 months constituting 57 % of the study population. Out of these 20% of children were wasted and stunted, 9% had severe wasting and 3% had severe stunting. Micronutrient deficiency was highly prevalent with 63% children having nutritional anaemia and 5% had rickets. Most of the study population were from rural background (83%) and one subject was from tribal area of Palakkad district. The study population were mainly from upper lower class and lower middle class socioeconomic group. Mothers were the primary caregivers. Most mothers were educated beyond tenth standard and only 10% had schooling below 10th standard. Most of mothers were in the age group of 20-30 years. The demographic details are given in Table 1.

Table 1: Demographic Characteristics of Study Population

Variables	Categories	Frequency (%)
Age	6-8 months	13(15.3)
	9-12 months	23(27.1)
	12-23 months	49(57.6)
Gender	Male	54(60)
	Female	31(40)
Place	Rural	71(83.5)
	Urban	13(15.3)
	Tribal area	1(1.2)
Mother educational status	Below 10^{th} grade	10(11.8)
	10^{th} -12^{th} grade	38(44.7)
	Graduation and above	37(43.5)
Birth order	1	41(48.2)
	2	32(37.6)
	3	11(12.9)
	4	1(1.2)
Socio economic status	Upper lower class	79(92.9)
	Lower middle class	6(7.1)

Table 2: Nutritional status of the study population

Variables	Categories	Frequency (%)
Weight for height	Normal	60(70.6)
	Wasted	17(20)
	Severely wasted	8(9.4)
Weight for age	Normal	50(58.8)
	Underweight	26(30.6)
	Severely underweight	9(10.6)
Height for age	Normal	65(76.5)
	Stunted	17(20)
	Severely stunted	3(3.5)
Anemia	Yes	54(63.5)
	No	31(36.5)
Rickets	Yes	5(5.9)
	No	80(94.1)

The IYCF indicators were determined and is listed in Table 3. In this study, we found that the percentage of children who were exclusively breastfed till 6 months was 88.2 % and continued breastfeeding in the age group of 12-23 months was observed in 77.6%. The use of bottle feeding was found to be only 7%. Introduction of solid /semi solid /soft food in the age group of 6-8 months was around 97%, which was well above the national percentage. However, the dietary diversity was poorest in this age group, with most children getting only ragi or banana powder-based gruel. Egg/ flesh foods and vegetable /fruit consumption was non-existent in this age group. The overall percentage of children getting minimal meal frequency was 91.8% but the percentage getting minimal dietary diversity was 28.3 % and minimal acceptable diet was only 22.4%. Percentage of children eating Egg and flesh food was only 35 % and 50.6% had zero vegetable or fruit consumption. Unhealthy food habits reflected by sweet beverage consumption and unhealthy food consumption was around 34%.

Table 3: IYCF Indicators

Variables	Categories	Frequency (%)
Exclusive breast feeding	Yes	75(88.2)
	No	10(11.8)
Continued breast feeding in 12-23 months	Yes	38(77.6)
	No	11(22.4)

Minimum of 2 milk feeds in non-breastfed	Yes	3(20)
	No	12(80)
Bottle feeding	Yes	6(7.1)
	No	79(92.9)
Introduction of soft/semi solids in 6-8 month	Yes	11(84.6)
	No	2(15.4)
Fruits/vegetable consumption	Yes	42(49.4)
	No	43(50.6)
Egg/flesh foods consumption	Yes	30(35.3)
	No	55(64.7)
Sweet beverages consumption	Yes	29(34.1)
	No	56(65.9)
Unhealthy food consumption	Yes	29(34.1)
	No	56(65.9)
Minimum meal frequency	Yes	78(91.8)
	No	7(8.2)
Minimum Dietary diversity	Yes	24(28.3)
	No	61 (71.7)
Minimum acceptable diet	Yes	19(22.4)
	No	66(77.6)

A detailed statistical analysis of the association between the variables revealed no association between the majority of the observations. The results are given in Table 4. The only positive association was seen between Minimum Acceptable diet and age group ($p<0.005$).

Table 4: Association of study variables with minimum acceptable diet

Study Variables	Categories	Minimum acceptable diet		p value
		Yes	No	
Weight for height	Normal	14(23.3)	46(76.7)	0.919
	Wasted	4(23.5)	13(76.5)	
	Severely wasted	1(12.5)	7(87.5)	
Weight for age	Normal	12(24)	38(76)	0.927
	Underweight	5(19.2)	21(80.8)	
	Severely underweight	2(22.2)	7(77.8)	
Height for age	Normal	13(20)	52(80)	0.296
	Stunted	6(35.3)	11(64.7)	
	Severely stunted	0(0)	3(100)	
Pallor/Low Haemoglobin	Yes	13(24.1)	41(75.9)	0.615
	No	6(19.4)	25(80.6)	
Features of rickets	Yes	0(0)	5(100)	0.494
	No	19(23.8)	61(76.2)	
Age	6-8 months	0(0)	13(100)	<0.001*
	9-12 months	19(82.6)	4(17.4)	
	12-23 months	0(0)	49(100)	
Gender	Male	10(19.6)	41(80.4)	0.457
	Female	9(26.5)	25(73.5)	
Place	Rural	16(22.5)	55(77.5)	1.00
	Urban	3(23.1)	10(76.9)	
	Tribal area	0(0)	1(100)	
Mother education status	Below 10^{th} grade	1(10)	9(90)	0.163
	10^{th} -12^{th} grade	6(15.8)	32(84.2)	
	Graduation	12(32.4)	25(67.6)	
Birth order	1	10(24.4)	31(75.6)	0.708
	2	8(25)	24(75)	
	3	1(9.1)	10(90.9)	
	4	0(0)	1(100)	
Socio-economic status	Upper lower class	17(21.5)	62(78.5)	0.872
	Lower middle class	2(33.3)	4(66.7)	

DISCUSSION

This study highlighted the poor dietary practices seen in our state, despite high rate of female literacy and better access to preventive health care. The percentage of children getting minimal acceptable diet was only 22.4%and this percentage is comparable to global percentage of 21% and much higher than National percentage of 11%(4). Minimal meal frequency is satisfactory with 91.8% of children receiving the minimum required frequency of meals. The real problem lies in dietary diversity, most children are consuming cereal-based diet which lacks adequate protein source like legumes or egg/flesh food.

Mothers were the primary caretakers of all children in this study, all of them were educated, majority above tenth standard. Studies have shown that maternal age and education has a key role in ensuring optimal feeding practices (6,7,8). Mothers were aware of practising exclusive breastfeeding till 6 months and importance of starting complementary

feeds at 6 months. But majority of mothers were not aware of different food groups and importance of including them in diet daily.

The diet of general population has adequate protein due to consumption of fish and meat, the EFF percentage in 6-23 months children was only 35%, well below the global percentage of 47%. It was observed that most parents were reluctant to include non-vegetarian items in diet under one year of age due to religious belief.

The lack of vegetable and fruit consumption was evident by ZVF percentage of 50.6%, which is comparable to global percentage of 57%. As far as vegetable are concerned, most parents complained that there is refusal to eat vegetables. The main fruit consumed in our state is banana and plantains, plantains were excluded from the fruit list in the adopted questionnaire, while apples, oranges and similar fruits remain unaffordable to our population which might have added to the low percentage.

The high percentage of sweet beverage consumption was due to highly prevalent practice of giving sweetened tea to children including infants in our state. Consumption of biscuits and cakes as snacks is a common occurrence and it contributed largely to the 34% of children consuming unhealthy food, surprisingly most parents were unaware that these are unhealthy food which are processed and are high in sugars and trans fats, thus needs to be avoided.

On the other side, the exclusive breastfeeding rates were good, with 88.2% babies in the study group were exclusively breastfed for first six months and continued breastfeeding at 12-23 months of age was satisfactory at 77%. Almost 97% of babies in the age group of 6-8 months were started on semisolid/solid/soft food which was also higher than the global percentage of 72%.

Children who were not on continued breastfeeds in the age group of 12-23 months were very few but only 15% in this group children received minimum milk feed frequency. Most previous studies have showed better indicators for non breastfed infants because in 2008 edition of IYCF document, non human was milk taken as individual food group so breastfed infants were at a disadvantage, with 2021 update breastmilk is taken as separate food group.[9]

Studies have shown direct relationship of optimal feeding with early childhood growth and development.[10] It was reported that MAD and MMF had positive correlation with Length for Age z scores at 24 months.[6] Studies have also shown association between childhood stunting and anaemia co-occurrence in children with poor dietary practices.[11]

In our we could not establish similar correlation probably due to limited sample size. Similarly, in the present study, a very high percentage of children had anaemia, which is attributed to poor dietary diversity but a direct association could not be established.

Limitation and strengths: IYCF questionnaire was designed to be used in community setting by a field worker. This questionnaire being adopted in tertiary care institution could have added on as limitation of the study. The data about diet was based on the pre illness/hospitalisation day diet of the child and was obtained by interviewing the caregiver so there must be recall bias. The subjects were sick children, so there could be element of selection bias as childhood illness also influence feeding practices as described in a previous study.[12]

The institution based study helped us to analyse feeding practices of children from different pockets of same geographical region. The data was collected by clinicians with experience in child nutrition compared to previous studies which were all done by public health specialists which must have added a different perspective to the study. Most previous studies are based on 2008 WHO IYCF indicators, studies based on updated 2021 edition are very few. Previous nationwide studies have shown regional difference in feeding indicators and need for subnational level policies to address the gaps.[13] So a study from this part of Kerala determining the feeding practices is geographically of utmost relevance.

This study has highlighted the fact that cultural beliefs and food taboos have significant influence on feeding practices and poor feeding practices is prevalent despite good education and socioeconomic conditions.

CONCLUSION

Recommendations: Over the years, a lot of emphasis and initiatives in promoting exclusive breastfeeding has shown results with satisfactory breastfeeding indicators but transition to complementary feeding is still a problem. Adopting immunisation schedule which ensures mandatory visit at 6 months to health care will help in educating caregivers about complementary feeding practices. Parental education about avoiding unhealthy food habits and reinforcing importance of adopting healthy alternatives and hygiene while preparing meals is the need of the hour.[9,14] Also including different diet charts with local recipes in Mother and child protection card as per ICMR recommendation can also help in this direction. Role of ASHA and ANM has to be strengthened to propagate and disseminate knowledge about complementary feeding.[15] Government has a key role in implementing policy which protect and promote optimal feeding practices.[16] Strengthening of health care facilities, mass media campaign, individualised counselling and policy advocacy can improve child feeding practices.[8,17,18,19]

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