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Original Research Article

Assessment of nutritional status in children using WHO IYCF indicators: an institution based study

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ABSTRACT

Background: Poor child feeding practices and sub-optimal breastfeeding have a detrimental effect on health of children less than 2 years of age. We studied the breastfeeding as well as the complementary feeding practices in the children <2 years of age in our tertiary institute with the help of the WHO2008 document, Indicators for assessing infant and young child feeding (IYCF) practices.
Methods: This cross-sectional study was carried out in asymptomatic children (< 2 years), in a tertiary care hospital using a pre-designed, validated WHO questionnaire for information regarding feeding practices.
Results: The mean age in hours, for initiation of breastfeeding after birth was 3.92. Amongst the age group of 4-5 months, 72.9% (51/70) babies were exclusively breastfed and 86% (43/50) of infants aged 6–8 months received appropriate solid, semi-solid or soft food. Breastfeeding was continued in majority of the children in 90% in the age group of 12-15 months. Only 13 (7.5%) of 177 breastfed babies and only 4 (8.5%) out of 47 non-breastfed were receiving Minimal Acceptable Diet in the 6-23 months group.
Conclusions: Although the results for the breastfeeding and weaning indicators were fairly good, there still exists a lack of knowledge about complimentary feeding practices which need to be drastically improved by appropriate health education and dietary advice.

Keywords: Household roster, IYCF Indicators, Initiation of breastfeeding (IBF) module, Infant and young child feeding (IYCF) module, Malnutrition

INTRODUCTION

Adequate nutrition is essential for every child's optimum health and development. Although stunting rates declined by almost 40 per cent between 1990 and 2015, currently stunting is still seen in 156 million children worldwide. Two thirds of these stunted children belong to low and middle-income countries thus restricting their physical growth and brain development. In the under-five age group, as many as 50 million wasted children are at risk of detrimental effects of malnutrition if timely intervention is not provided.[1] Maximum health benefits are obtained if optimum nutritional interventions are carried out during the critical window period or first 1000 days from pregnancy till the child's second birthday which includes exclusive breastfeeding for the first 6 months and continued breastfeeding till age of two years along with timely, safe, appropriate and high-quality complementary foods and appropriate micronutrient interventions.[1] In 1991, WHO released a set of indicators, most of which focused on breastfeeding practices, designed to be used in population-based surveys to measure adherence to recommended feeding practices.[2] In 2008, WHO published the document *"Indicators for assessing infant and young child feeding (IYCF) practices"*, which includes an updated set of simple, valid and reliable indicators measuring food-related aspects of complementary feeding (including dietary variety and

frequency of eating episodes).[2] The document also includes guidelines on the feeding of non-breastfed infants and young children up to 24 months of age.[2] The global strategies to implement healthy nutrition policies is on the rise with increasing awareness among various national and international organisations that good nutrition is the pathway for attainment of 17 Sustainable Development Goals (SDGs) endorsed by the international community in 2015 that are anchored to the 2030 Agenda for Sustainable Development, a larger plan of action for the next 15 years.[1] Thus in keeping with the IYCF recommendations we studied the breastfeeding as well as the complementary feeding practices in the children <2 years of age in patients attending our patient department in our tertiary care institute.

METHODS

This prospective observational study was carried out on study population including asymptomatic children below 2 years of age visiting the General Pediatric and Well Baby OPD of the tertiary care center of Mumbai, Maharashtra for routine check-up over a period of one and a half years. Those with a history of NICU admission in the past, were excluded from the study. The sample size required for each indicator with respect to the particular age group was derived by analysing the number of asymptomatic children of each sample size visiting the hospital from the OPD record register and was calculated such that for 0-24 months: Total: N_1=360, 6-23 months: N_2=220, 4-5 months: N_3=70, 6-8 months: N_4=50 and12-15 months: N_5=50. The primary aim of the study was to study the IYCF indicators in our tertiary metropolitan hospital in children below 2 years of age. The secondary objectives like influence of age, sex, birth order and immunization status of the child and maternal factors like parity, immunization and supplements taken antenatally by the mother in addition to family income per month, on individual IYCF indicators were also studied.

A pre-designed, validated WHO English questionnaire comprising of three modules: Household Roster, Initiation of breastfeeding (IBF) module and the Infant and young child feeding (IYCF) module was used as a tool to interview the mothers about feeding practices in the language they understood.[3] The previous day recall period was taken for the survey of dietary intake to reduce recall bias. The feeding practices were categorized as per the norms provided by WHO-IYCF Practices (1) 2010 Publication and the rates of eight different core indicators were calculated after collecting the data, as per the formulas stated below.[4]

Definitions of Core indicators

Early initiation of breastfeeding

Proportion of children born in the last 24 months who were put to the breast within one hour of birth: [No. of Children born in the last 24 months who were enrolled in the study were put to the breast within one hour of birth]/ [No. of Children born in the last 24 months who were enrolled in the study].

Exclusive breastfeeding at 4-5 months of age

Proportion of infants 4-5 months of age who are fed exclusively with breast milk: [No. of Infants 4-5 months of age who received only breast milk during the previous day] / [No. of Infants 4-5 months of age in the study].

Continued breastfeeding at 1 year

Proportion of children 12-15 months of age who are fed breast milk: (No. of Children 12-15 months of age who received breast milk during the previous day) / [No. of Children 12-15 months of age].

Introduction of solid, semi-solid or soft foods

Proportion of infants 6–8 months of age who receive solid, semi-solid or soft foods: [No. of infants 6-8 months of age who received solid, semi-solid or soft foods during the previous day]/ [No. of Infants 6-8 months of age].[5]

Minimum dietary diversity (MDD)

Proportion of children 6-23 months of age who received foods from 4 or more food groups: [No. of Children 6-23 months of age who received foods from ≥4 food groups during the previous day]/ [No. of Children 6-23 months of age].

Minimum meal frequency (MMF)

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. The indicator is calculated from the following two fractions: [No. of Breastfed children 6-23 months of age who received solid, semi-solid or soft foods the minimum number of times or more during the previous day] / [No. of Breastfed children 6-23 months of age] and [Non-breastfed children 6-23 months of age who received solid, semi-solid or soft foods or milk feeds the minimum number of times or more during the previous day] / [Non-breastfed children 6-23 months of age].

Minimum acceptable diet (MAD)

Proportion of children 6-23 months of age who receive a minimum acceptable diet (apart from breast milk). This composite indicator will be calculated from the following two fractions: [Breastfed children 6-23 months of age who had at least the minimum dietary diversity and the minimum meal frequency during the previous day] / [Breastfed children 6-23 months of age] and [Non-breastfed children 6-23 months of age who received at least 2 milk feedings and had at least the minimum

dietary diversity not including milk feeds and the minimum meal frequency during the previous day] / [Non-breastfed children 6-23 months of age].

Consumption of iron-rich or iron-fortified foods

Proportion of children 6-23 months of age who receive an iron-rich food or iron-fortified food that is specially designed for infants and young children, or that is fortified in the home: [Children 6-23 months of age who received an iron-rich food or a food that was specially designed for infants and young children and was fortified with iron, or a food that was fortified in the home with a product that included iron during the previous day] / [Children 6-23 months of age].

Statistical Analysis

The individual factors were statistically analyzed by using the Chi-Square statistical test wherever feasible. Chi square test was not applied in the following indicators: minimal dietary diversity, minimal meal frequency, minimal acceptable diet and Consumption of iron-rich or iron-fortified foods because there were no two different group of population to compare with this indicator. Children of 6-23 months of age were considered as one group. The other group of the population below 6 months of age was not considered to be compared as this group was recommended exclusive breastfeeding as per IYCF indicator.

RESULTS

Among the total 360 participants enrolled, we found a male preponderance [197 (54.7%)] as compared to females [163 (45.3%)] (Table1) with 196 (54.4%) being breastfed within 1 hour of birth (Table 1). Pre-lacteal feeds were given to 29 (8.1%) babies. Maximum proportion of enrolled children 173 (48%) were in the family income category of Score 4 (Rs. 4894-7322) as per the modified Kuppuswamy's socioeconomic scale (Table 1). It was found that out of 70 enrolled infants of 4-5 months of age, 72.9% (51/70) babies were exclusively breastfed. This association was found to be statistically significant (Table 2). Analysis further revealed that 90% (45/50) continued whereas 10% (5/50) had stopped breastfeeding out of 50 enrolled children at 12-15 months of age (Table 2). In infants aged 6–8 months, a significantly higher proportion, i.e. 86% (43/50) received solid, semi-solid or soft food in the previous day as compared to 92.36% (157/200) in the older, i.e.9-23 months age group.

Table 1: Frequency table.

		Mean	Mode	Std. Deviation	Minimum	Maximum	Percentiles		
	Valid						25	50	75
Age (months)	360	9.02	4	6.269	1	23	4.00	8.00	13.00
GA (weeks)	360	37.51	37	0.958	34	41	37.00	37.00	38.00
Birth Weight (kg)	360	2.697	2.6	0.3230	1.5	4.0	2.500	2.700	2.900
Time of 1st BF (hours)	360	3.92	1	9.268	1	96	1.00	1.00	3.00
Milk frequency in non-breastfeed	48	1.94	2	0.755	1	3	1.00	2.00	2.75
Income[π]	360	4.01	4	0.767	2	6	3.00	4.00	5.00
Parity[Ø]	360	2.01	2	0.984	1	7	1.00	2.00	3.00
Birth order[Ø]	360	2.92	3	1.385	1	9	2.00	3.00	4.00

[Ø]For the purpose of analysis, birth order and parity were grouped as 1 or 2 in one group and more than 2 in the other group. [π]For analysis of the family income as per the Kuppuswamy's socioeconomic scale the study sample was categorized into 2 groups: 1 to 4 and 6 to 12. The frequency of modified Kuppuswamy's family income scale for per month for each income group category was 0 (0%) for Score 1 (≤Rs.979), 3 (0.8%) for Score 2 (Rs.980-2935), 89 (24.7%) for Score 3 (Rs.2936-4893), 173 (48%) for Score 4 (Rs.4894-7322), 90 (25%) for Score 6 (Rs.7323-9787), 5 (1.38%) for Score 10 (Rs.9788-19574), 0 (0.0%) for Score 12 (Rs.≥19575).

This association was found to be statistically significant (Table 2).

Out of 220 children between age 6 - 23 months enrolled in this study, Minimum dietary diversity (MDD) was seen only in 43 (19.5%) children with 215 (97.7%) children accepting grains, roots or tubers as their first complementary food followed by dairy products (milk, yogurt, cheese) accepted by 139 (63.1%), vitamin-A rich food by 32 (14.5%) and flesh foods by 7 (3.1%) (Table 2).

Results also showed that out of 220 children of age 6-23 months those receiving minimum meal frequency (MMF) was 77 (44.5%) for 173 (78.6%) breastfed, receiving at least 2 meals per day and 22 (46.8%) for 47 (21.36%) non-breastfed category receiving minimum four meals per day as per the MMF criteria.

Similarly, out of 220 children of age 6-23 months, Minimum acceptable diet (MAD) which is a combination of MDD and MMF was received by 13 (7.5%) of the 173 (78.6%) breastfed as compared to 4 (8.5%) of the 47 (21.36%) non-breastfed group (Table 2). Less than half, i.e. 104 (47.3%) of the total children between 6-23 months of age were receiving iron-rich or iron-fortified food (Table 2).

Table 2: Evaluation of IYCF Parameters and their comparison in study groups and UNICEF global databases, 2016 based on MCIS, DHS and other nationally represented sources®.

Comparison groups	Age group (months)	Parameter evaluated in particular age group		Total	®UNICEF global databases2016
1. Early Initiation of breastfeeding within 1 hour of birth - 54.4%					ᴪ45%
Nil	0-23	Early initiation of breastfeeding within 1 hour in 0-23 months age			
		Yes	No		
		196 (54.4%)	164 (45.6%)	360 (100%)	
2. Exclusive breastfeeding of infants at 4–5 months of age* - 72.90%					ᴪ43%
	4–5	Exclusive breastfeeding at age 4–5 months			
		Yes	No		
	Yes	51 (72.90%)	19 (27.10%)	70 (100%)	
0-4	No	68 (97.10%)	2 (2.90%)	70 (100%)	
	Total	119 (85.00%)	21 (15.00%)	140 (100%)	
Statistical test: Pearson Chi-Square and Continuity Correction*					
3. Continued breastfeeding (BF) at 12-15 months of age - 90.00%					ᴪ74%
	12-15	Continued breastfeeding at age 12-15 months			
		Yes	No		
	Yes	45(90.00%)	5(10.00%)	50(100.00%)	
0-12 and 15-23	No	266(85.80%)	44(14.20%)	310(100.00%)	
	Total	311(86.40%)	49(13.60%)	360(100.00%)	
Statistical test: Pearson Chi-Square and Continuity Correction					
4. Introduction of solid, semi-solid/soft-foods at age 6-8months¥ - 86.00%					ᴪ64%
	6-8	Introduction of solid, semi-solid or soft foods at age 6-8 months			
		Yes	No		
	Yes	43 (86.00%)	7 (14.00%)	50(100.00%)	
8-23	No	157 (92.36%)	13 (7.64%)	170(100.00%)	
	Total	200 (90.9%)	177 (9.1%)	220(100.00%)	
Statistical test: Pearson Chi-Square and Continuity Correction¥					

®Source: Unicef Global Databases, 2016 based on MCIS, DHS and other nationally represented sources. Note: Data included in these global averages are the most recent for each country between 2010-2016. ᴪAggregates for these indicators use China, 2008; ᴪᴪAggregates for these indicators do not include China due to lack of data and while >50% of the global population was met, almost all of the data for these indicators are from low and middle income countries. *Statistically Significant (SS) by Pearson Chi-Square:Value-16.190, df-1,p-value:5.73E-05, (E= 10^{-x})Continuity Correction tests: Value-14.342, df-1, p-value:0.00015;¥ Statistically Significant (SS) by Pearson Chi-Square:Value-16.190, df-1,p-value:5.73E-05, (E= 10^{-x}) & Continuity Correction tests: Value-14.342, df-1, p-value:0.00015; * Minimum dietary diversity; # Minimum meal frequency; § Minimal acceptable diet; £SS by Chi-square 0.731, P value 0.045.

In our study we found that there was no significant association between eight core IYCF indicators and the sex of the child, parity of the mother, birth order of the child, immunization status of the mother, supplements taken during antenatal period by the mother and family income, except that the consumption of the iron rich or iron fortified food was significantly higher in the children born to immunised mothers (31.7%) when compared to the children born to unimmunised mothers (18.7%). This association was statistically significant (Table 2).

DISCUSSION

The nutritional status of children under two years of age is directly affected by Infant and young child feeding practices which ultimately impact child survival directly. In 2016, 50 million children under five faced the life-threatening risk of wasting, or acute malnutrition, the majority of them in Asia. Increased marketing strategies and consumption of processed foods along with lower amount of physical activity has resulted in 42 million children being overweight now with an increase by 11 million children since 2000.[1]

According to the National Family Health Survey 2015-16(NFHS-4) the current Infant mortality rate (IMR) is 41,(29 for urban and 46 for rural) as compared to 57 according to NFHS-3(2005-06) survey and the Under-five mortality rate(U5MR) being 50, (34 for urban and 56 for rural) as compared to total of 74 stated by NFHS-3 (2005-06) survey per 1000 live births.[5] A strong protective effect was evident, with exclusively breastfed

infants having only 12% of the risk of death compared with those who were not breastfed.[6]

The World Health Organization (WHO) recommends exclusive breastfeeding for the first six months of life with early initiation and continuation of breastfeeding for two years or more together with nutritionally adequate, safe, age-appropriate complementary feeding starting at six months of age.[2-4]

If breastfeeding were scaled up to near universal levels, about 820000 child lives would be saved every year.[7]All over the world, breastfeeding is initiated in 44% of newborns within one hour after birth, however significant disparities in breastfeeding rates across countries have been documented.[8] Of the 129 countries with available data, only 22 currently meet the target of rates of early breastfeeding initiation aimed at being 70%.[8]

Table 2 (Continued): Evaluation of IYCF Parameters and their comparison in study groups and UNICEF global databases, 2016 based on MCIS, DHS and other nationally represented sources®.

Comparison group	Age group (months)	Parameter evaluated in particular age group		Total	®UNICEF global databases2016
5. MDD*in children 6–23 months of age - 19.50%					ΨΨ29%
Nil	6–23	MDD* in 6-23 months age group			
		Yes	No		
	Yes	43 (19.50%)	177 (80.50%)	220 (100.00%)	
6. MMF #in babies in 6–23 months age group					ΨΨ52%
Nil	6–23	MMF #in breastfed babies in 6-23 months age group			
		Yes	No		
		77 (44.5%)	96 (55.5%)	173 (100.0%)	
Nil	6–23	MMF #in non-breastfed babies in 6-23 months age group			
		Yes	No		
	Yes	22 (46.8%)	25 (53.2%)	47 (100.0%)	
	Total	77+22=99 (45%)	96+25=121 (55%)	220 (100.0%)	
7. MAD§ in babies in 6–23 months age group					ΨΨ16%
Nil	6–23	MAD§ in breastfed babies in 6-23 months age group			
		Yes	No		
		13 (7.5%)	160 (92.5%)	173 (100.0%)	
Nil		MAD§ in non-breastfed babies in 6-23 months age group			
		Yes	No		
		4(8.5%)	43(91.5%)	47 (100.0%)	
	Total	13+4=17 (7.72%)	160+43=203 (92.27%)	220 (100.0%)	
8. Consumption of iron-rich or iron-fortified food in 6–23 months age group					NA
Nil	6–23	Consumption of iron-rich or iron-fortified food in 6-23 months age group			
		Yes	No		
		104 (47.30%)	116 (52.70%)	220 (100.00%)	
9. Comparison of Immunization status of mother with Consumption of iron-rich or iron-fortified foods in children in 6-23 months age group£					
	6–23 months	Consumption of iron-rich or iron-fortified foods in children in 6-23 months age group			
		Yes	No		
Immunization status of mother	Yes	99 (31.7)	213 (68.26%)	312 (100.0%)	
	No	9 (18.7)	39 (81.25%)	48 (100.0%)	
	Total	108 (30%)	252 (70%)	360 (100.0%)	
Statistical test: Pearson Chi-square£					

®Source: Unicef Global Databases, 2016 based on MCIS, DHS and other nationally represented sources. Note: Data included in these global averages are the most recent for each country between 2010-2016. ΨAggregates for these indicators use China, 2008; ΨΨAggregates for these indicators do not include China due to lack of data and while >50% of the global population was met, almost all of the data for these indicators are from low and middle income countries. *Statistically Significant (SS) by Pearson Chi-Square:Value-16.190, df-1,p-value:5.73E-05, (E= 10^{-x})Continuity Correction tests: Value-14.342, df-1, p-value:0.00015;¥ Statistically Significant (SS) by Pearson Chi-Square:Value-16.190, df-1,p-value:5.73E-05, (E= 10^{-x}) & Continuity Correction tests: Value-14.342, df-1, p-value:0.00015; * Minimum dietary diversity; # Minimum meal frequency; § Minimal acceptable diet; £SS by Chi-square 0.731, P value 0.045.

As compared to the results of the DHS 2005-6 survey which revealed early initiation of breastfeeding within one hour to be only 22%[2,3] and 41 according to the NFHS-4 survey 2015-16 in India,[5] we observed that out of 360 children enrolled in our study under 2 years of age, a significantly higher proportion of 196 (54.4%) children being breastfed within 1 hour (Table 1), which is slightly lower than the previous studies done in the Kaski district of Western Nepal (57.9%), NDHS 2006 (35.4%),

Central Nepal (63.0%) and higher than previous studies from India (36.4%), Bangladesh (24%) and Pakistan (8.5%) which have comparable socioeconomic condition and cultural practices.[9]

Globally, only 40% of infants under six months of age are exclusively breastfed.[7] Only 23 countries have achieved at least 60% of infants less than six months being exclusively breastfed and have met the 2030 global goal for exclusive breastfeeding at six months.[8] Out of the 70 infants of the 4-5 months age group enrolled in our study, 51 (72.9%) infants were exclusively breastfed which was found to be statistically very significant (p-<0.0001) (Table 2) and was almost similar to 55% found in NFHS-4 survey 2015-16[5] with only a small increment being recorded in infants 0-6 months of age from 41.2% in 1998-99 NFHS-2 to 46.3% in 2005–2006 NFHS-3.[10]

Lack of exclusive breastfeeding during first 6 months accounts for 77% deaths and 85% disability-adjusted life years.[11] Our hospital being a 'Baby Friendly Hospital,' having trained staff nurses and 'Mother Support Group'(MSG) counsellors for antenatal and postnatal counselling along with medical personnel may be one of the factors contributing to relatively higher rates of early initiation of breastfeeding within one hour as well as of exclusive breastfeeding in infants at 4–5 months of age as compared to various studies in literature.

Overall, globally rates of continued breastfeeding are much higher (74%) at one year.[8] Nearly 40% of the countries with data have rates above 80% ranging from 70% of countries having high rates of continued breastfeeding at one year in Africa to only four countries having such high rates in the Americas.[8] Our study revealed a high continued breastfeeding rate of 90% at 12-15 months of age (Table 2) which was higher than high-income countries like UK (<1%), USA (27%) and Norway (35%). Globally, the prevalence of breastfeeding at 12 months is highest in sub-Saharan Africa, south Asia, and parts of Latin America.[6]

Infants and young children less than 2 years of age are at an increased risk of malnutrition, illness and mortality due to inappropriate complementary feeding practices.[12] Our study also showed a statistically significant higher proportion of introduction of complementary foods at 6-8 months of age of 86% (Table 2) as compared to 64% and 55% stated by the NFHS-4 survey 2015-16 and NFHS 2005-06 respectively in the same age group.[1] Only 50% of infants aged 6–8 months receive complementary foods while continuing to be breastfed in Ethiopia.[13]

By ensuring optimal dietary diversity and meal frequency which are the most important components of complementary feeding, an estimated 6% of under-five deaths can be prevented significantly contributing to the aim of achieving the Millennium Development Goal 4.[14] Greater than two-thirds of malnutrition related child deaths are associated with inappropriate feeding practices like poorly diversified and infrequently feeding and intake of inadequately nutritious diets during the first two years of life.[12] The major proportion of our study group (97.7%) accepted grains, roots or tubers as their first complementary food. Other foods frequently given were dairy products (milk, yogurt, cheese) (63.1%), flesh foods (3.1%), eggs (6.3%) and food rich in vitamin-A (14.5%) were least consumed items among the participants, indicating a major lacking in the intake of food from diverse food groups in the children below 2 year of age. High cost of fruits and vegetables, meat, fish, eggs may be one of the reasons for their reduced consumption, and more so were large number of members in the family and belonged to low per-capita income.

The Minimum dietary diversity (MDD) in this study, 43 (19.5%) (Table 2) is similar to NFHS-4 (42%) and lower than NFHS-3(52%).[5] A study conducted by Beyene et al among infant and young children aged 6–23 months in Dangila Town in 2014, Northwest Ethiopia, found that only 12.6% of children received the recommended dietary diversity,[12] which is lower as compared with the DHS reports of developing countries from Africa, Asia, and Latin America similar to the results of different studies according to the Demographic and Health Survey (EDHS) 2011 conducted in Ethiopia (10.8%),[12] Democratic Republic of Congo(12%), Burkina Faso (14%), Mali (16%), and India (15.2%). However, it is lower than findings from Nepal (34%), East New Delhi (33%), Bangladesh (41.9%), Nepal (72%), and Sri Lanka (71%).[12]

In the same study Beyence et al found that the proportion of children who received Minimum meal frequency (MMF) was 50.4% which was higher as compared to EDHS report (44.7%),[12] Mali (25%), Burkina Faso (31%), Democratic Republic of Congo (30%), Cameron (41%) and India (42%). It is similar with studies conducted in New Delhi (49%), Vietnam (48%), Namibia (49%) but lower when compared with studies from Asia and Latin American countries like Nepal (82%), Kathmandu (65%), Bangladesh (81%), Sri Lanka (88%), and Peru (78%). Mothers who had attended post natal clinics (PNC) within 1–2 days after delivery were more likely to provide recommended meal frequency than mothers who had no PNC visit.[12] Our study shows a similar minimum meal frequency of 44.5% which was nearly the same in breastfed as well as non-breastfed group and is lower as compared to 52% found in NFHS-4 survey 2015-16.[1] Mothers with satisfactory exposure to media had 29% less risk to practice inadequate meal frequency compared to mothers with unsatisfactory exposure to media.[13]

There was no significant difference between the breastfed (7.5%) and non-breastfed (8.5%) children receiving Minimum acceptable diet(MAD) (Table 2) which has a very low frequency in our study as compared to 16% found in NFHS-4 survey 2015-16.[1] Only 4 % of children have been fed using MAD as stated by Beyence et al in

their study.[12] Lack of postnatal counselling by health workers as well as infrequent antenatal health clinics, poor exposure to media and maternal illiteracy were found to be the reasons for not meeting Minimum dietary diversity(MDD) and Minimum acceptable diet (MAD) criteria.

The NFHS-4 states that more than 50% of the children and more than 50% of women are still anaemic in 10 out of 15 states and 11 states respectively.[15] Our study shows that only less than half, 47.3% of total children between 6 – 23 months of age were receiving iron-rich or iron-fortified foods suggesting high risk for iron-deficiency anemia.

In the association of 8 core IYCF indicators with secondary parameters, a statistically significant association which showed a significantly higher proportion of consumption of the iron rich or iron fortified food in the children born to immunised mothers (31.7%) when compared to the children born to unimmunised mothers (18.7%) was found in our study. This finding may be true because the mothers who are immunised are antenatally registered and are more knowledgeable about the consumption of iron rich or iron fortified food due to counselling by their health practitioners on regular follow-up visits.

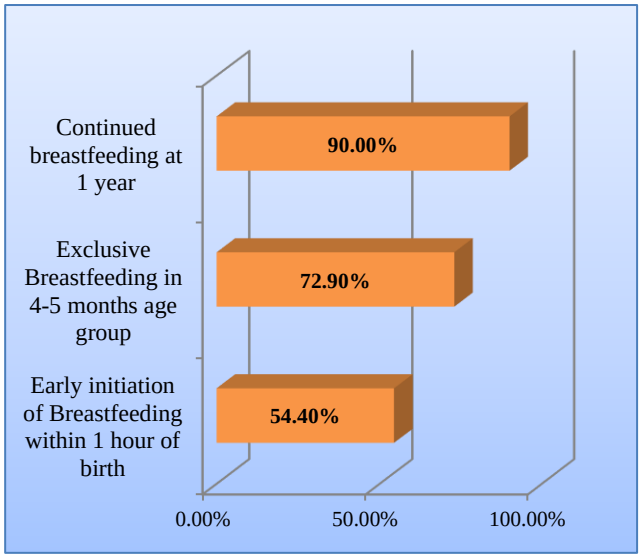

Figure 1: Percentages of breastfeeding indicators (%).

In our study we found that there was no significant association between the initial seven IYCF core indicators with any of the secondary demographic parameters.

Literature states that children aged 12–17 and 18–23 months had about two times higher odds of having dietary diversity compared to children aged 6–11 months respectively.[12] Also children who were born third had nearly two times more risk to be feed inappropriately compared to children born first.[12]

On comparing this study results with UNICEF global databases 2016 results, we found that in our study the percentages of breastfeeding indicators (1-3) (Table 2 and Figure 1) were higher; however the percentages of complementary feeding indicators (5-7) (Table 2 and Figure 2) are quiet low with the exception of indicator 4 (Table 2 and Figure 2) which is also higher compared those to stated in the UNICEF global databases 2016.

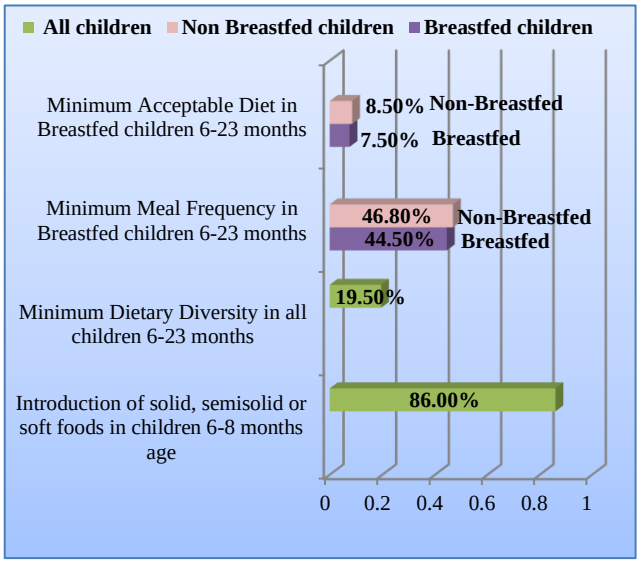

Figure 2: Complementary feeding Indicators (%)

The limitations of the present study were that proportion of exclusively breastfed infants appears to be overestimated due to the previous day recall system as some infants who are given other liquids irregularly may not have received them in the day before the survey. Since our study setting was a Baby Friendly Hospital the study results cannot be directly extrapolated to the general population.

It is recommended to use population-level indicators of infant and young child feeding practices primarily for assessment to make national and sub-national comparisons and to describe trends over time, to identify populations at risk, target interventions, and make policy decisions about resource allocation as well as to monitor progress in achieving goals and to evaluate the impact of interventions. Programs and projects should augment these with more specific indicators that reflect their own interventions, messages, and behaviour change objectives.

CONCLUSION

Present study results of the breastfeeding indicators like 'Early initiation of breastfeeding', 'Exclusive breastfeeding at 4-5 months of age', 'Continued breastfeeding at 1 year', 'Introduction of solid, semi-solid or soft foods' were better than the various studies mentioned in literature. However, the complementary feeding indicators results like Minimum dietary diversity

(MDD), Minimum meal frequency (MMF) and Minimum acceptable diet (MAD) were lower, probably due to a lack of knowledge about the dietary quality, iron consumption and frequency of intake of a balanced meal after the weaning period. This causes the diet to falter in the period after 6-8 months of age and needs to be improved drastically with the help of health education and appropriate dietary advice.

There is still scope for further research to study the other aspects of optimal feeding such as responsive feeding and adequate texture of food which are more complex to assess. The work of developing valid and reliable indicator definitions and measurement approaches for these parameters is still in progress by WHO which may be implemented in future.

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