

Original Research Article

Determination of the impact of infant and young child feeding counselling services on the knowledge of mother-children dyads less than two years

Karen Janice Moras^{1*}, Asha D. Benakappa², Gangadhar Belavadi²

¹Department of Pediatrics, Manipal Academy of Higher Education, Manipal University, Udupi, India

²Department of Pediatrics, Bangalore Medical College and Research Institute, Bangalore, India

Received: 16 May 2021

Accepted: 31 May 2021

*Correspondence:

Dr. Karen Janice Moras,

E-mail: drkarenmoras87@gmail.com

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ABSTRACT

Background: Optimum infant and young child feeding (IYCF) practices are essential for adequate growth and development of infants and children. Malnutrition in children occurs almost entirely during the first two years of life, is virtually irreversible after that. Despite the IYCF guidelines, there is no consistent literature on the prevalence of existing IYCF practices and impact of optimum IYCF practices. This study was conducted to estimate the prevalence of existing IYCF practices and to determine the impact of IYCF counseling in children less than 2 years.

Methods: A cross-sectional before and after study was done in mother-children dyads (aged 0-24 months). All 125 mother-children dyads were interviewed using prevalidated IYCF questionnaire after obtaining informed consent. The pre-counseling knowledge of mothers, on existing IYCF practices were analyzed using IYCF core and optional indicators. At 6 weeks, the post-counseling knowledge of the mothers was assessed using the same core and optional indicators.

Results: Exclusive breastfeeding was seen in 18 of 43 (41.8%) mothers who showed statistically significant improvement to 40 (93%) ($p < 0.001$) after counseling. Children ever breastfed were 62.4%. Predominant breastfeeding was observed in 24%. Initiation of complementary feeding at 6 months of age, improved significantly ($p < 0.001$) post-counseling from 19 mothers (82.6%) to 23 mothers (100%). Minimum dietary diversity improved significantly post counseling, from 23 (28.7%) children to 70 children (87.5%) ($p = 0.03$). Minimum meal frequency was only 22 (48.8%) in breastfed and 8 (22.9%) in non-breastfed children before counseling and improved to 40 (88.9%) in breastfed and 28 (80%) in non-breastfed children ($p = 0.04$). The minimum acceptable diet was given to 2 (4.4%) children aged 6-23 months out of 45 in the breastfed group and on counseling, it improved to 37 (82.23%), which was statistically significant ($p < 0.001$). Among the 35 non-breastfed children, with 2 children aged 6-23 months receiving minimally acceptable diet increased to 28 (80%) post counseling, which was found to be statistically significant ($p < 0.0001$). A significant reduction in bottle feeding was observed from 52 (41.6%) mothers bottle feeding pre counseling, to 18 (1.4%) post counseling ($p < 0.001$).

Conclusions: The present study concludes that maternal education on IYCF practices improves their knowledge significantly irrespective of their socioeconomic and education status. Effective IYCF counselling services improve the growth and development of a child. IYCF counselling services provide a critical window of opportunity to tackle the malnutrition crisis and ensure and promote appropriate child growth and survival.

Keywords: IYCF, Malnutrition, Breastfeeding, Complementary feeding

INTRODUCTION

Every year, malnutrition has been responsible directly or indirectly for 10.9 million deaths among children under five globally.¹ More than two-thirds of these deaths is often associated with inappropriate feeding practices in the first year of life.¹ The first two years of life is called critical period of brain growth. This emphasizes the importance of breastfeeding and optimum nutrition during these years. Malnutrition has a negative impact on cognitive development, school performance and productivity. Appropriate feeding practices during infancy are essential for attaining and maintaining optimum nutrition, health and development and overall wellbeing of infants and children.²

In many community settings, there is poor access and utilization of nutritional services. There are a lot of wrong beliefs regarding diet during childhood illness and also surprisingly during health.³ There is a need for one-to-one IYCF counseling to break the vicious cycle of malnutrition. Hence this study was done to determine the impact of IYCF counseling services in children less than 2 years.

METHODS

A cross-sectional, single-center before and after study was done in children 0-24 months visiting the Bangalore Medical College and Research Centre in South India from November 2012 to November 2015. Healthy term infants attending the out-patient department from 0-24 months were enrolled into the study after obtaining informed consent from mothers. Exclusion criteria were preterm infants ≤ 37 weeks, low birth weight infants ≤ 2.5 kgs, children with NICU admissions, HIV exposed/infected infants and children on anti-tubercular drugs.

Pre-counseling knowledge of the mother/caretaker was assessed by predefined optional and core IYCF indicators. The interview included questions on breastfeeding, initiation of complementary feeding, minimum dietary diversity, minimum meal frequency, and minimum acceptable diet. The staff nurse demonstrated the proper positions of breastfeeding and the need for regular follow-up. The pediatrician explained the various food groups and importance of each to the mother. Each counseling session lasted for 30 minutes with 10 minutes of demonstration of breastfeeding techniques by pediatrician.

The post-counseling knowledge of the mothers was assessed at the end of six weeks using the same IYCF core and optional indicators.

Statistical analysis

Statistical analysis was carried using software OPEN EPI version 3.2. Results on continuous measurements are

presented as Mean \pm SD (min-max) and results on the categorical scale are shown in number (%). Significance is assessed at a 5% level of significance. All comparisons with qualitative data and done by Mc Nemar test (pre and post).

Sample size was calculated with,

$$N = \frac{Z\alpha^2 pq}{d^2},$$

Where,

$Z\alpha = 1.96$ at 95% confidence level,

$p =$ proportion,

$q = 1 - p$.

With 95% confidence level and 85% power with respect to the study of IYCF indicators on practices and knowledge of mothers in rural areas conducted by Arzu et al.⁴ The sample size was calculated to be a minimum of 228 with 20% non-response error total sample size comes to be 272 ($p = 42.8$, $q = 57.2$, $d = 15\%$ of p).

Demographic data were analyzed using descriptive statistics. Comparison of pre to post qualitative data was done using Mc Nemar test. Confounding factors were education and socio-economic status. Most of the mothers were above middle school and socio-economic status was equally distributed. The confounding bias was thus eliminated. No subgroup analysis was done in the study. Baseline characteristics and demographic data of all 125 children have been described (Table 3). Sensitivity analysis was not done in the study and purposive sampling was done.

RESULTS

Among 270, 145 children were excluded, 42 were low birth weight, 37 pre-term infants, 24 had NICU admissions at birth, 8 had HIV and 5 were on anti-tubercular treatment (ATT). The prolonged time needed for counseling and apprehension were reasons for refusal to consent from 29 mothers. Of the 125 children, 67 attended the immunization clinic for routine immunization and the remaining 58 children attended out-patient department. Of the 58 children, upper respiratory tract infection, diarrhea, rash and excessive cry were observed in 32, 12, 5 and 9 children, respectively.

The majority of children, 53 (42.4%) were between 0-6 months of age, with a male to female ratio of 0.8:1. The mean decimal age was 9.19 ± 5.75 months with 59 boys (47.2%) and 66 (52.8%) girls. The mean birth weight was 2.91 ± 0.29 kgs. The education status of the mother was noted in the study as the mode of intervention was directed towards maternal knowledge. The socio-

economic status was at or above the lower middle class as described in Table 4.

Of 125 mothers only 80 mothers adhered to the study protocol and brought the children to follow-up on regular visits. The remaining 45 mothers enrolled in the study, mainly visited the hospital for treatment of upper respiratory tract infection, diarrhea and rash. The core IYCF indicators were analyzed and the results were shown (Table 2 and 5).

Early initiation of breastfeeding was done in only 45 (36%) of 125 mothers in the study population. Exclusive breastfeeding was seen in 18 of 43 (41.8%) children who showed statistically significant improvement to 40 (93%) ($p < 0.001$) after counseling. There was no significant difference in impact of counseling to continue breastfeeding practices up to one year age ($p = 0.65$). Initiation of complementary feeding at 6 months of age, improved significantly ($p < 0.001$) post-counseling from 19 mothers (82.6%) to 23 mothers (100%). Continued

breastfeeding at one year showed no significant difference post counseling ($p = 0.65$).

Minimum dietary diversity improved significantly post-counseling, from 23 (28.7%) children to 70 children (87.5%) ($p = 0.03$).

Minimum meal frequency was given to only 22 (48.8%) breastfed and 8 (22.9%) non-breastfed children before counseling, improved to 40 (88.9%) and 28 (80%) ($p = 0.04$) in breastfed and non-breastfed children, respectively.

The minimum acceptable diet was given to 2 (4.4%) children aged 6-23 months out of 45 in the breastfed group and on counseling, it improved to 37 (82.23%), which was statistically significant ($p < 0.001$). Among the 35 non-breastfed children, with 2 children aged 6-23 months receiving minimum acceptable diet increased to 28 (80%) post-counseling, which was found to be statistically significant ($p < 0.0001$).

Table 1: Definitions of the terms used in the study.

Feeding practices	Requires that the infant receives	Allows the infant to receive	Does not allow the infant to receive
Exclusive breastfeeding	Breastmilk (including milk expressed or from a wet nurse)	ORS, drops, syrups (vitamins, minerals, medicines)	Anything else
Predominant breastfeeding	Breastmilk (including milk expressed or from a wet nurse) as the predominant source of nourishment	Certain liquids (water and water-based drinks, fruit juice), ritual fluids and ORS, drops or syrups (vitamins, minerals, medicines)	Anything else (in particular, non-human milk, food-based fluids)
Complementary feeding	Breastmilk (including milk expressed or from a wetnurse) and solid or semi-solid foods	Anything else: any food or liquid including non-human milk and formula	NA
Breastfeeding	Breastmilk (including milk expressed or from a wet nurse)	Anything else: any food or liquid including non-human milk and formula	NA
Bottle-feeding	Any liquid (including breastmilk) or semi-solid food from a bottle with nipple/teat	Anything else: any food or liquid including non- human milk and formula	NA

Table 2: Summary of core IYCF indicators.

Indicators	Numerators	Denominators
Early initiation of breastfeeding	Children born in the last 24 months (living or deceased) who were put to the breast within 1 hour of birth	Children born in the last 24 months
Exclusive breastfeeding under 6 months	Infants 0-5 months who received only breastmilk during the previous day	Infants 0-5 months
Continued breastfeeding at 1 year	Children 12-15 months who received breastmilk during the previous day.	Children 12-15 months
Introduction of solid, semisolid or soft foods	Infants 6-8 months who received solid, semisolid or soft foods during the previous day	Infants 6-8 months
Minimum dietary diversity	Children 6-23 months who received foods from 4 or more food groups out of the standard 7 food groups during the previous day	Children 6-23 months

Continued.

Indicators	Numerators	Denominators
Minimum meal frequency	Children 6-23 months who received solid, semisolid or soft foods the minimum number of times or more during the previous day*	Children 6-23 months
Minimum acceptable diet	Breastfed children 6-23 months who had at least the minimum dietary diversity and meal frequency and non-breastfed children 6-23 months 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	Children 6-23 months

*2 and 3 times for breastfed children 6-8 and 9-23 months, respectively; 4 times for non-breastfed children; the number of milk feeds is counted for non-breastfed children as meals.

Table 3: Summary of optional IYCF indicators.

Indicators	Numerators	Denominators
Children ever breastfed	Children born in the last 24 months (living or deceased) who were ever breastfed	Children born in the last 24 months
Predominant breastfeeding under 6 months	Infants 0-5 months of age who received breast milk as the predominant source of nourishment during the previous day	Infants 0-5 months
Bottle-feeding	Children 0-23 months who were fed with a bottle during the previous day	Children 0-23 months

Table 4: Baseline characteristics and demographic data.

Baseline characteristics	Mean±SD
Age (in months)	9.19±5.75
Birth weight (in kgs)	2.91±0.29
Weight (in cms)	7.03±1.77
Length (in cms)	66.08±8.08
Age (in months) (%)	
0-6	53 (42.4)
7-11	30 (24)
12-17	27 (21.6)
18-23	15 (12)
Male children	59 (47.2)
Female children	66 (52.8)
Reason of visit	
Immunization	67
URTI	32
Diarrhea	12
Rash	5
Excessive cry	9
Education status of the mother (%)	
Illiterate	1 (0.8)
Primary school	4 (3.2)
Middle school	13 (10.4)
High school	52 (41.6)
Post high school	32 (25.6)
Graduate	23 (18.4)
Socio economic status (%)	
Upper class	12 (9.6)
Upper middle class	30 (24)
Lower middle class	20 (16)
Upper lower class	33 (26.4)
Lower class	30 (24)

Table 5: IYCF core indicators.

Core indicators			
Early initiation of breastfeeding within 1 hour			
Yes	45		
No	80		
Total	125		
Indicators	Pre-counseling	Post-counseling	P value
Exclusive breastfeeding under 6 months			
Yes	18 (41.8%)	40 (93%)	<0.001
No	25	3	
Total	43		
Continued breastfeeding at 1 year			
Yes	12 (60%)	13 (65%)	0.65
No	8	7	
Total	20		
Introduction of liquid, semi-solid, solid foods			
Yes	19 (82.6%)	23 (100%)	<0.001
No	4	0	
Total	23		
Minimum dietary diversity			
Yes	23 (28.7%)	70 (87.5%)	0.03
No	57	10	
Total	80		
Minimum meal frequency in breastfed children			
Yes	22 (48.8%)	40 (88.9%)	0.04
No	23	5	
Total	45		
Minimum meal frequency in non-breastfed children			
Yes	8 (22.9%)	28 (80%)	0.04
No	27	7	
Total	35		
Minimum acceptable diet in breastfed children			
Yes	2 (4.4%)	37 (82.23%)	<0.001
No	43	8	
Total	45		
Minimum acceptable diet in non-breastfed children			
Yes	2 (5.7%)	28 (80%)	<0.001
No	33	7	
Total	35		

Table 6: IYCF optional indicators.

IYCF optional indicators		
Children ever breastfed		
Yes	78 (62.4%)	
No	47	
Predominant breast feeding at 0-5 months		
Yes	13 (68%)	
No	19	
	Pre-counseling	Post-counseling
Bottle feeding of infants at 0-23 months		
Yes	52 (41.6%)	18 (1.4%)
No	73	107

Table 7: Total number of participants.

	Numbers
Mother-children enrolled in the study	270
Excluded	145
Low birth weight	42
Pre-term infants	37
NICU admission	24
Refused consent	29
HIV positive	8
TB treatment given	5
Mother-children dyads enrolled	125
Reason of Visit	
Immunization	67
Others	58
URTI	32
Diarrhoea	12
Rash	5
Excessive cry	9

Among the optional indicators predominant breastfeeding was observed in 13 of 19 (68%) children (Table 6). Children ever breastfed were 78 of 125 (62.4%).

A significant reduction in bottle feeding was observed from 52 (41.6%) mothers bottle feeding pre-counseling, to 18 (1.4%) post-counseling ($p < 0.001$) (Table 6).

DISCUSSION

IYCF is an essential component in curbing child mortality and malnutrition. Among all the components, breastfeeding appears to be the single most important component for preventing malnutrition. The present study showed exclusive breastfeeding to be 41%, which is comparable with others studies.⁵ Exclusive breastfeeding improved with counseling to 93% which was because of the benefits of breastfeeding like increased IQ, decrease in diarrheal diseases, decrease incidence of metabolic syndrome in adult life, reduced expenditure, explained to the mothers in their own native language. In the present study, early initiation of breastfeeding in the first hour was practiced only in 36% as compared to 23.7% mothers in a study done in rural India.⁶ This was due to the traditional belief that yellow colored colostrum is devil's milk.

Timely initiation of complementary feeds was observed in 82.6% of children aged 6-23 months due to counselling during immunization as compared to 55% in children in other Indian studies.⁷

In the present study, there was no significant change (60% to 65%) in continuing breastfeeding up to one year as majority mothers' felt their breastmilk-output was low, compared to other studies were mean duration of breastfeeding was 24.4 months.⁸

The present study showed minimum dietary diversity of 28.7%. This is attributed to the preconceived fear in the mothers that, introduction of diverse foods would cause respiratory tract infection in their children. This was comparable with other studies were minimum dietary diversity was 15.2%, 34% and 41.9% respectively due to the lower socio-economic status impairing the purchasing power and offering diverse food to their children.⁹⁻¹¹ However, with counseling 87.5% mothers were able to give diverse food to about four food groups.

The present study showed significant improvement minimum meal frequency in breastfed and non-breastfed children from 48.8% to 88.9% and 22.9% to 80% respectively was compared to other studies were prevalence of minimum meal frequency was 32.6%.¹²

Minimum acceptable diet which is a composite measure of minimum meal frequency and minimum dietary diversity improved from 4.7% to 82% in breastfed and 5.8% to 80% in non-breastfed children respectively compared to other studies were minimum acceptable diet was 19.6% and 48%.^{12,13}

Among the optional indicators, children ever breastfed less than 2 years was 62.4% compared to 95.8% in the other study which was due to low milk output and early cessation of breastfeeding.¹⁴ Predominant breastfeeding in children less than 6 months was 24% due to the belief that other prelacteal feeds prevented respiratory illness.

In the present study 52 (41.6%) infants were bottle-fed compared to 53.3% in a study by Rathur et.al.¹⁴ This may be due to higher socio-economic status and education of the mothers. On explaining the dangers of bottle feeding, there was significant reduction, with only 18 mothers ($p < 0.001$) continuing bottle feeding.

Limitations

Limitations of the study were a small number of subjects in the study group. Some mothers who attended the outpatient department for illness-related visits were not keen to adhere to counseling follow up regularly. Low birth weight, pre-term infants were excluded from the study, who if included would have further added to the objectivity of the study results. Since the sample size was small, the study was underpowered for outcome of interest. Since 145 out of 270 children were excluded from the study at such a small sample size the generalizability of results would be difficult to achieve. The family size and number of siblings were not noted in the study which would be a confounding variable and would alter the outcome of interest.

CONCLUSION

The present study concludes that maternal education on IYCF practices improves their knowledge significantly irrespective of their socioeconomic and education status. The present study followed up maternal knowledge and IYCF practices that were not observed in previous studies. Timely and effective IYCF counseling services to the mothers, during immunization, regarding appropriate breastfeeding practices, complementary feeding, dietary diversity and frequency of feeds would significantly improve the feeding practices and tackle the malnutrition crisis.

ACKNOWLEDGEMENTS

Authors would like to thank to the mothers who visited the hospital immunization clinic and outpatient department for adhering to the counseling protocol.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Moras KJ, Benakappa AD, Belavadi G. Determination of the impact of infant and young child feeding counselling services on the knowledge of mother-children dyads less than two years. *Int J Contemp Pediatr* 2021;8:1151-8.