Feeding Practices Among Low Birth Weight and Normal Birth Weight Infants

Arundhathy, M.V., Research Scholar in Human Development, Department of Studies in Food Science and Nutrition University of Mysore. Email: arundhathysanthosh270@gmail.com

Komala, M., Senior Assistant Professor of Human Development, Department of Studies in Food Science and Nutrition, University of Mysore, Email: komalagangadhar71@gmail.com

Abstract

The first two years of life are the most vital in a child's growth and development. The nutrition provided during this phase of life, lays the foundation of health and healthy feeding habits. Poor feeding practices during 0-5 years, resulting in malnutrition, contribute to impaired cognitive and social development, and reduced productivity in later life. Research studies were clearly provided the evidence that being born with low birth weight infant is inconvenience for the infants and intervention on feeding practices of infants boost the immediate and long term health and well being of the infants. This prospective study aimed at knowing the feeding practices among low birth weight infants (LBW) from birth to 2 years of age and to compare with normal birth weight (NBW) infants of Mysore city. A total of 106 LBW infants (born with <2.5 kg) as target group and 63 NBW infants (born with ≥ 2.5 kg) as control group were selected as sample. The findings revealed that around 85% of LBW as well as NBW infants were introduced to breast feeding and colostrum on first day and remaining (around 15%) infants were introduced on 2nd day. There was a significant association between LBW and NBW infants with regard to feeding schedule and frequency of breast feeding. There was a significant association between LBW and NBW infants with type of milk used for bottle feeding. Nearly equal percentage of LBW and NBW infants were introduced with bottle feeding and weaning foods at same age. There was a significant association between LBW and NBW with regard to age at which normal diet introduced to infants. There was no significant association between the genders among LBW as well as among NBW infants with regards to any issues related to breast feeding, bottle feeding and supplementary feeding practices.

Key Words: *Low birth weight infants, Feeding practices, Breast feeding, bottle feeding, supplementary feeding.*

Introduction

The first two years of life are the most vital in a child's growth and development. The nutrition provided during this phase of life, lays the foundation of health and healthy feeding habits. Infant feeding practices

comprising of both the breast feeding and complementary feeding, determines the nutritional status of the child. Infant feeding practices refer generally to meet nutritional and immunological needs of the body at different stages of child growth. Exclusive breastfeeding for the first four to six months of life and timely introduction of weaning foods are important for laying down proper foundations of growth in later childhood (Bavdekar, et.al. 1994). However, faulty habits arising from ignorance, superstitions and wrong beliefs are responsible for aggravating malnutrition in communities. Poor feeding practices during 0-5 years, resulting in malnutrition, contribute to impaired cognitive and social development, and reduced productivity in later life (Food and Nutrition Board, 2004). The effects of infant feeding practices are largely socio-economic. Unfortunately a majority of children in India live under such economic and environmental conditions that hamper their growth and development. Recent scientific evidence reveals that malnutrition has been responsible, directly or indirectly, for 60% of all deaths among children under five years of age annually. Over 2/3 of these deaths are often associated with inappropriate feeding practices, that occur during the first year of life. Only 35% of infants world-wide are exclusively breastfed during the first four months of life and complementary feeding begins either too early or too late with foods which are often nutritionally inadequate and unsafe (Das and Mukherjee, 2014).

In developing countries like India, low birth weight (LBW) remains a significant public health problem and is associated with a range of both short and long term adverse consequences (Ramakrishnan Usha, 2004). Feeding of LBW infants is relatively difficult because LBW infants are born with inadequate feeding skills and gut immaturity; suffer from significant illness during first few week of life. Nutritional management influences immediate survival as well as subsequent growth and development of LBW infants. Even simple interventions such as early initiation of breastfeeding and avoidance of pre-lacteal feeding have been shown to improve their survival in resource restricted settings. (Sankar Jeeva, et.al., 2008). Research studies clearly provided the evidence that being born with LBW infant is inconvenience for the infants and intervention on feeding practices of infants boost the immediate and long term health and well being of the infants (WHO, 2011). In this study an attempt was made to know the feeding practices among LBW infants.

Material and Methods

A longitudinal prospective study was carried out to know the feeding practices among LBW infants and to compare with NBW infants in Mysore city. Infants born during the month of September 2010 in selected hospitals of Mysore city were included as sample and follow up study was carried out every month till infants reached 2 years of age. A sample size of 106 LBW Infants and 63 NBW infants were selected as target group and control group respectively. LBW infants born with less than 2500

grams without any congenital anomaly were only included for the study. 63 NBW infants i.e., more than 2.5 kg were selected randomly from the same hospitals as control group. Hospital records were referred for details of birth of infants and information on feeding practices was sought from mothers. The collected data were analysed using IBM SPSS version 19.0. Frequency and Percentage was calculated, chi-square test was done to see the association between variables and feeding practices.

Results and Discussion

Table 1 showed that there were 62.72 percent low birth weight (LBW) infants and 37.28 percent were normal birth weight (NBW) infants. Among LBW infants, 57.55 percent constituted females and remaining 42.45 percent comprised males. Among NBW infants, 50.79 percent comprised females and 49.21 percent constituted males. This result indicates a high percentage of females than males observed as LBW infants.

Table 2 reveals the gender and birth weight wise distribution of sample. Among LBW infants, majority (63.21%) were under the birth weight group of 2001 to 2499 grams followed by 32.1 percent of them under the birth weight group of 1501 to 2000 grams and 4.7 percent were under the birth weight group of ≤1500 grams. Higher percentage of female infants observed under the birth weight groups of 2001 to 2499 grams (67.2) and while higher percentage of male infants observed under birth weight group of 1501 to 2000 grams (35.6%) and ≤1500 grams (6.7%). Among NBW infants, nearly equal percentages of females (50.0% & 51.6%) and males (50.0% & 48.4%) were under the birth weight groups of 2500 to 2999 grams and 3000 to 3500 grams respectively.

Table 3 depicts the breast feeding practices among LBW infants and NBW infants. With regard to initiation of breastfeeding and colostrum to babies, nearly equal percentages of LBW (85.8% and 14.2%) and NBW (84.1% and 15.9%) infants were introduced to breast feeding on first day and second day respectively. Same percentages of LBW (85.8% and 14.2%) and NBW (84.1% and 15.9%) infants were introduced to colostrum on first day and second day respectively. This clearly indicates that initiation of breast feeding and colostrum did not decided upon on birth weight of babies. A considerable percentage of mothers were aware that breastfeeding and colostrum has to be initiated on first day itself. Among LBW infants, higher percentages of females (91.8% & 91.8%) than males (77.8% & 77.8%) were introduced to breast feeding and colostrum on first day respectively. Among NBW infants, higher percentages of females (90.6% & 90.6%) than males (77.4% & 77.4%) were introduced to breast feeding and colostrum on first day respectively. But no significant association of gender was observed among LBW and among NBW babies with regard to initiation of breast feeding and colostrum.

With reference to exclusive breast feeding (table 3), majority of LBW infants (93.4%) as well as NBW (87.3%) infants were exclusively breast fed up to 6 months. Remaining percentage of NBW infants (9.5% and 3.2%) and LBW (4.7% and 1.9%) infants were exclusively breast fed for 5 months as well as for 7 months respectively. No significant association was observed between period of exclusive breast feeding and birth weight groups. Among LBW infants, nearly equal percentage of female (95.1%) and male (91.1%) infants were exclusively breast fed up to 6 months. 6.7 percent of males and 3.3 percent of females were exclusively breast fed up to 5 months while very few percentages of males (2.2%) and females (1.6%) were exclusively breast fed up to 7 months. Among NBW infants, 81.2 percent of females and 93.6 percent of males were exclusively breast fed up to 6 months while remaining 15.7 percent of females and 3.2 percent of males were exclusively breast fed up to 5 months. 3.1 percent of females and 3.2 percent of males were exclusively breast fed up to 7 months. However, no significant association of gender with exclusive breast feeding was observed among LBW infants as well as among NBW infants.

With regard to schedule (timing) followed for breast feeding (table 3), higher percentages of LBW than NBW infants were fed at fixed schedule of time (61.4% & 50.8%) as well as on demand (29.2% & 25.4%). There was a significant association (χ^2=6.494 at P<0.039) between type of birth weight and schedule timing for breast feeding. This clearly indicates that parents of LBW infants adopted either demand or time schedule to fed breast milk where as parents of NBW infants were not adopted any particular schedule for breast feeding. Among LBW infants, majority of females (67.21%) than males (53.33%) were breast fed at fixed schedule time while higher percentages of males (31.11%) than females (27.87%) were breast fed on demand. Among NBW infants, equal percentages of females (50% and 25%) and males (51.62% and 25.81%) were breast fed at fixed schedule time and on demand respectively. Nearly same percentages of females (25%) and males (22.58%) were breast fed sometimes on demand and sometimes at schedule time. But no significant association was observed between gender and schedule followed for breast feeding among LBW and NBW infants.

With regard to frequency of breast feeding (Table 3), higher percentage of LBW infants (86.8%) than NBW infants (36.5%) were breast fed for 7 times per day. only small percentages of LBW infants (13.2%) were breast fed for 8 times per day while only NBW (63.5%) infants were breast fed for 6 times per day. There was a highly significant (χ^2=90.53 at P<0.001) association between type of birth weight and frequency of breast feeding. This clearly indicates that mothers of LBW infants were aware that their babies required more feedings compare to NBW infants. Among LBW infants, majority of females (88.52%) than males (84.44%) were breast fed for 7 times per day while minority of males (15.56%) and females (11.48%) were breast fed for 8 times per day. Among NBW infants, higher percentages of females (40.63%) than males (32.26%) were breast fed for 7 times per day while higher percentages of

males (67.74%) than females (59.38%) were breast fed for 6 times per day. However there was no significant association between the genders among LBW and NBW groups with regard to frequency of breast feeding.

Table 4 depicts the details about bottle feeding. Of the total sample, majority of LBW (93.4%) than NBW (87.3%) infants were introduced to bottle feeding at 6^{th} month. Little percentage of LBW (4.7% & 1.9%) and NBW (9.5% & 3.2%) infants were introduced to bottle feeding at 5^{th} and 7^{th} month respectively. On the other hand, no significant association was observed between type of birth weight and period of initiation of bottle feeding. Among LBW infants, higher percentages of females (95.1%) than males (91.1%) were introduced to bottle feeding at 6^{th} month. Little percentage of females (3.3% & 1.6%) and males (6.7% & 2.2%) were introduced to bottle feeding at 5^{th} and 7^{th} month respectively. Among NBW infants, higher percentages of males (93.6%) than females (81.3%) were introduced to bottle feeding at 6^{th} month. Higher percentages of females (15.6%) than males (3.2%) were introduced to bottle feeding at 5^{th} month. Nearly equal percentage female (3.1%) and male (3.2%) infants were introduced to bottle feeding at 7^{th} month. But there was no significant association observed between gender and initiation of bottle feeding among LBW and NBW infants.

With regard to type of milk used for bottle feeding (Table 4), majority of NBW (96.8%) than LBW (86.8%) infants were fed with cow's milk as bottle feeding. Higher percentages of LBW (13.2%) than NBW (3.2%) infants were fed with buffalo milk as bottle feeding. There was a significant association ($\chi^{2=}$ 4.641, $P<0.032$) between type of birth weight and type of milk used for bottle feeding. This clearly indicates that even though majority of mothers of LBW as well as NBW infants fed their offspring with cow's milk, considerable percentages of mothers of LBW infants fed their offspring with buffalo's milk because they were using buffalo milk at home as well as they consider it as good for infants' growth and development. Among LBW infants, higher percentage of females (91.8%) than males (80.0%) were fed with cow's milk as bottle feeding. Higher percentage of males (20%) than females (8.2%) were fed with buffalo milk as bottle feeding. Among NBW infants, equal percentage of males (96.8%) and females (96.9%) were fed with cow's milk as bottle feeding. Little percentage of males (3.2%) and females (3.1%) were fed with buffalo milk as bottle feeding. However, there was no significant association observed between the genders of LBW and NBW infants groups with type of milk used for bottle feeding.

With respect to reasons for introducing of bottle feeding, higher percentage of LBW infants (83.02%) than NBW infants (76.19%) were introduced to bottle as a supplementary feeding while less percentage of LBW (16.98%) and NBW (23.81%) were introduced to bottle feeding due to insufficient breast milk production (Table 4). However there was no significant association was observed between type of birth

weight and reasons for introducing bottle feeding. Among LBW infants, higher percentages of females (61.4%) than males (38.6%) were introduced to bottle feeding as supplementary feeding while higher percentages of males (61.1%) than females (38.9%) were introduced to bottle feeding due to insufficiency of breast milk production. Among NBW infants, 66.7 percent of females and 33.3 percent of males were introduced to bottle feeding due to insufficient breast milk production while remaining 45.8 percent of females and 54.2 percent of males were introduced to bottle feeding as supplementary feeding. There was no significant association observed between genders and reasons for introducing bottle feeding among LBW and NBW.

According to Table 5, majority of NBW (90.5%) than LBW (87.7%) infants were started to feed weaning food at 6^{th} month. Negligible percentage of LBW (3.8% and 8.5%) and NBW (6.3% and 3.2%) infants were seen under 5^{th} and 7^{th} month respectively. There was no significant association observed between type of birth weight and age of initiation of weaning food. Among LBW infants, higher percentages of males (88.9%) than females (86.9%) were started to feed weaning food at 6^{th} month. Remaining females (1.6% and 11.5%) and males (6.7% and 4.4%) were started to wean at 5^{th} and 7^{th} month respectively. Among NBW infants, higher percentages of males (93.6%) than females (87.5%) infants were started to feed weaning food at 6^{th} month. Remaining percentages of females (9.4% and 3.1%) and males (3.2% and 3.2%) were started to feed weaning food at 5^{th} and 7^{th} month respectively. There was no significant association of genders with age of introducing weaning foods in both the sample.

With regard to type of weaning food introduced (Table 5), same percentages (34.9%) of LBW and NBW infants were fed with readymade weaning food. Remaining (65.1% each) were fed with homemade weaning food. There was no significant association of type of birth weight and type of weaning foods used for weaning. Among LBW infants, higher percentage of males (66.7%) than females (63.9%) were fed with readymade weaning food while higher percentage of females (36.1%) than males (33.3%) were fed with homemade weaning food. Among NBW infants, higher percentages of females (68.8%) than males (61.3%) were fed with readymade weaning food. Higher percentage of males (38.7%) than females (31.2%) were fed with homemade weaning food. However there was no significant association observed between genders with type of weaning food fed among LBW and NBW.

With regard to product of weaning foods (Table 5), majority of LBW (80.19%) than NBW (68.25%) infants were fed with ragi based weaning food, while higher percentage of NBW (17.46% & 14.29%) than LBW (11.32% & 8.49%) infants were fed with rice based and mixed based weaning foods respectively. There was no significant association observed between birth weight groups and product of weaning foods. Among LBW infants, equal percentage of males (80.0%, 11.1% & 8.9%) and females

(80.3%, 11.5% & 8.2%) were fed with ragi based, rice based and mixed based weaning foods. Among NBW infants, higher percentage of males (74.2% &19.3%) than females (62.5% &15.6%) were fed with ragi based and rice based weaning food while higher percentage of females (21.9%) than males (6.5%) were fed with mixed type of weaning food. However, there was no significant association between genders and product of weaning foods fed to LBW and NBW infants.

With regard to age at normal diet introduced to babies (Table 5), higher percentages of NBW (90.5%) than LBW (77.4%) infants were introduced to normal diet at 1 year of age while vice versa result was observed where higher percentages of LBW (22.6%) than NBW (9.5%) infants were introduced to normal diet at 1½ years of age. There was a significant association between type of birth weight and age of normal diet introduced to infants. This clearly indicates that even though majority of mothers of LBW as well as NBW infants had introduced normal diet after 1 year of age, but considerable percentages of mothers of LBW infants had introduced normal diet very late i.e. after 1½ years of age which in turn may affect the growth and development of infants. Among LBW infants, higher percentages of males (80.0%) than females (75.4%) were introduced to normal diet after 1 year of age while higher percentages of females (24.6%) than males (20%) were introduced to normal diet after 1½ year of age. Among NBW infants, same percentage of males (90.3% & 9.7%) and females (90.6% & 9.4%) infants were introduced to normal diet after 1 year and 1½ year of age. There was no significant association between genders with regard to age at which normal diet was introduced to infants.

Conclusion

From the findings it may be concluded that around 85% of LBW as well as NBW infants were introduced to breast feeding and colostrum on first day and remaining (around 15%) infants were introduced on 2nd day. There was a significant association between LBW and NBW infants with regard to feeding schedule and frequency of breast feeding. There was a significant association between LBW and NBW infants with type of milk used for bottle feeding. Nearly equal percentage of LBW and NBW infants were introduced with bottle feeding and weaning foods at same age. There was a significant association between LBW and NBW with regard to age at which normal diet introduced to infants. There was no significant association between the genders among LBW as well as among NBW infants with regards to any issues related to breast feeding, bottle feeding and supplementary feeding practices. There is a need to educate the mother especially of LBW infants on feeding practices and special caring services required for LBW infants to boost the immediate and long term health and well being of the infants.

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Table 1: Gender Wise Distribution of Low Birth Weight Infants and Normal Birth Weight Infants

Sample		Females	Males	Total
Low Birth Weight Infants	No	61	45	106
	%	57.55	42.45	62.72
Normal Birth Weight Infants	No	32	31	63
	%	50.79	49.21	37.28

Table 2: Gender and Birth Weight Wise Distribution of Low Birth Weight Infants and Normal Birth Weight Infants

Sample	Birth weight wise groups	Females		Males		Total	
		No	%	No	%	No	%
LBW	≤1500 grams	2	3.3	3	6.7	5	4.7
	1501 to 2000 grams	18	29.5	16	35.6	34	32.1
	2001 to 2499 grams	41	67.2	26	57.8	67	63.2
NBW	2500 to 2999 grams	16	50.0	16	51.6	32	50.8
	3000 to 3500 grams	16	50.0	15	48.4	31	49.2

Table 3: Breast Feeding Practices among Low Birth Weight Infants and Normal Birth Weight Infants

Sample			Introduced to Breast Feeding On		Colostrum Introduced		Exclusively Breast Feeding up to			Breast Feeding Schedule			Frequency of Breast Feeding		
			1st day	2nd Day	1st day	2nd Day	5 month	6 month	7 month	Demand	Time Schedule	Both	6 times	7 times	8 times
LBW (N_1=106)	Female (n_1=61)	No	56	5	56	5	2	58	1	17	41	3	0	54	7
		%	91.8	8.2	91.8	8.2	3.3	95.1	1.6	27.87	67.21	4.91	0.0	88.52	11.48
	Male (n_2=45)	No	35	10	35	10	3	41	1	14	24	7	0	38	7
		%	77.8	22.2	77.8	22.2	6.7	91.1	2.2	31.11	53.33	15.56	0.0	84.44	15.56
	χ^2 Value (d.f.) P Value		4.193 (1) P>0.051		4.193 (1) P>0.051		0.721 (2) P>0.697			4.013 (2) P>0.134			0.376 (1) P>0.573		
NBW (N_2=63)	Female (n_3=32)	No	29	3	29	3	5	26	1	8	16	8	19	13	0
		%	90.6	9.4	90.6	9.4	15.6	81.2	3.1	25.0	50.0	25.0	59.38	40.63	0.0
	Male (n_4=31)	No	24	7	24	7	1	29	1	8	16	7	21	10	0
		%	77.4	22.6	77.4	22.6	3.2	93.6	3.2	25.81	51.62	22.58	67.74	32.26	0.0
	χ^2Value(d.f.) P Value		2.056 (1) P>0.184		2.056 (1) P>0.184		2.815 (2) P>0.245			0.051 (2) P>0.975			0.476 (1) P>0.603		
LBW		No	91	15	91	15	5	99	2	31	65	10	0	92	14
		%	85.8	14.2	85.8	14.2	4.7	93.4	1.9	29.2	61.4	9.4	0.0	86.8	13.2
NBW		No	53	10	53	10	6	55	2	16	32	15	40	23	0
		%	84.1	15.9	84.1	15.9	9.5	87.3	3.2	25.4	50.8	23.8	63.5	36.5	0.0
χ^2Value (d.f.) P Value			0.093 (1) P>0.824		0.093 (1) P>0.824		1.841 (2) P>0.398			6.494* (2) P<0.039			90.305**(2) P<0.000		

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Table 4: Bottle Feeding practices among Low Birth Weight and Normal Birth Weight Infants

Sample			Introduced bottle feeding After			Type of milk used for bottle feeding		Reason for introducing bottle feeding	
			5 month	6 month	7 month	Cow	Buffalo	Insufficient breast milk	Supplementary feeding
LBW	Female	No	2	58	1	56	5	7	54
		%	3.3	95.1	1.6	91.8	8.2	38.9	61.4
	Male	No	3	41	1	36	9	11	34
		%	6.7	91.1	2.2	80.0	20.0	61.1	38.6
	χ^2Value(d.f.) P Value		0.721(2) P<0.697			3.147(2) P<0.089		3.090(1) P<0.115	
NBW	Female	No	5	26	1	31	1	10	22
		%	15.6	81.3	3.1	96.9	3.1	66.7	45.8
	Male	No	1	29	1	30	1	5	26
		%	3.2	93.6	3.2	96.8	3.2	33.3	54.2
	χ^2Value(d.f.) P Value		2.815(2) P<0.245			0.001(1) P<1.000		1.985(1) P<0.237	
LBW		No	5	99	2	92	14	18	88
		%	4.7	93.4	1.9	86.8	13.2	54.5	64.7
NBW		No	6	55	2	61	2	15	48
		%	9.5	87.3	3.2	96.8	3.2	45.5	35.3
χ^2Value (d.f.) P Value			1.841(2) P<0.398			4.641* (1) P<0.032		1.173(1) P<0.318	

Table 5: Supplementary Feeding practices among LBW and NBW infants

Sample			Weaning food introduced After			Type of weaning food		Product of weaning food			Normal diet was introduced After	
			5 Month	6 Month	7 Month	Home made	Ready made	Ragi base	Rice base	Mixed	1 year	1½ year
LBW	Female	No	1	53	7	22	39	49	7	5	46	15
		%	1.6	86.9	11.5	36.1	63.9	80.3	11.5	8.2	75.4	24.6
	Male	No	3	40	2	15	30	36	5	4	36	9
		%	6.7	88.9	4.4	33.3	66.7	80.0	11.1	8.9	80.0	20.0
	χ^2Value(d.f.) P Value		3.254(2) P<0.197			0.085(1) P<0.838		0.018(2) P<0.991			0.312(1) P<0.644	
NBW	Female	No	3	28	1	10	22	20	5	7	29	3
		%	9.4	87.5	3.1	31.2	68.8	62.5	15.6	21.9	90.6	9.4
	Male	No	1	29	1	12	19	23	6	2	28	3
		%	3.2	93.6	3.2	38.7	61.3	74.2	19.3	6.5	90.3	9.7
	χ^2Value (d.f.) P Value		1.002(2) P<0.606			0.386(1) P<0.603		3.063(2) P<0.216			0.022(1) P<1.000	
LBW		No	4	93	9	37	69	85	12	9	82	24
		%	3.8	87.7	8.5	34.9	65.1	80.19	11.32	8.49	77.4	22.6
NBW		No	4	57	2	22	41	43	11	9	57	6
		%	6.3	90.5	3.2	34.9	65.1	68.25	17.46	14.29	90.5	9.5
χ^2Value (d.f.) P Value			2.303 (2) P<0.316			0.998 (1) P<0.1000		3.084 (2) P<0.214			4.657* (1) P<0.037	