Effect of Feeding-Type on The Nutritional Status of Infants in Urban and Rural Area

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Abstract: Breast feeding is widely accepted to be the optimal source of nutrition for infants, which providing them with suitable nutrients for growth, development and immune protection. The aim of this study was to compare between different type of feeding and nutritional status and development of infants in urban and rural area in El-Gharbia governement.100 infants and their mothers were chosen randomly from m.c.h. centers. Data were collected from mothers and anthropometric measurements were used to measure nutritional status of infants during vaccines time (2, 4.6.9.12 months). Physical development was followed in the same time. The results showed that 45%of infants were boys and 55% were girls,83%of infants were breastfed ,7% were artificial feeding and 10% were mixed feeding. The mothers of most breast feeding infants (88.37%) were either intermediate or highly educated. Regarding to nutritional status, there was 2%of infants were under weight (weight/age), 8% infants were wasting and 8% were overweight (weight/height). Under-weight was found among 14.28% of artificial feeding infants ,but not found among breast-feeding infants, while wasting was found among 28.56% of artificial feeding and 30% of mixed feeding. The differences in nutritional status by type of feeding were not significant. All children were anemic in both rural and urban areas. For physical development it was found that breastfeeding infants starting in sitting down, crawling and walking earlier than artificial and mixed feeding infants. The results of this study illustrated that breast-feeding is widely accepted in El-Gharbia -Egypt than other studies before. We can conclude that breast feeding is more suitable for infant's growth and development than other type of feeding.

Key words: Type of feeding; Infants; Nutritional status; Physical Development.

INTRODUCTION

Breast feeding is the golden standard for infant feeding. The dietary patterns of infants influence their health during infancy.[1, 2] and may influence health later in childhood and adulthood.[3, 4]

Human milk is the ideal food for infants, providing them with nutrients and energy for rapid growth and development during the first year of life.[5] It offers its carbohydrate in the easy to assimilate form

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of lactose, its fat contains a generous proportion of the essential fatty acid linoleum acid; and its protien.alpha-lactalbumin.is one that the infant can easily digest. With the exception of vitamin D, Its vitamin contents are ample as for minerals calcium. phosphorus. and magnesium are present in amounts appropriate for the infant. And breast milk is low down in sodium. Its iron is highly absorbable, and the presence of a zinc-binding protein favors the absorption of the zinc it contains.[6] in rare cases women may not be able to breast-feed for physical or health reasons. Some may feel uncomfortable, others may take medications that wouldn't be safe if passed through their breast milk to the baby. Still others have cultural or work-related reasons. In all of these cases parents can feel reassured that bottle feeding is a healthful option. Infant formula also is a good supplement for nurse-feeding moms when a mother chooses to skip a breast-

feeding, or when the mother doesn't make enough breast milk for her baby.[7]

There are significant growth differences between breastfeed and formula-fed infants, breastfeed infants gain weight more rapidly during the first three months and more slowly during the fourth, fifth, and sixth months of life. After the third month of life weight gains of breastfeeding infants are consistently slower than those of formula fed infants; however head circumference remains the same for both.[8, 9] reported positive effects of breast-feeding on infant development. Such effects are apparent early in development as well as in later years. Recently, elements in breast milk, polyunsaturatred fatty acids (PUFAs), have been identified as having great potential for increasing nutritional benefits. Some scientists are enthusiastic about the long-term benefits of PUFAs on brain and cognitive development.

Breast-fed babies have fewer

illnesses and a much lower hospitalization rate because breast milk contains maternal antibodies and immunological cells that stimulate the infant's immune system. When breast-fed babies do get sick, they recover more quickly. They are also less likely to be obese than babies fed on formulas and they have fewer allergies. They may even be more intelligent, a new study finds that the longer a baby was breast –fed, the higher the IQ in adulthood[10]

The aim of this study was to compare the effect of different type of feeding on the nutritional and health status of infants.

METHODS:

Sampling: A random sample of 100 infants and their mothers was chosen from MCH centers in El-Gharbia governorate representing urban and rural areas. Infants were nearly 2 months of age to follow their growth and development. All infants were subjected to anthropometric measurements (weight, height, head circumference) at 2, 4, 6, 9, and 12 months in every visit to MCH centers to take their vaccines. Hemoglobin level was estimate for all samples at 9, and 12 months.

Materials: A questioner was used to collect social data from mothers, and some information about type of feeding, nutrition status, and health status of infants. **Anthropometric measurements**: Measurements of weight, height, and head circumference were used to obtained anthropometric measurements, which considered the most sensitive and commonly used indicators of health.

Weight: A pan-type pediatric electronic scale for weighting young babies was used. It accurate to within the limits required (e.g. 0.1 kg). It provision for adjusting back to zero. Child's clothes were not removed, so it was preferable to have another underwear clothes to be weighed equal to those warren by the baby. The infant should be set lying down in the

middle of the pan. The average of two successive readings for the same baby was taken.

Height (Length): The infant was laid on the board, which was itself on a flat surface. The head was positioned firmly against the fixed head board was the eyes looking vertically. The knees are extended usually by firm pressure applied by an assistant and the feet are fixed at right angles to the legs. The upright sliding foot piece was moved at obtain firm contact and the length read to the nearest 0.1 cm

Head circumference: A flexible non-stretchable measuring tape is required. Objects such as pins should be removed from the hair. The lower edge of the tape should be positioned just above the eyebrows, above the ear, and around the back of the head, so that the maximum circumference is measured. The tape should compress the hair. The measurement was read to the nearest 0.1 cm.

Blood analysis: Venous blood samples were collected from all studied babies at 9th, and 12th, months for the determination of blood hemoglobin (Hb) level. Samples were analyzed in maternal and baby care units. The concentration of hemoglobin in circulating red blood cells is the most direct and sensitive measure (colorimetric method). The WHO criterion for iron deficiency anemia (hemoglobin level less than 11g\dl) was used to diagnose anemic infants.

Data analysis: collected data were presented and analyzed using SPSS statistical package 1996 .[11]Chi square test was used for comparison among proportions.

RESULTS:

Social characteristics: Table (1) shows that; the total sample was 100 infants and their mothers, 50 from urban area and 50 from rural area.45%of the total sample were boys and 55% girls. Ages for more than half of lactating mothers were

between 20-35 years (55%), but 30%of the rural lactating mothers were over 35 years. There was no significant difference between urban and rural in age. Table (1) show that half of the sample.

Was intermediate level of education in urban, but 48% of lactating mothers in rural were in a high level of education, and the difference was significant between urban and rural in education. Regarding to work, it was found that (92%, 82%) of the sample were housewife in urban and rural area respectively, and there was no significant difference between urban and rural lactating mothers in work.

Type of infant's feeding: From table (2) it was found that 83% of infant in the sample were breast fed (86%in urban, 80%in rural) respectively. Artificial feeding infants represented 7% of the sample (4% in urban, and 10% in rural). The same table showed that 10% of the infants in the sample were mixed fed (10% in urban, and 10% in rural).

The difference in type of feeding between urban and rural infants was not significant.

Mother education and type of feeding:

From table (3) it was noticed that (88.37%) of breastfeeding mothers in urban either intermediate or highly educated (44.18%, 44.18%) respectively, where (82.5%) of breastfeeding women in rural were either intermediate or highly educated (52.5%, 30%) respectively, these results indicated that highly educated mothers prefer to breastfeed their infants .and the difference was significant.

Nutritional status of infants: Nutritional status of infants was estimated by using z scores .As shown in table (4), regarding to weight/age, underweight were found between only 2% of rural infants, while all infants in urban were normal .All the infants have normal height /age, but for weight/height it was found that in rural 8% of infant were wasting, and 8% were

overweight, while 2% and 4% of the infants in urban were wasting and overweight respectively. The difference between rural and urban was not significant. Table (4) also showed that under weight (w/a) was found between 2.22% of boys, but not found between girls, while over weight (w/h) was found among girls in highly percent (7.27%) than boys (4.44%). Wasting was found among 6.67% and 3.64%0f boys and girls respectively. The difference between boys and girls was not significant.

Type of feeding and nutritional status of infants: Underweight scored by weight/age (w/a) was found among 14.28% of artificial feeding infants, but not found among breastfeeding infants as shown in table (5).Regarding to weight/height it was found that; wasting was found among 28.56%of artificial feeding and 30% of mixed feeding infants, and overweight were found among 2.41% of breastfeeding infant, 14.28% of artificial feeding, and 30% of mixed feeding. The difference in nutrition status of infants was not significant by type of feeding.

Level of hemoglobin for infants:

Table (6) showed that mean hemoglobin level was nearly similar in urban and rural (9.79±5.2582, 9.85±5.2861in urban and 9.84±5.3055, 9.93±5.3414 in rural at 9 and12 month) respectively. Between boys and girls (9.82±5.3062, 9.91±5.3271 for boys and9.82±5.2575, 9.87±5.3004 for girls at 9 and 12 month) respectively, but it was less than the optimal hemoglobin level for this period of live. The same table showed that, regarding to mother education, the mean level of hemoglobin for infants was high among intermediate and highly educated mothers (9.80±0.2606, 10.12±1.5023).

Physical development: Table (7) show that 64% of infants starting sit down at 6th months which represents the normal time for sitting as described by WHO 1995,[12] the higher percent was found in urban area

(76%) .But 10% of infants starting sit down at 7th month in rural area. Table (7) also showed that nearly third quarter of the infant sample start crawling at 9th month, which represents the normal time for crawling as described by WHO 1995 [12].High percent was found between urban infants (84%) than rural infants (64%), while it was found that 8% and 4% of infants start crawling earlier at 8th month in urban and rural area respectively. On the other hand it was noticed that 15 % of the total sample delaying in crawling till 10th month, most of them were from a rural area (24%).From the same table it was noticed that most infants in rural area (82%) start walking at 12th month which represents the normal time for walking as described by WHO 1995,[12] while54% of infants in urban area delaying in walking till 13th month.

From table (8) it was noticed that 78.3% of breastfeeding infants start sitting down at 6th month, but28.57% and 40% of artificial and mixed feeding infants starting sitting down at 6month. Higher percent of artificial and mixed feeding infants starting sit down at

6.5 month (71.43%, 60% artificial and mixed feeding) respectively. From the same table it was found that 80.7% of breastfeeding infants start crawling at 9th month, while 57.14%and 30% of artificial and mixed feeding infants start crawling at 9th month .Table (8) also showed that (67.5%) of breast feeding infants starting walking at 12 month, while 28.57% and 30% of artificial and mixed feeding infants starting walking at 12 month, respectively, but 70% of mixed feeding infant starting walking at 13Month.These results indicated that breast feeding is suitable for normal developments.

Discussion:

The results in the recent study found that breast feeding was the main source of feeding for 83% of infants in El-Gharbia-Egypt. These results not agree with the results of a study conducted in Egypt (2003)[13], who found that 22.7% of mothers exclusively breastfed their babies. While in WHO report (2007)[14], it was found that exclusive breast feeding rates in East Asia and the Pacific are just 61% at four months of babies live and even lower to 35%

at six months. Bonet et al., (2008)[15] also found that 56.3% breastfed exclusively and 6.3% used mixed breast feeding. Giashuddin et al (2003)[16] in Bangladesh found that 16% of women still exclusively breast fed their children for less than 6 months .Also Al-Sahab (2008)[17] found that in developing country breast feeding rates at 1 and 4 month were 56.3% and 24.7% respectively. The results indicated that highly educated mothers prefer to breastfeed their infants', and the difference was significant. Dubois (2003)[18] also found that breastfeeding initiation, duration, and its exclusivity improved with mother's age and education level, Bonet (2008)[15] also found that exclusive breastfeeding were higher among highly educated women in French. But Giashuddin in Bangladesh (2003)[16] showed that maternal education and family income were important correlates of exclusive breastfeeding

Table (1): Social characteristics of the sample

	Urban		Rural		Total	
	N=50	%	N=50	%	N=100	%
Infant sex Boys	19	42.22	26	57.78	45	45.00
Girls	31	56.36 $x^2=$	24 1.979	43.64 n.s	55	55.00
Mother age ≤ 20 year	10	20.00	8	16.00	18	18.00
20-35 year	28	56,00	27	54.00	55	55.00
≥ 35 year	12	24.00 $x^2=$	15 2.179	30.00 n.s	27	27.00
Mother education Read & write	10	20.00	6	12.00	16	16.00
Intermediate	25	50.0	20	40.0	45	45.0
High	15	30.0 $x^2=$ 5.12*	24	48.0 P<0.05	39	39.0
Mother work Housewife	46	92.00	41	82.00	87	87.00
Employer	4	8.0 $x^2=$	9 2.12	18.0 n.s	13	13.0

x^2: chi square test   *: significant at 0.05
n.s: not significant

Table (2): Type of infant's feeding:

Type of feeding	Urban		Rural		Total	
	N=50	%	N=50	%	N=100	%
Breastfeeding	43	86.00	40	80.00	83	83.00
Artificial feeding	2	4.00	5	10.00	7	7.00
Mixed feeding	5	10.00 x^2=1.394	5 *n.s*	10.00	10	10.00

x^2: chi square test   n.s: not significant

Table (3): Mother education and type of feeding:

Type of feeding / Education Level	Breast feeding				Artificial feeding				Mixed feeding			
	Urban		Rural		Urban		Rural		Urban		Rural	
	N = 43		N = 40		N = 2		N = 5		N = 5		N = 5	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Read & Write	5	11.64	7	17.5	-	-	2	40.00	2	40.00	1	20.00
Intermediate	19	44.18	21	52.50	-	-	3	60.00	-	-	2	40.00
High	19	44.18	12	30.00	2	100	-	-	3	60.00	2	40.00
x^2= 29.23* p< 0.05												

x^2= chi square test   *: significant at 0.05

Table (4): Nutritional status of infants by z score

	Weight/age		Height/age	Weight/height		
	<-2SD N %	±2SD N %	±2SD N %	<-2SD N %	±2SD N %	>+2SD N %
Regions Urban (n=50)	-	50 100.00	50 100.00	1 2.00	47 94.00	2 4.00
Rural (n=50)	1 2.00	49 89.00	50 100.00	4 8.00	42 84.00	4 8.00
	x^2=0.315 n.s			x^2=0.253 n.s		
Sex Boys (n=45)	1 2.22	44 97,78	45 100.00	3 6.67	40 88.89	2 4.44
Girls (n=55)	-	55 100.00	55 100.00	2 3.64	49 89.1	4 7.27
	x^2=0.257 n.s			x^2=0.671 n.s		

x^2 = chi square test

Table (5): Type of feeding and nutritional status of infants

	Breast feeding		Artificial feeding		Mixed feeding		Total		x^2
	N=83	%	N=7	%	N=10	%	N=100	%	
Weight/age (<-2SD)	-	-	1	14.28	-	-	1	1.00	0.243
±2SD	83	100.00	6	85.72	10	100.00	99	99.00	
Height/age (±2SD)	83	100.00	7	100.00	10	100.00	100	100.00	
Weight/Height (<-2SD)	-	-	2	28.56	3	30.00	5	5.00	0.643
(±2SD)	81	97.59	4	57.16	4	40,00	89	89.00	
(>+SD)	2	2.41	1	14.28	3	30.00	6	6.00	

Table (6): Hemoglobin level for infants

	9 months mean±SD	12 months mean±SD
<u>Rigon</u> Urban	9.79±5.2582	9.85±5.2861
Rural	9.84±5.3055	9.93±5.3414
<u>Sex</u> Boys	9.82±5.3062	9.91±5.3271
Girls	9.82±5.2575	9.87±5.3004
<u>Mother education</u> Read/write	9.57±0.2147	9.66±0.2634
Intermediate	9.80±0.2606	10.12±1.5023
High	9.86±0.3423	10.05±0.3100
<u>Type of feeding</u> Breast feeding	9.88±0.2320	10.10±1.1541
Artificial feeding	9.36±0.2651	9.53±0.1960
Mixed feeding	9.58±0.3400	9.70±0.1871

Table (7): Physical development for urban and rural infants according to age

	Urban		Rural		Total	
	N=50	%	N=50	%	N=100	%
Sitting down 6month	38	76.00	32	64.00	70	70.00
6.5month	12	24.00	13	26.00	25	25.00
7month	-	-	5	10.00	5	5.00
Crawling 6month	-	-	2	4.00	2	2.00
7month	1	2.00	2	4.00	3	3.00
8month	4	8.00	2	4.00	6	6.00
9month	42	84.00	32	64.00	74	74.00
10month	3	6.00	12	24.00	15	15.00
Walking 12month	22	44.00	41	82.00	63	63.00
13month	27	54.00	9	18.00	36	36.00
14month	1	2.00	-	-	1	1.00

Table (8): Physical development according to age and type of feeding

	Breast feeding		Artificial feeding		Mixed feeding		Total	
	N=83	%	N=7	%	N=10	%	N=100	%
Sitting down 6month	65	78.3	2	28.57	4	40.00	71	71.00
6.5month	13	15.70	5	71.43	6	60.00	24	24.00
7month	5	6.00	-	-	-	-	5	5.00
Crawling 6month	1	1.3	-	-	-	-	1	1.00
7month	3	3.6	-	-	-	-	3	3.oo
8month	5	6.0	1	14.29	-	-	6	6.00
9month	67	80.7	4	57.14	3	30.00	74	74.00
10month	7	8.4	2	28.57	7	70.00	16	16.00
Walking 12month	56	67.5	2	28.57	3	30.00	61	61.00
13month	27	32.5	3	42.86	7	70.00	37	37.00
14month	-	-	2	28.57	-	-	2	2.00

and illiterate women were more breastfeed their infants than highly educated women. Sobhy (2003)[13] also found that exclusive breastfeeding was declined with increasing maternal education in Cairo.

For nutritional status of infants, the result of this study showed that the percents of nutrition problems (under weight, wasting and over weight) were higher among rural infants (2%,8%,8%) than urban infants (0,2%,4%). Under weight and wasting were found among boys (2.22%, 6.67%) than girls, while over weight was found among 7.27% of girls but

didn't found among boys. These results were lower than the result of a study conducted by Sakisaka (2006)[19] which found that 10.3% of children in Nicaragua were underweight (weight for age) while 30.1% were stunted (height for age). Regarding to type of feeding it was found that under weight, wasting and overweight were found among artificial and mixed feeding infants than breast feeding infants. Panpanich (2003)[20] in Thailand also found that in rural; under nutrition, wasting and stunting in the exclusively breastfed group was 0.0%, 1.9% and 7.7% respectively

compared to 2.1%, 4.3% 8.5% respectively in non breastfed children. Gobrial (2003)[21] also found that in Behera governorate in Egypt, children aged 6-24 month were the most nutritionally affected, about 3% of children were under weight (weight/age<-2SD), but stunting affected 6.2%.Underweight affected mainly children in the age group 6-<12 months, while stunting appeared in age 12-18 months. She was also found that the majority of normal weight for age infants was exclusively breast fed for 4-6 months of age. Hemoglobin level in this study was under the optimal level. while Sibeko(2004)[22] found that 50% 0f south African infants under6 months of age were anemic with mean (sd) Hb 10.9(1.1)g/dl.

Regarding to physical development it was found that breast feeding infants starting in sitting down, crawling and walking in the suitable time than artificial and mixed feeding infants.

The results of recent study illustrate that attitude of lactating mothers towards breastfeeding in El-Gharbia, Egypt was higher than previous studies in Egypt and other countries. In conclusion breast feeding is more effective on infant's growth and development than other type of feeding, so breast-feeding must be encouraged.

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