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Exclusive Breastfeeding & Non-Nutritive Sucking (Pacifier) Affect the Nutritional Status of Infants

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Abstract. Mothers' decision to practice both of breast-feeding and using pacifier or not is the most important decisions that have an impact on the child health. The aim of study was assessment the effect of feeding type and non-nutritive sucking activity on nutritional status of infants. Methods: Questionnaire was designed to assess nutritional status of infants (N=86) who came to outpatient clinic in Misr Al-Kadema Center for motherhood and child care, affiliated to Ministry of health in Egypt in 2011. Questionnaire sheet included socioeconomic characteristics, maternal obstetric history and initiation time of breastfeeding, type of feeding and using a pacifier. Results: Significant relationship could be noticed between weight, length, head circumference and type of feeding. Compared with no breast-feeding, exclusive breast feeding had lower weight, length and head circumference. Chi-square showed significant relationship between using pacifier and weight/length percentiles. The infants who use pacifiers were less weight /length percentiles.

Keywords: non-nutritive sucking, pacifier, exclusive breast feeding, length, weight

1. Introduction

The health and growth of the child is influenced by a range of complex factors, the most important of them is nutritional factor, since early infant feeding practice is a major preoccupation of mothers. More growth occurs during the first year than at any other time in your child's life. For the first few months, breast milk or formula is all that is needed. Encouraging healthy eating habit development early in life is a way to prevent the onset of diet-related diseases [1]. While, the principal risk factors for stunting and wasting in infants < 6 months of age were either maternal behaviors or child biological characteristics under maternal control [2]. Breast feeding is a universal phenomenon common to all cultures, in the last 2 decades, there was a universal awareness of advantages of breast milk in the western world. On the other hand, there has been a decline in the breast feeding in the developing countries [3]. One million infant lives could be saved every year in developing countries by promoting breastfeeding, according to a UNICEF estimate [4], it provided the ideal nourishment for infants for the first six months of life, as it contains all the water, nutrients, antibodies, and other factors an infant needs to thrive, constantly adapt to the child's needs & environmental challenges [5]. While, there are many well-recognized risks of not breastfeeding. Early bottle-feeding brings forward the obesity rebound, predictive of obesity in later life [6].

Using pacifier in many places of the world especially in developing countries in early childhood is very common [7]. Despite UNICEF advice no artificial teats or pacifiers to breastfeeding infants [8]. It may cause failure of breastfeeding, dental deformities, recurrent acute otitis media, and the possibility of accidents [9], development of latex allergy, tooth decay, oral ulcers and sleep disorders [10].While, beneficial effect of pacifier is lower incidence of sudden infant death syndrome & pain relief [11]-[13]. But, the breast-fed neonates should be avoided exposing to artificial nipples [14].

The aim of study was assessing the effect of feeding type and non-nutritive sucking activity on nutritional status of infants.

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2. Subjects and Methods:

The following definitions were used:

- Exclusive breast feeding: if a child was exclusively breast fed from his/her mother or a wet nurse, or expressed breast milk, for more than the first three months of life
- Bottle feeding: if a child was exclusively bottle fed from birth or in the first three months of life.
- Mixed feeding: giving other liquids and/or foods together with breast milk to infants □6 mo.
- Non-nutritive sucking: if a child had sucking for an object (pacifier) not related to feeding.

2.1. Subjects

The subjects (No. = 86) under study were mothers and their infants (aged <1-6 months) chosen during their visit to outpatient clinic in Misr Al-Kadema Center for motherhood and child care, Cairo, Egypt.

2.2. Data Collection

The data were collected through interviews with infants' mothers to answer the questions found in specially designed questionnaire sheets. Questionnaire sheet included socioeconomic characteristics, maternal obstetric history and initiation time of breastfeeding, type of feeding, using a pacifier and anthropometric measurements of infants.

2.3. Measures

Weights were measured on a calibrated pediatric scale. Once the infant is lying quietly, readings were recorded to the nearest 10 g. Length was measured to nearest millimeter, it was recorded using a graduated wooden measure with a fixed transverse perpendicular piece which is made to touch both heels firmly and another movable one which touches the crown. The infant was laid on the board, the head is positioned firmly against the fixed head piece, with the eyes looking vertically, the knees extended and feet fixed at right angles to the legs. The sliding foot piece is moved to obtain firm contact with heels. Head circumference was measured with a narrow, flexible and non stretch tape made of fiberglass. The tape placed above the supraobital ridges covering the most prominent part of the frontal bulge, and over the part of the occiput which gave the maximum circumference to the nearest millimeter [15].

2.4. Data Analysis

The collected data were entered into a computer and analyzed using SPSS ver.11. Descriptive statistics, Chi-square (χ^2) test and One-Way ANOVA were used .level of significance was set at $P < 0.05$.

3. Results and Discussion

A total of 86 mothers from Misr Al-Kadema Center for maternity and child care provided complete data required for this study. One third of participants ended secondary school, quarter of mothers were illiterate and about one quarter of them had high education (ended college) (Table I). The age mean of mothers was 27.9 years. Majority of mothers (66.4%) had vaginal delivery in hospitals (79.1%), in home (11.6%). 7% of mothers gave birth by midwife assistance and only one of them by mother in law.

Regard to the initiation of breastfeeding, half of mothers initiated breastfeeding by the end of the first day, however, 35% of mothers initiated it in less than or equal four hours. Despite the high rate (50%) of initiation of breastfeeding in North Africa (including Egypt) [16], but WHO recommend the start of breastfeeding after an hour of birth. It is clear that there is a difference from the study of Jana, mothers have not started breastfed in the first hour after birth according to the advice of the World Health Organization even ladies with normal deliveries. That is an important point to raise their awareness and support.

Table II shows characteristics of infants, 22.1% of infants were neonates, 41.9% of infants were more than one month to three months and the infants aged between more than 3 to 6 months. More than half (55.8%) of infants were males. About 70% of infants were breastfed and the reminder of them was using formula or combination between breastfeeding and formula. Respect to the use of pacifier, in total 59.3% had never used a pacifier and 40.7% were using it.

Table I: Characteristics, maternal obstetric history and initiation time of breastfeeding of mothers.

Items	No.	%
Mother's age (Years)		
<20	15	17.4
20-35	63	73.3
>35	8	9.3
Mother's education		
Illiterate	22	25.7
End preparatory school	15	17.4
End secondary school	29	33.6
College	20	23.3
Income (Pounds)		
<300	36	41.9
300- 500	30	34.8
500+	20	23.3
Type of delivery		
Vaginal	57	66.4
C- section	29	33.6
Place of delivery		
Hospital	68	79.1
Private clinic	8	9.3
Home	10	11.6
Delivery by		
Physician	79	91.9
Midwife	6	7.1
Mother in law	1	1.0
Inter-pregnancy interval (months)		
≤ 12	40	46.5
12-24	42	48.8
> 24	4	4.7
No of deliveries		
1	33	38.4
2	53	61.6
No. of abortions		
None	50	58.1
One time	36	41.9
Initiation of breastfeeding		
≤ 4 hours	30	35.0
> 4- 24 hours	45	52.3
By end of second day	11	12.7

Mean of mother's age 27.9 ± 0.6, all mothers were married & housewives

Table II: Descriptive statistics of selected infant characteristics

Characteristics	No.	%
Infant's age		
≤ 1	19	22.1
> 1-3	36	41.9
> 3-6	31	36.0
Infant's sex		
Male	48	55.8
Female	38	44.2
Type of feeding		
Breast feeding	60	69.8
Bottled feeding	10	11.6
Mixed (breast + formula)	16	18.6
Using a pacifier		
Yes	35	40.7
No	51	59.3

Nutritional status of infants under study is shown in Table III. A weight for age below -2SD is indicator of underweight, which usually occurs after a period of recent food shortage. The percentage of infants which suffering underweight was 17.4% and overweight was 14%. 18.6% of infants were stunted (length/age below -2 SD) which usually occurs after a period of chronic malnutrition. The prevalence of wasting (weight/length below -2 SD) was 23.3%.

The relation between some anthropometric measurements and type of feeding was investigated by one way ANOVA in Table IV among 3 groups of infants: breast-feeding, bottle-feeding and mixed feeding. Bottle-feeding infants had higher means in weight and head circumference than those of breast or mixed feeding. On the other hand, mixed- fed infants had higher length mean than those of breast or bottle feeding.

The LSD test indicated the difference between weight, length & head circumference and types of feeding as show in Table V. Highly significant differences was observed between length of the breastfeeding and mixed feeding infants. While, significant relationship could be noticed between weight, length and head circumference and type of feeding. With respect to the weight and head circumference, that's mean bottle-fed infants have weight greater than mixed or breast. This data was agreement with three studies on infant feeding which reported that higher nitrogen and energy intakes of formula-fed infants may stimulate insulin and insulin like growth factor secretion, leading to increase weight gain without necessarily affecting linear growth[17]-[19]. Also, feeding method was strongly associated with total physical activity, especially the activity of upper limbs was significantly higher for breast-fed than formula-fed infants [20]. A study is compatible with the foregoing and reported that children still being breast-fed with significantly higher prevalence of low weight for length than those who had been totally weaned, and those receiving breast-plus bottle feeding presented with intermediate levels [21].With respect to length, the difference between mixed and breastfeeding is greater than bottle and breast feeding. Similarly, breast feeding was associated with a greater decline in weight for age and weight for length but not length for age [22].

Table III: Percentage of underweight, stunted and wasted study infant by age

	Weight/Age		Length/Age		Weight/Length	
	No.	%	No.	%	No.	%
-2SD	15	17.4	16	18.6	20	23.3
-2 SD- +2 SD	59	68.6	57	66.3	53	61.6
> +2 SD	12	14.0	13	15.1	13	15.1

Table IV: Means, SD and F-test of infant's anthropometric measurements according to type of feeding

Anthropometric measurements	Mean ±SD	F- value
Weight		3.668*
Bottled feeding	6.29 ±0.22	
Mixed feeding	6.16 ±0.40	
Breastfeeding	5.35 ±0.17	
Total	5.61 ±0.15	
Length		6.063**
Bottled feeding	58.50 ±1.01	
Mixed feeding	59.13 ±1.21	
Breastfeeding	55.03 ±0.63	
Total	56.20 ±0.54	
Head circumference		4.228**
Bottled feeding	40.60 ±0.48	
Mixed feeding	40.19 ±0.67	
Breastfeeding	38.81 ±0.29	
Total	39.27 ±0.26	

*p < 0.05, **p < 0.01

Table V: LSD test of difference between anthropometric measurements of infants and type of feeding

Anthropometric measurements	Mean Difference	Std. Error	Sig.
Weight			
Bottled & Breast	0.9342	0.461	0.046*
Mixed & Breast	0.8067	0.380	0.037*
Length			
Bottled & Breast	3.4667	1.331	0.035*
Mixed & Breast	4.0917	1.616	0.003**
Head circumference			
Bottled & Breast	1.7917	0.779	0.024*
Mixed & Breast	1.3792	0.641	0.034*

Bottled & mixed are not significant, *p < 0.05, **p < 0.01,

Table VI: Relationship between using pacifier and weight/length percentiles of infants

Percentiles	Using pacifier %			
	Yes		No	
	No.	%	No.	%
Up to 85th	21	24.4	18	20.9
> 85-100th	14	16.3	33	38.4
Total	35	40.7	51	59.3
²value 6.345*				

*p < 0.05

Table VI showed significant relationship between using pacifier and weight/length percentiles of infants. The less weight/length of infants who using pacifier could be explained by the probable increase of diarrhea times, respiratory infection & reducing of milk consumed by infant distraction, greater risk of having recurrent attacks of acute otitis media [23]-[26].

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