



Research Article

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# Comparison and Behavioral of the Breast, Formula and Mix Feeding Related to Infant Health from Birth Up to One Year

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## Abstract

The multitude of health organization recommended that breastfeeding as the significant configuration of nutrition for infants throughout the first 12 months of life, most momentarily they are consistent exclusively breastfeed for the first 6 months of life. The aim of this study was the evaluations of breast milk and formula milk connected to infant health from birth up to one year of age as well as to find the developmental nourishing of the baby through this time followed by the period of supplementary feeding. The cross-sectional study was carried out randomly including 200 babies (boys=89, girls=111), in the Halabja Hospital sector of pediatric health. Nutritional status was determined by weight for age, weight for height and height for age calculating according to the National Center for Health Statistics chart. The data were analysed by SPSS version 22. There was a significant difference between weight and height, the statistical results show the p-value was 0.02 for weight and 0.001 for height, for infant girls during the period of the last three months compared to the boys. However, no significant difference in weight and height in the first nine months of life in both boys and girls. Also, the highest rate of breastfeeding is observed among low educated or no-educated mothers compared to highly educated and employed. However, the educational level of most mothers high but, unfortunately, they are not following the recommended guidelines for breastfeeding during the first 12 months of life. In conclusion, exclusive breast milk for a new born is the best recommended, and it is regularly sufficient for the first six months of life. The amount and quality of supplementary food are significant to assure good health and improvement. Complementary and type of feeding were the most difficult part of feeding among all moms, related to wrong traditional behaviours.

**Keywords:** Breastfeeding; Dietary supplement; Formula feed; Infant

## Introduction

Nutrition and estimation of infant improvement are two important outlooks for infants in the first year of life. Progressive and reassuring breast-feeding methods are needed in letting newborns consume health and vigorous approaches toward themselves and other ones. From the past evaluation of feeding drill for a “full-term” infant without delay and immediately after delivery

comprises “wet nursing”, natural mother feed and formula feed. The use of a wet nurse, women who breastfeed another’s child was a public drill before the preface of any other feed [1]. Wet nursing commences as early as 2000 BC and expanded until the 20th century. Because breastfeeding is not always performance due to failure of the mother to lactation or mother dying during delivery,



a wet nurse was the primary optional feeding technique during ancient Egyptian times [2]. Finally, in the 19th-century artificial feeding become achievable replace for wet nursing. Besides, forward movement in feeding bottle and accessibility of formula milk not only effect the wet nurse begun to decline, but it also affects the decline in natural breastfeeding in resent day.

Medical newsletters have increased the developing and health advantage of breast milk than the baby formula. Study in the United State and Europe afford effective proof that humankind breastfeeding weakening the regulatory or harshness bacteremia [3,4], butilism [5], urinary tract infection [6], shortness and respiratory infection [7,8], allergic disease [9], and it has been found to provide healthier antioxidant than other feedstuff [10]. Epidemiological study displays that the death level of breastfeeding new-borns lesser and less visiting hospitals evaluated to formula feed babies [11]. A lot of inquiries and concerns rise upon facing of gestation. One of the most important questions is "How will we nourish our new born?" In this research, we will revise the benefits and shortcomings of formula versus breastfeeding and supportive conceptions willingness for breastfeeding, and it is intentional to aid parents to fill comfy in making a cultivated choice about nourishing their child based on technical facts.

## Materials and Methods

In present study data was collected via questioners for the type of baby feeding, the groups of the mother were asked about breastfeeding, formula feeding and or complementary foods for the different age groups of infants and the mother were in various ages and educational levels and ethical aspect.

An interview study was carried out randomly among 278 boys and girls. The questioner asked when the infants were one to 12 months of age. In addition, data on feeding were collected, including the type of feeding, duration of feeding, and complementary feeding throughout infancy. All observed infants under the research were full-term birth and weight was  $\geq 2.5$  kg at birth and all of those who included were from the same demographic area. Finally, 200 children (Boys=89) and (Girls=111) were selected in Halabja Hospital Sector of pediatric health. These include 50 children aged

at birth to three months, 50 children aged between 4 to 6 months, 50 children aged between 7 to 9 and finally 50 aged between 10 to 12 months.

The nutritional state was determined and calculates by National Center for Health Statistics (NCHS) chart and infant feeding compared to the guideline of baby feeding on birth to twelve months of age.

## Results

Out of 200 infants interviewed mothers in the health sector, only 31% of the infant was exclusively breastfed. Approximately, 25% were fed formula and 44% feed both formula and breast milk during the first six months of age. Whereas the feeding types among infants were different during the 12 months of age. 50% of infants were (breastfeed + complementary feeding), 65% (formula + supplementary feeding) and 85% were fed (breast + formula + supplementary feeding) (Table 1).

The percentage of exclusive breastfeeding dramatically decline to 3% during the month of 5 and the period of the last three months of infancy not observed any exclusive breastfeed. Also, shared breastfeed still common mostly among mothers that cannot breastfeed, due to some reasons like anaesthesia, delay of breast milk and or health state after delivery. Meanwhile, formula feed appears widely accepted by many women. However, the result indicates that from the first and second months of infancy did not observe any percentage of infant formula feed. In terms of Formula + Breast + complementary feed, results indicate that the percentage of mix feed to an infant is distributed at a high level among infants of different ages. According to interview, percentage of mothers that decide to give her baby formula based on different reasons; approximately 15% of mothers stopped breastfeed according to the "pediatric" recommendation related to jaundice (58% of infants are exposed jaundice after delivery), diarrhea, and Diabetic Mellitus, 5% recommended by friends, but the high percentage 44% of an infant gives formula feed related to the relative recommendation and 25% was related to the mistake of mothers that believe that her breastfeed not satisfy to the baby fill (Table 2).

**Table 1:** Data analysis of type of feeding for both boys and girls from birth to 3<sup>rd</sup> month of age.

	Types of feeding	Mean±SD	P. value	N (%)		p. value	M	F	Total	p. value	Boys from Birth to 3 months		
				M	F						Type of feed	Mean±SD	p. Value
							Mean±SD						

Month	Parameter	Feeding Type	Mean±SD	P. value	N (%)	N (%)	p. value	M	F	Total	p. value	Boys from 4 to 6 months			
												Type of feed	Mean±SD	p. Value	
1 <sup>st</sup> month	Weight	Breast	3.29±0.68	0.81	5(41.7)	7(58.3)	0.771	3.2±0.62	3.3±0.76	3.2±0.68	0.77	Weight	Breast	5.3±1.6	0.5
		Breast + formula	3.18±0.8		2(50.0)	2(50.0)							For-mula	6.4±0.6	
		Total	3.26±0.68		7(43.8)	9(56.2)							Both	4.9±1.4	
	Height	Breast	49.25±3.44	0.81	49.57±2.87	49.22±3.96	49.38±3.42	0.84	Total	5.2±1.5					
		Breast + formula	49.75±3.86												
		Total	49.38±3.42												
2 <sup>nd</sup> month	Weight	Breast	5.17±0.6	0.53	4(40.0)	6(60.0)	0.3	5.17±0.61	4.96±0.59	5.09±0.59	0.52	Height	Breast	57.8±6.2	0.4
		Breast + formula	4.96±0.59		4(66.7)	2(33.3)							For-mula	62.5±0.7	
		Total	5.09±0.59		8(50.0)	8(50.0)							Both	56.4±4.9	
	Height	Breast	58.25±2.04	0.34	58.25±2.04	57.08±2.72	57.81±2.30	0.34	Total	57.7±5.7					
		Breast + formula	57.08±2.72												
		Total	57.8±2.3												
3 <sup>rd</sup> month	Weight	Breast	6.2±0.88	0.77	7(63.6)	4(36.4)	0.5	6.5±0.8	5.5±0.5	6.1±0.8	0.02	Weight	Breast	5.3±1.6	0.5
		For-mula	6.4±0.56		2(100.0)	0(0.0)							For-mula	6.4±0.6	
		Breast + formula	5.9±0.93		3(60.0)	2(40.0)							Both	4.9±1.4	
		Total	6.1±0.83		12(66.7)	6(33.3)							Total	5.2±1.5	
	Height	Breast	62.4±1.7	0.08	62.2±1.9	61±1.2	61.8±1.8	0.12	Total	Breast	57.8±6.2		0.4		
		For-mula	62.5±0.7							For-mula	62.5±0.7				
Breast + formula		60.3±1.5	Both							56.4±4.9					
Total		61.8±1.8	Total							57.7±5.7					

Table 2: Data analysis of type of feeding for both boys and girls from 4 to 6 month of age.

Month	Parameter	Types of feeding	Mean±SD	P. value	N (%)	N (%)	p. value	M	F	Total	p. value	Boys from 4 to 6 months			
												Type of feed	Mean±SD	p. Value	
					M	F		Mean±SD					Type of feed	Mean±SD	p. Value

		Breast		P. value	N (%)		p. value	M	F	Total	p. value	Breast		p. Value		
		Mean±SD			N (%)	N (%)						Type of feed	Mean±SD			
4 <sup>th</sup> month	Weight	Breast	6.8±0.9	0.8	4(44.4)	5(55.6)	0.74	6.9±0.73	6.05±0.8	6.5±0.9	0.02	Weight	Breast	7.3±0.7	0.7	
		Formula	6.1±1		2(66.7)	1(33.3)							For-mula	7±0.9		
		Breast + formula	6.3±0.9		3(60.0)	2(40.0)							Both	7.5±1		
		total	6.5±0.9		9(52.9)	8(47.1)							Total	7.3±0.9		
	Height	Breast	64.2±1.9	0.08			64.9±1.7	62.1±1.9	63.6±2.3	0.007	Height	Breast	66.1±1.9	0.7		
		Formula	62.3±2.5									For-mula	66.2±2.8			
		Breast + formula	63.3±3									Both	67.1±2.8			
		total	63.6±2.3									Total	66.5±2.4			
Girls from 4 to 6 months																
		Types of feeding	Mean±SD	P. value	N (%)	N (%)	p. value	M	F	Total	p. value		Type of feed	Mean±SD	p. Value	
5 <sup>th</sup> month	Weight	Breast	6.7±0.6	0.7	1(50.0)	1(50.0)	0.3	7.3±0.2	6.9±0.8	7±0.7	0.6	Weight	Breast	6.5±0.7	0.4	
		Formula	6.9±0.8		0(0.0)	5(100.0)							For-mula	7.1±0.9		
		Breast + formula	7.2±0.7		1(20.0)	4(80.0)							Both	6.9±1		
		total	7±0.7		2(16.7)	10(83.3)							Total	6.90.9		
	Height	Breast	66.5±0.7	0.8			68±2.8	65.1±2.4	65.6±2.6	0.2	Height	Breast	63.8±1.9	0.5		
		Formula	65±2.9									For-mula	65.4±3			
		Breast + formula	65.8±3.03									Both	64.9±2.9			
		total	65.6±2.6									Total	64.9±2.6			
		Types of feeding	Mean±SD	P. value	N (%)	N (%)	p. value	M	F	Total	p. value					
6 <sup>th</sup> month	Weight	Breast	7.5±0.4	0.1	1(100.0)	0(0.0)	0.2	7.7±1.1	7.4±0.8	7.5±0.9	0.4					
		Formula	7.5±0.7		3(30.0)	7(70.0)										
		Breast + formula	7.4±1.2		2(20.0)	8(80.0)										
		total	7.5±0.9		6(28.6)	15(71.4)										
	Height	Breast	69±1.9	0.6			68.4±1.6	66.3±1.9	66.9±2	0.03						
		Formula	67±2.1													
		Breast + formula	66.6±2													
		total	66.9±2													

ZStatistical analysis did not discover any significant difference between any sort of infant breast milk and mix feeding for boy's mean weight and height, at any stage of age. But the situation is different for girls, during the last three-month statistical analysis showed a significant difference between infant formula feed and

mix feeding for girls mean weight (P-value = 0.02) and height (p-value = 0.001). However, until 9 months of age the difference between the type of feeding for weight and height not observed (Table 3 & 4).

**Table 3:** Data analysis of type of feeding for both boys and girls from 7 to 9 month of age.

		Types of feeding	Mean±SD	P. value	N (%)	N (%)	p. value	M	F	Total	p. value	Boys from 7 to 9 months			
					M	F		Mean±SD					Type of feed	Mean±SD	p. Value
7 <sup>th</sup> month	Weight	Breast	7.3±2.1	0.3	0(0.0)	1(100.0)	0.5	8.9±0.9	7.8±0.6	8.4±0.9	0.02	Weight	Breast	9.4±0.8	0.8
		Formula	8.7±2.8		5(62.5)	3(37.5)							For- mula	9.3±0.7	
		Breast + formula	8.1±2.3		3(50.0)	3(50.0)							Both	9±1.3	
		Total	8.3±3		8(53.3)	7(46.7)							Total	9.2±1	
	Height	Breast	65±0.9	0.06				71.8±2.7	68.3±2.3	70.1±3	0.02	Height	Breast	72.5±0.7	0.4
		Formula	71.5±0.8										For- mula	72.9±1.9	
		Breast + formula	69.1±1.1										Both	71.7±2.3	
		Total	70.1±0.9										Total	72.3±2.3	
		Types of feeding	Mean±SD	P. value	N (%)	N (%)	p. value	M	F	Total	p. value				
8 <sup>th</sup> month	Weight	Breast	8.3±1.3	0.4	0(0.0)	2(100.0)	0.3	9.8±1.5	7.7±0.8	8.3±1.5	0.006	Girls from 7 to 9 months			
		Formula	7.6±1		1(20.0)	4(80.0)									
		Breast + formula	8.9±1.7		3(50.0)	3(50.0)									
		Total	8.3±1.4		4(30.8)	9(69.2)									
	Height	Breast	69.5±4.9	0.6				72.5±2.6	69±2.5	70±2.9	0.04	Weight	Breast	7.9±1	0.9
		Formula	69.2±2.9										For- mula	8±1	
		Breast + formula	71±2.7										Both	8.1±0.8	
		Total	70±2.9										Total	8±0.9	
		Types of feeding	Mean±SD	P. value	N (%)	N (%)	p. value	M	F	Total	p. value				
9 <sup>th</sup> month	Weight	Breast	9.4±0.8	0.5	2(100.0)	0(0.0)	0.3	9.2±0.9	8.7±0.9	8.9±0.9	0.2	Height	Breast	68±4.3	0.5
		Formula	9.1±1		3(37.5)	5(62.5)							For- mula	70±2.6	
		Breast + formula	8.7±0.8		6(50.0)	6(50.0)							Both	69.7±2.2	
		total	8.9±0.9		11(50.0)	11(50.0)							Total	69.7±2.6	
	Height	Breast	72.5±0.7	0.6				72.5±1.9	71.1±2.3	71.8±2.2	0.1				
		Formula	72.4±1.8												
		Breast + formula	71.4±2.5												
		total	71.8±2.2												

**Table 4:** Weight and height again standard for breastfeed boys and girls according to the WHO.

Age in months	Weight in Kg	Height in Cm		Weight in Kg	Height in Cm
		Boy		Girl	

At birth	3.3	50.561.1	3.2	49.9
At 3 months	6	61.1	5.4	60.2
At 6 months	7.8	67.8	7.2	66.6
At 9 months	9.2	72.3	8.6	71.1
At 12 months	10.2	76.1	9.5	75

**Table 5:** Data analysis of type of feeding for both boys and girls from 10 to 12 month of age.

		Types of feeding	Mean±SD	P. value	N (%)	N (%)	p. value	M	F	Total	p. value	Boys from 10 to 12 months				
												Type of feed	Mean±SD	p. Value		
10 <sup>th</sup> month	Weight	Breast		0.8			0.7	9.8±1.6	8.2±1	8.8±1.5	0.03	Weight	Breast		0.9	
		For- mula	8.9±1.2		3(42.9)	4(57.1)							For- mula	9.6±1.2		
		Breast + for- mula	8.7±1.7		3(33.3)	6(66.7)							Breast + for- mula	9.6±1		
		Total	8.8±1.5		6(37.5)	10(62.5)							Total	9.6±1.1		
	Hight	Breast		0.3			0.6	74±2.5	73±4.5	73.4±3.8	0.6	Height	Breast		0.9	
		For- mula	74.4±4.8										For- mula	75.5±2.9		
		Breast + for- mula	72.5±2.8										Breast + for- mula	75.6±1.2		
		Total	73.4±3.8										Total	75.5±2		
11 <sup>th</sup> month	Weight	Breast		0.4			0.1	9.7±0.6	8.9±1.2	9.2±1	0.07	Girls from 10 to 12 months				
		For- mula	9.4±0.9		3(27.3)	8(72.7)						Type of feed	Mean±SD	p. Value		
		Breast + for- mula	9±1		6(60.0)	4(40.0)						Breast + for- mula	8.1±1	0.02		
		Total	9.2±1		9(42.9)	12(57.1)						Total	8.7±1			
	Height	Breast		0.2			0.02	76±1.6	73.6±2.3	74.6±2.4	0.02	Weight	Breast			0.02
		For- mula	75.3±1.8										For- mula		9.1±0.9	
		Breast + for- mula	73.9±2.8										Breast + for- mula	8.1±1		
		Total	74.6±2.4										Total	8.7±1		
		Types of feeding	Mean±SD	P. value	N (%)	N (%)	p. value	M	F	Total	p. value					

12 <sup>th</sup> month	Weight	Breast		0.2		0.7	9.3±1.1	9.3±0.4	9.3±0.9	0.9	Height	Breast		0.001	
		For- mula	9.6±1		4(57.1)							3(42.9)	For- mula		75±3
		Breast + for- mula	8.9±0.4		4(66.7)							2(33.3)	Breast + for- mula		71.3±2
		Total	9.3±0.8		8(61.5)							5(38.5)	Total		73.4±3.1
	Height	Breast		0.2		76.2±1.7	73.8±2.2	75.3±2.2	0.05						
		For- mula	76±2.1												
		Breast + for- mula	74.4±2												
		Total	75.3±2.1												

Wrong and traditional behaviours were common among mothers, research showed 73% of infants were supplied with water and sugar water during the first six months of life and approximately 48% of infants give honey. According to the present research, 29% of mothers give complementary feeding to her baby's in an early stage of life. Fortunately, 71% are started after 6 months. Finally, results indicate that 61% of the infant was hospitalized after discharged from the Hospital (Table 5).

## Discussion

Nutrition and evaluation of infant improvement are two important aspects of nutritional care in the first year of life. In the current research, growing is evaluated principally by weight for age, height for age and weight for height against the National Center of Health Statistics (NCHS) and standard growing for the new born. The result of the study showed there was a significant difference between infant weight who feed formula and those who feed mix (formula + Breast milk), ( $p$  value=0.02), also height was significantly increased in formula milk compared to mix ( $p$  value=0.001), during the last three month of age (10 to 12 months). According to the research, breastfeeding is much less likely to die from diarrhoea, acute respiratory infection, and maintain the new born immune system, therefore, it helps protect from chronic circumstances later in life such as diabetes and obesity [12]. Besides breastfeeding, mothers had a better psychological condition and they have extra positive tempers and less stress than formula feeders, also the serum prolactin levels were in inverse linked to mood and pressure in formula feeders [13]. However, the combination of breast milk and formula feeding will be a better option than stop breastfeeding. In agreement with the study in 1995 in the united states 59.4% of women were breastfeeding, both exclusively or combination with formula at the time of hospital eject, only 21.6% were exclusively breastfeed and the rest were supplementing with formula [14].

Indeed, many mothers decide to mix feeding babies for many reasons; because they go back to work after they had permitted to

stay home for one year, so they think it better to feed their baby with formula while they are not home. Others believe that breastfeeding is not enough to support growth infants properly, and many moms just want the freedom to let a family member or babysitter give an occasional bottle. In addition, joint breastfeeding (cross nursing) is still experienced among women, most commonly in low educated mother and anaesthesia women after delivery by close family. Therefore, the cross-civilization in lactation has an important role in feeding infants [15].

Through the first 4 to 6 months is a time of quick growing and improvement, therefore, the breast milk that contains the complete nutrient are requisite. Mothers should be stimulated to breastfeed and not to give solid food before the age of 4 months [16]. The introduction of complementary food in the early 4 months definitely can impact the production of breast milk, because; the infant will be less hungry and suckle the breastless vigorously and less often, which in turn will decrease the quantity of milk secretion. Studies show that babies who had solid food before the age of 4 to 6 months their weight are less than those who had solid food after 6 months [17]. Therefore, delaying introducing solid food gives babies digestive system time to mature, reduce danger of food allergy, help to save the baby from iron deficiency anaemia and assist the baby to protect from future life obesity [18,19].

Sufficient complementary feeding of children from 6 months to 2 years of age is chiefly important for growth, development and obstructing of undernutrition. There is proof that complementary feeding practices are commonly poor in most developing countries, meaning that many new-borns continue to be unprotected to largely unalterable outcomes such as standing and poor cognitive growth, as well as to increase the risk of infectious disease [6]. Along the WHO recommended, sufficient nutrition during babyhood is important for being healthy and lifelong health. Therefore, to meet their evolving nutritional requirement infant should receive nutritionally adequate and save complementary foods while lasting to breastfeed up to 2 years or more [20].

Wrong and traditional behaviour in current research shows 48% of mothers give her babies honey during the first 6 months of infant life. According to the American Academy of Pediatric advice, honey should never be given to a child under the age of 12 months [21]. Honey may contain spore of *Clostridium botulinum*, which can grow and multiply in the baby intestine and should not give infant because it can lead to botulism. Infant botulism “is a form of paralysis that results from the blockage of nerve impulse transmission by the toxin of micro-organism named *C. Botulinum*”. In elderly, the intestinal tract can prevent the growth of spores, but, in the infant, the digestive system is failed and the spore can grow or may not properly digest and may cause health problem such as; digestive upset, gas, constipation, and producing life-threatening toxins, and it is difficult to remove spore without destroying honey [22].

In addition to honey, 73% of the infant were supplied with water during the first six months. Water supplements for a new born can be vulnerable [21]. Water supplements can affect weight growth for the baby. The supplement is related to progress bilirubin levels in jaundiced infants. Too much water supplement may lead to a serious condition called “oral water intoxication”, decrease the concentration of baby normal sodium levels, changes the electrolyte balance, also can lead to seizures, coma, brain damage and death [23]. More event, 73% of mothers gives sugar water to their infants during first 6 months of life for many reasons; first, they believe that directly after birth the sugar water may cause diarrhoea in infant and by this way, the intestine of the infant will become clean as they believe that the stomach of the infant has become ready to feed. Also, they used sugar to prevent the infant constipation, also they believe that it’s good for infant sleep and become overweight by sugar feeding. Others believe that sugar can decrease infant gas and decrease pain. Studies show sugar water can increase sensitivity to persistent pain [24].

## Conclusions

Exclusive breast milk for a new born is the best recommended, affording all the nutrients in the exact quantities that the baby is required to fulfil the lack of food and thirstiness. In addition, to be the best foundation nourishment, it attains several protection reasons for a growing infant, and it is regularly sufficient for the first six months of life. Generally, the amount and quality of supplementary food are significant to assure good health and improvement. Complementary and type of feeding were the most difficult part of feeding among all moms, related to wrong traditional behaviours.

## Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

## Conflicts of Interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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