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The Cost of Formula Milk Feeding in Infancy in Al-Amarah City, South East of Iraq

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Abstract

Background

Infant formula means a breast-milk substitute specially manufactured to satisfy, by itself, the nutritional requirements of infants during the first months of life up to the introduction of appropriate complementary feeding. We aimed to determine the cost and burden of formula feeding on the family in Al-Amara city, Iraq.

Materials and Methods

A cross-sectional analytic study was carried out in Al-Sadder Teaching Hospital in Al-Amara city, Iraq, during period from August/2015 to February/2016. The study performed on 100 mothers of infant less than 6 months who were attended the pediatric ward. Data was collected then calculating the average of ounces consumed per a day for each age group with calculating their cost per a day.

Results

The mean cost of ounces consumption per a day for each infant who was exclusively on formula feeding during the first month of age was (1,584 IQD: Iraqi Dinar), while for the second month and 3-6 months age group were (1,806 IQD) and (2,322 IQD) respectively. The cost was significantly higher than those infants on mixed feeding in all age groups, the P-values are 0.007, 0.005 and 0.002 in 1st month, 2nd month and 3-6 month of age respectively.

Conclusion

In general the cost of formula milk feeding in infancy was high and causing a burden on the family. Saving money, health and emotional wellbeing will direct our vision toward breast feeding.

Key Words: Breastfeeding, Breast milk, Infant, Iraq, Milk ounces.

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1- INTRODUCTION

Infant formula means a breast-milk substitute specially manufactured to satisfy, by itself, the nutritional requirements of infants during the first months of life up to the introduction of appropriate complementary feeding (1). It is formulated in accordance with Codex Alimentarium Standards. The Codex Alimentarius (Latin for "Food Code") is a collection of internationally recognized standards, codes of practice, guidelines, and other recommendations relating to foods, food production, and food safety.

In Europe "infant formula" is legally defined as a product that by itself meets the nutritional requirements of normal healthy infants in the first 6 months of life. Its composition is determined by European and UK legislation (2).

Cow's milk–based formulas are the vast majority of commercial formulas. Most milk-based formulas have added iron, which the American Academy of Pediatrics (AAP) recommends. Infant formula manufacturers have begun to examine the benefits of adding a variety of nutrients and biological factors to infant formula to mimic the composition and quality of breast milk (3). The use of artificial feeding substances grew rapidly and was significantly influenced by advertising campaigns. This had a profound negative effect on breastfeeding trends, despite research that revealed many discrepancies between breastfed and artificially fed infants (4, 5). Although artificial or formula-feeding of infants is presently much safer than it has been in decades, breast milk is still considered the best source of infant nutrition (6). Formula milk was invented in 1867 by a chemist called Justus Von Liebig, who developed the first commercial formula, Liebig's Soluble Food for Babies (7).

Historically; almost all U.S newborns were nursed up until around 1950. In the last 50 years, however, infant feeding has changed markedly. After World War II, with the development and large-scale manufacture of infant formula, formula feeding became the standard (8).

Mothers may refrain from breastfeeding for a number of reasons: aggressive formula product marketing; lack of support from family and friends; insufficient knowledge among medical professionals about breastfeeding techniques and challenges; religious beliefs; cultural attitudes; and lack of public acceptance (9). All or some of these factors may come into play, but it is of interest that increased formula feeding parallels a rapid increase in the number of working women. Breastfeeding and working outside the home are commonly believed to be incompatible. Increased participation of women in the labor force is frequently cited for the low rates of breastfeeding (10). The increase in the number of working women since World War II is one of the most significant social and economic trends in modern U.S (11). The AAP recommends breast milk as the best nutrition for infants. Babies should be breastfed exclusively for the first six months, according to the AAP. After other foods have been introduced, the AAP encourages mothers to continue to breastfeed until baby is at least a year old (regardless of gestational age) (12), and as long after that as both mother and child are willing (13-15).

Major organizations, including the World Health Organization and UNICEF, recommend exclusive breastfeeding for the first 6 months and continued breastfeeding for 2 years or more with adequate complementary feeding (16), as longer duration of breastfeeding has been shown to be associated with greater health benefits (17). The AAP also noted that the protective effect of BMF is a combined function of its duration and exclusivity (18). Despite these recommendations,

WHO states that globally less than 40% of infants less than six months of age are exclusively breastfed (19). National Center for Chronic Disease Prevention and Health Promotion stated that in 2011 although 79% of newborn infants started to breastfeed, only 49% were breastfeeding at 6 months and 27% at 12 months of age in the USA (20). It was found that if 90% of U.S families could comply with medical recommendations to breastfeed exclusively for 6 months, the United States would save $13 billion per year (21). Some studies showed that total annual cost of not breast feeding was $1.186 to $1.301 Billion (22, 23). Most women make their infant feeding choices early in pregnancy. Parental preference is the most common reason for using infant formula (24).

Successfully promoting and supporting breastfeeding in the U.S may depend on persuading both mothers and society that breastfeeding is not only nutritionally sound, but economically beneficial as well (25). Current U.S. rates of breastfeeding are 64% for mother in-hospital and 29% at 6 months postpartum, below the recommendations of the Surgeon General (75 and 50%, respectively). This analysis concludes that a minimum of $3.6 billion would be saved if the prevalence of exclusive breastfeeding increased from current rates to those recommended by the Surgeon General (25). So, human milk is species specific and is, thus, markedly superior to all alternatives for newborn feeding. Although bovine- and plant-based formulas approach the fat, protein and carbohydrate composition of human milk, they are not able to replicate the complexity or functionality of other bioactive factors found in human breast milk. The benefits of human breast milk include optimum growth (26, 27), immune function (28), and development (29) at minimal cost to the family. Breastfeeding is associated with lower rates of infant illness in both developing (30), and industrialized countries (31). A study of the costs of not breastfeeding (1997) by Dr. Jan Riordan "Breastfeeding, a valuable natural resource, promotes health, helps prevent infant and childhood disease, and saves health care costs". Additional national health care costs, incurred for treatment of four medical conditions in infants who were not breastfed were estimated. Infant diarrhea in non-breastfed infants costs $291.3 million; respiratory syncytial virus, $225 million; insulin-dependent diabetes mellitus, from $9.6 to $124.8 million; and otitis media, $660 million. Thus, these four medical diagnoses alone create just over $1 billion of extra health care costs each year (32). This is a great example of how a single nutritional measure can lead to broad health and health cost benefits to society as a whole (32, 33). In South Asia countries the percent of exclusive breastfeeding were 46% while in East Asia countries were 31%. In Middle East countries the percent of breastfeeding were 37% (19).

Fig.1: Amarah's location inside Iraq

2- MATERIALS AND METHODS

2-1. Study design and setting

A cross-sectional analytic study was carried out in Al-Sadder Teaching Hospital in Al-Amara city, South East of Iraq, during period from August/2015 to February/2016 (**Figure.1**).

One hundred mothers of infant less than 6 months of age who attended the pediatric ward were enrolled in the study; 74 (74%) were exclusive formula feeding while 26(26%) of them had mixed formula and breast feeding.

2-2. Data Collection

A physician collected data from patients' files. Routinely, in the Al-Sadder Teaching Hospital, data on demographic characteristics of the subjects were gathered on the patients' arrival. Data was collected using a special questionnaire, constructed by the researcher and based on the standard criteria. The information include name, age (date of birth), gender, residence (whether urban or rural area), number of children (primigravida or multigravida mother), type of formula milk (marketing name), price of formula can, average of ounces consumption per a day, preparation method of feeding formula (mixing one scope with each ounce or not).

2-3. Participants

So infants were divided into two groups; infants with formula feeding only (exclusive formula feeding) and infants with mixed feeding (formula with breast feeding). In our study, we already exclude the exclusive breast feeding, malnourished, ill infants and those infants who do not meet study criteria. Also we exclude those infants who need special formula such as high caloric formula or lactose free formula or any other special formula. The age that was chosen here was infants less than six months (before introduction of any additional supplementary food), so for this point we exclude those infants in whom early weaning was established. Then calculating the average of ounces consumed per a day for each age group with calculating their cost per a day.

2-4. Statistical Analysis

In this study; we were not calculating the indirect costs of formula milk feeding, such as the need for bottles, teats, sterilizing materials or sterilizing machine, sterilized water for formula preparation and so on. The analysis of data was carried out using the available Statistical Packages for Social Science, version 18.0 (SPSS-18.0). Data were presented in form of table of numbers with percentages and some figures by using Microsoft Excel 2010. Independent sample t-test was used for testing the significance of association between variables under study. Statistical significance was considered whenever the P-value was equal or less than 0.05.

3- RESULTS

The present study showed that the mean cost of ounces consumed per day for infants on exclusive formula during the first month of age was higher (1,584 Iraqi Dinar to US Dollar [IQD]: Iraqi Dinar) than the infants on mixed feeding (774 IQD) (P= 0.007) as shown in **Table.1**.

The mean cost of ounces consumed per day for infants on exclusive formula during the second month of age was significantly higher (1,806 IQD) than the infants on mixed feeding (1,032 IQD) (P= 0.005) as shown in **Table.2**.

Also, the same for age group 3-6 months old infant, in whom the mean cost of ounces consumed per day for infants on exclusive formula was higher (2,322 IQD) than the mixed feeding infants (1,462 IQD) (P= 0.002) as shown in **Table.3**.

In studying the effect of gender in choosing formula milk, it was found that there were more male distribution in both categories (exclusive formula feeding and mixed feeding), which was much higher

than female distribution as shown in **Figure.**2. It was obviously found that formula feeding (whether exclusive or mixed) was associated with multigravida mother more than primi one as shown in **Figure.3**. The study showed that infants using exclusive formula feeding were higher in urban 44 (59.46%) infants than rural area 30 (40.54%) infants and the same were found in infants using formula mixed with breast feeding as shown in **Figure.4**.

Table-1: Cost of formula milk during first month of age

Type of feeding	No. of samples	Mean cost of ounces consumption/day(IQD)	Standard Deviation	P- value
Mixed feeding	4	774	238.4	0.007
Exclusive formula feeding	8	1584	447	
Total	12			

Table-2: Cost of formula milk during second month of age

Type of feeding	No. of samples	Mean cost of ounces consumption/day(IQD)	Standard Deviation	P- value
Mixed feeding	4	774	238.4	0.007
Exclusive formula feeding	8	1584	447	
Total	12			

Table-3: Cost of formula milk during 3-6 months of age.

Type of feeding	No. of samples	Mean cost of ounces consumption/day(IQD)	Standard Deviation	P- value
Mixed feeding	16	1462	447.5	0.002
Exclusive formula feeding	52	2322	715.5	
Total	68			

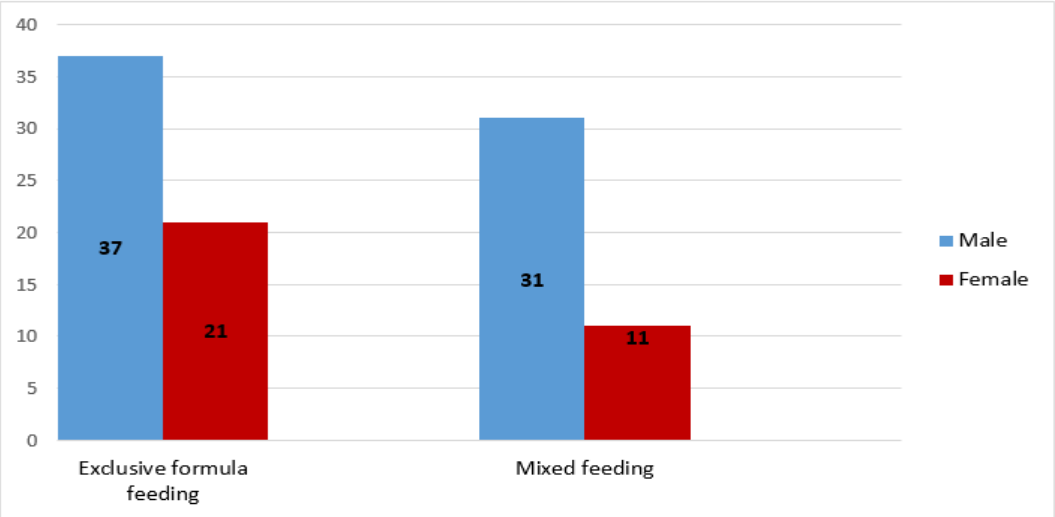

Fig.2: Distribution of formula feeding in relation to gender

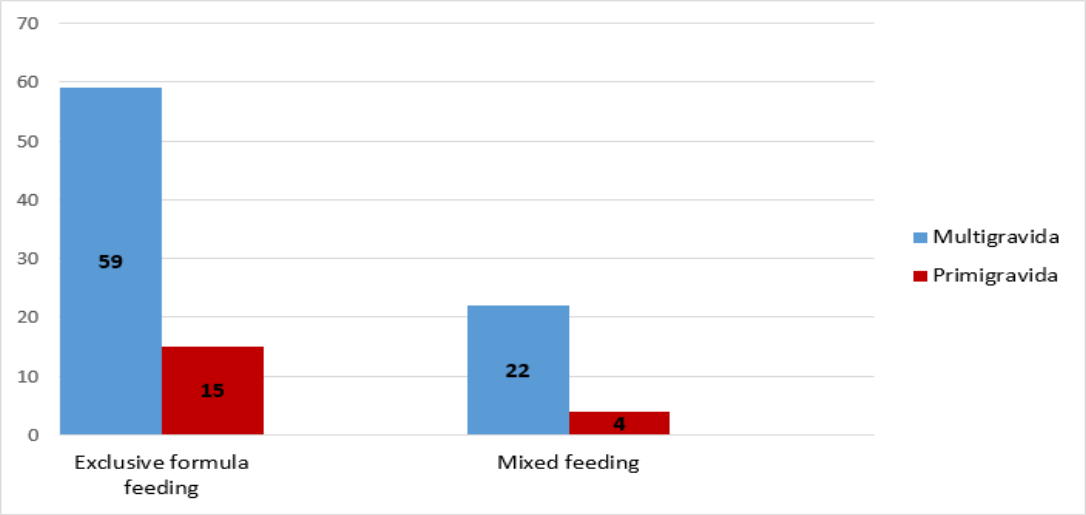

Fig.3: Distribution of formula feeding in relation to gravida.

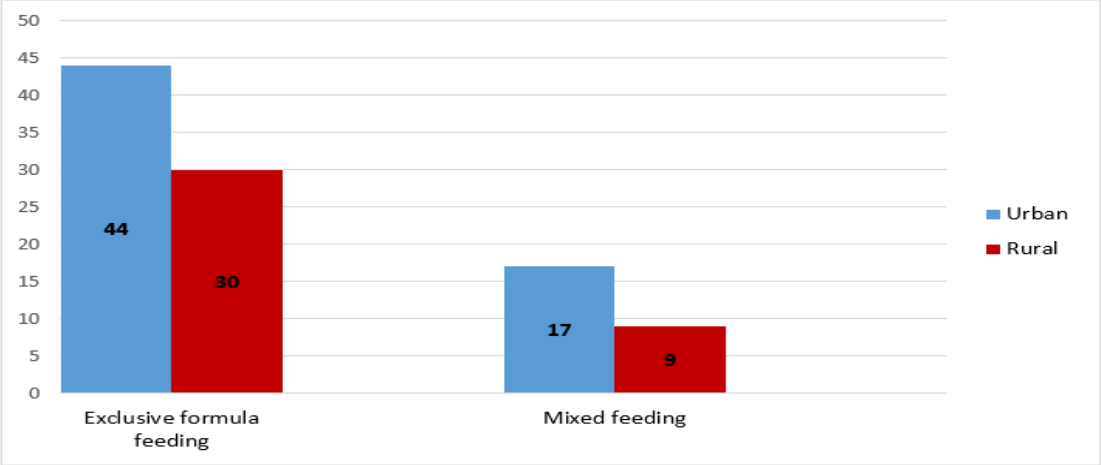

Fig.4: Distribution of formula feeding in relation to residence

4- DISCUSSION

Currently, many believe the development and advertisement of infant formula has once again negatively impacted the practice of breastfeeding (34, 35). Women should have to think consciously about their decision to use formula rather than breast milk. They are free to decide to use formula, but that choice must be informed by the truth about what bottle-feeding will cost them and their babies (36). In our study, the cost of formula milk feeding in infancy was high. It was found that the cost of formula feeding was significantly higher in infant feeding exclusive formula than those feeding formula and breast milk in all age groups ($P \leq 0.05$). The age of the child was significantly related to the cost of ounces consumption per day; during first month of age, the cost of formula milk is higher in the exclusive formula feeding than mixed formula feeding (P=0.007). Significantly more cost of formula milk between exclusive formula feeding and mixed formula during second month of age (P=0.005) and more significantly during 3-6 months of age (P=0.002). A study compiled by Lindsey, IBCLC in USA showed that average formula costs per a month saved by breastfeeding ($USD) is 122 $ in the first month, 302 $ in the second month, 477 $ in the third month

and 1045 $ in the sixth month age (37). So, when comparing our results with this study, the cost is much higher in US. This is may be related to the aggressive formula product marketing and presence of original brand name with high quality and big difference in the cost of formula milk when comparing with our country. There are defficient or no studies in Iraq and even in Arabic countries about cost of formula milk to compare with. In Haiti, where just 3 per cent of infants are exclusively breastfed, infant formula costs $ 10 per a week, or more than twice a typical income (36).

It is of sound, if we involve the cost of formula milk with the income of Iraqi family, but we faced many problems when assessing the income of each family, and it is clear that our country is facing social, political and economic problems especially in the last 2 years causing a big economic collapse. This will make Iraqi people facing a lot of challenges like economic instability, a lot of non-employee people and other things.

For this important issue, we chose this research to determine the burden on the family from formula feeding in a trial to find a solution and to support the Iraqi family in this point. In this study we chose hospitalized patients and calculate the cost of consumptive ounces per a day, so the cost may be slightly higher, if we choose healthy infants from AL-Amara city rather than hospitalized infants; and the cost may be much higher, if we include those hospitalized infants who need medical formula. In our study we were trying as possible to calculate the average usual cost of ordinary formula milk used in infancy. We picked up the cases of correct preparation of milk. So, for those who cannot afford adequate supplies of formula, the temptation to over dilute it will be applied and here the cost will be much less; and the opposite for those who are thinking that if they are giving their infant a concentrated formula will cause more weight gain and here the cost may be doubled. The study revealed that formula feeding is more prevalent in males, multigravida mothers and urban area; this may be due to social, educational, cultural attitude, and environmental factors. On top of that, precious health care moneys are spent on illnesses caused by artificial feeding. Use of infant formula has been cited for numerous increased health risks. Studies have found infants in developed countries who consume formula are at increased risk for acute otitis media, gastroenteritis, severe lower respiratory tract infections, atopic dermatitis, asthma, obesity (38), type 1 and 2 diabetes, sudden infant death syndrome , eczema and necrotizing enterocolitis, when compared to infants who are breastfed (39-41).

So, we need further and more studies that emphasize the cost of not breastfeeding. For babies in developing nations, breastfeeding is imperative: their very survival depends on the immune-boosting properties of mother's milk. For them, infant formula is not just inferior; it can cause disease or even death (42). So, in addition to having more illnesses, formula-fed infants cost the health care system money. Health care plans will likely realize substantial savings, as well as providing improved care, by supporting and promoting exclusive breast feeding (43).

4-1. Limitations of the study

In this study the data collection it is reflect percentage of our province and not all cities in our country. The children including in our study composed about all cases attend to hospital. We need more information and studies for covering such subjects.

5. CONCLUSION

Generally the cost of formula milk feeding in infancy is high and causing a

burden on the family and public-health. Apart from the indirect cost which may cause more burden. So saving money, health and emotional wellbeing will direct our vision toward breast feeding.

6- CONFLICT OF INTEREST: None.

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