Meal and Snack Patterns of Infants and Toddlers in the United Arab Emirates: The UAE Feeding Infants and Toddlers Study

Yousef M. Abdulrazzaq^a Shahraban Abdulla^b Ghazala Belhaj^c

^aDepartment of Paediatrics, College of Medicine and Health Sciences, UAE University, Al Ain, United Arab Emirates;

^bDepartment of Paediatrics, Latifa Hospital, Dubai, United Arab Emirates; ^cDepartment of Paediatrics, Al Ain Hospital, Al Ain, United Arab Emirates

Keywords

Toddlers · Infants · Feeding · Snacks · Breast milk · Complementary feed

Abstract

Aim: To describe meal and snack patterns and practices of infants and toddlers in the UAE. **Method:** A random sample of 1,000 infants and toddlers, aged 5 months to 2 years and attending Public Health clinics for immunization, was recruited. One face-to-face interview in which caregivers reported the feeding pattern of their infants and toddlers in the preceding 24-h period was conducted. For statistics, we used percentages (proportions) by age group (5–11.9 and 12–24 months). **Result:** The rate of breastfeeding decreased with age from 60% at 5 months to 37% at 12 months. At the age of 5–6 months, 90% of infants had been introduced to complementary foods. Juice was consumed by 7% of the infants before the American Academy of Pediatrics-recommended age of 6 months. At the age of 9–11 months, 90–100% of infants consumed cows' milk on a daily basis. Moreover, French fries and/or sweetened beverages were consumed by 10% of infants and toddlers. Chicken was the

most commonly fed meat (19.6% of infants and 57.2% of toddlers). **Conclusion:** The study results provide important evidence of improper feeding in some children and would help in providing guidance to parents and caregivers about the introduction of appropriate solid foods at an appropriate time.

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Introduction

Breastfeeding is the most appropriate way to provide the body with the required nutrients to promote healthy development and growth, especially in an infant's critical period, i.e., the first year of life [1]. There is supporting evidence that exclusively breastfeeding in the first 6 months of life has great benefits for infants' growth and health, both physiologically and psychologically [2]. Breastfeeding also has a modest protective effect on the development of obesity in childhood, adolescence, and adulthood [3]. Moreover, the World Health Organization (WHO) has recommended that infants should be exclusively breastfed for the first 6 month of life, with no intro-

duction of any complementary foods or liquids [4]. Despite the availability of such convincing information, only 30% of children under 6 months of age in Sub-Saharan Africa are exclusively breastfed [5], hence influencing the mortality rates of African children. In a study from the UAE, the exclusive breastfeeding rate was found to be 76.5% on day 1, 48.4% at 1 month, and 13.3% at 6 months of age [6]. The National Nutrition Survey in the UAE done in 1992 [7] showed that 42% of infants received bottle-feeds during the first month, 21% during the second month, and 9% during the third month. Another study showed that 70% of infants received non-milk supplements during the first month of life [8]. According to Osman and El-Sabban [9], 76.1% of infants were given milk supplements before the end of their first month and only 28% of the mothers exclusively breastfed their infant. Radwan [10] reported that, although 98% of mothers initiated breastfeeding, complementary feeds were introduced early and breastfeeding was stopped early.

Complementary foods are often prepared, served and stored under conditions that increase the child's vulnerability to the risk of frequent infections. When complementary foods are introduced prior to 6 months of age, the incidence of diarrheal disease rises [11]. In addition, complementary foods are usually deficient in calcium, zinc, and iron [12]. The WHO has strongly recommended that babies are breastfed exclusively during the first 4–6 months of life [13]. Breast milk plays an important role in preventing various diseases in the perinatal period and also has the long-term benefits of protection from chronic diseases in later life [14]. Moreover, frequent, exclusive breastfeeding during the first 6 months postpartum in developing countries is beneficial to the infant and the mother [15]. The introduction of cows' milk prior to 4 months of age may be associated with an increased risk of developing diabetes [16].

There is a lack of awareness of the right type and amount of nutritious foods for older infants and toddlers. Women with infants and toddlers need to be guided to provide sufficient amounts of essential nutrients and cultivate healthy eating practices to meet their infants' energy and body requirements.

Literature on the dietary status of UAE infants and toddlers remains scarce. This is the first large-scale study on infant feeding practices in the UAE. The main aims of this study are to describe meal and snack patterns of infants and toddlers and assess adherence to infant feeding recommendations among a sample of infants and toddlers aged 5–24 months in the cities of Dubai and Al Ain, UAE.

Methods

This is a descriptive, cross-sectional study. We calculated the number of infants and toddlers by taking into account the fact that we had to compare a binary variable that occurred in 5% of children in 1 group and 10% in the other group, with a 2-sided significance level of 5% and a power of 80%. We obtained the number of 475 children per group, but decided to sample 500 children in each group to allow for possible losses. In the UAE, vaccination for >96% of infants and toddlers occurs in government-run clinics and primary health care centers. Recruitment of study subjects took place at these centers as they provide good coverage of the target population. We used centers from 2 cities in the Emirates of Dubai and Abu Dhabi (Dubai and Al Ain, respectively), as these cities represent urban (Dubai) and rural (Al Ain) areas of the UAE. Two clinics were randomly selected from each of 8 clinics in Dubai and 5 clinics in Al Ain.

Families were recruited consecutively from the infants attending primary health care centers for immunization (250 from each of the 4 sites), until the number needed was attained. The study included only infants born to fathers who were UAE nationals and excluded infants of all other nationalities. A sample of 500 infants and toddlers was selected from Dubai and an equal number from Al Ain. There were 500 infants aged 5–11.9 months and 500 toddlers aged 12–24 months.

A single face-to-face interview was conducted with each of 1,000 participants who were asked about the breastfeeding pattern of their infants. They were also asked about the timing of the introduction of complementary foods. The information obtained was based on a 24-h dietary recall. They had to provide details of all the foods consumed by the infant including the type of food. Foods consumed outside of the 3 main meals were considered as snacks. The interview included supplementary questions about feeding patterns, growth, and development. It also included questions concerning emerging issues in childhood nutrition and obesity such as toddlers' physical activity levels, TV/video "screen time," and family meals. The results of this part of the study dealing with nutrition quality and quantity have been published previously [17].

Data were entered into a Microsoft Excel spreadsheet and then transferred to SPSS v20 for statistical analysis. As types of food were recorded as string variables, a special routine was written to translate these into the presence/absence of certain food items, e.g., whether or not the string "puree" occurred. Data were aggregated over the entire day of observation to obtain representative values for the daily intake of food items. Simple statistics like percentages were used to depict the prevalence of breastfeeding, the frequency of feeding, and the frequency of the intake of all types of food.

Results

It was found that 54.2% of infants aged 5–11.9 months were fed breast milk. However, this decreased to 25.2% in toddlers 12–24 months of age. Specifically, at 5 months, 60% of infants were breastfed; at 12 months of age, only 37% were consuming breast milk. Breastfeeding was continued till 2 years of age in only 20% of the children (Fig. 1).

Fig. 1. Breastfed infants and toddlers in the UAE.

About 90% of the infants aged 5–6 months had been introduced to complementary foods. Juice was taken by 7% of infants <6 months of age, 12.9% aged 5–11.9 months, and 27% aged 12–24 months. It was common for infants aged 5–11.9 months to consume either camel's or cow's milk (in the form of formula) (85.7%). Between 90 and 100% of infants aged 9–11 months consumed cows' milk (formula) on a daily basis while 92% of their counterparts aged 12–24 months consumed camel's or cow's milk (formula). A significantly larger percentage (82.1%) of the infants in Dubai than in Al Ain (68.5%) drank cow's (formula) or camel's milk ($p < 0.01$). At least 10% of infants consumed foods such as French fries and/or sweetened beverages on any given day.

Surprisingly, a good percentage of children in both age groups ate vegetables (62.9% of infants 5–11.9 months and 76.7% of toddlers aged 12–24 months). The 5 most common fruits eaten by the children were bananas, apples, dates, mangoes, and oranges (Table 1). Dates were fed to only 3% of infants and 2.9% of toddlers. Rice, which is a staple UAE diet, was fed to 70.6% of infants and 93.9% of toddlers, and pasta (macaroni and noodles) to 6% of infants and 25.1% of toddlers, potato to 11% of infants and 9.4% of toddlers, and bread to 5.1% of infants and

Table 1. Fruits eaten by infants and toddlers in the UAE

	Infants aged 6–11 months, %	Toddlers aged 12–23 months, %
Banana	25.7	29.1
Apple	15.7	16.1
Dates	3	2.9
Grapes	0.2	0.6
Mango	2.1	16.1
Orange	1.4	2.5
Other fruits	17.1	18.9

19.9% of toddlers (Table 2). Almost all toddlers were fed meat (Table 2). Eggs were fed to 9.1% of infants and 28.9% of toddlers. Other foods taken by this sample group of children, mostly as snacks, were Nestlé Cerelac®, the most widely used (50.2% in infants and 20.5% in toddlers), cornflakes, sandwiches, soups, cakes, oats, biscuits, custard, fruit puree, yoghurt, and cheese (Tables 3). Snacks were eaten between 3 and 5 times daily by all the infants.

Table 2. Constituents of the main meals of infants and toddlers in the UAE

	Infants aged 5–11.9 months (<i>n</i> = 500)	Toddlers aged 12–24 months (<i>n</i> = 500)
Breast milk	232 (54.2%)	120 (25.2%)
Formula milk	367 (85.7%)	439 (92%)
Cerelac®	215 (50.2%)	98 (20.5%)
Vegetables	269 (62.9%)	366 (76.7%)
Rice	303 (70.8%)	449 (94.1%)
Pasta (macaroni + noodles)	26 (6.0%)	120 (25.1%)
Bread	22 (5.1%)	95 (19.9%)
Potato	47 (11%)	45 (9.4%)
Red meat	19 (4.4%)	73 (15.3%)
Fish	8 (1.9%)	46 (9.6%)
Chicken	84 (19.6%)	273 (57.2%)
Eggs	39 (9.1%)	138 (28.9%)

Discussion

This study is part of a larger study, the UAE Feeding Infants and Toddlers Study (FITS), which aimed at shedding light on infant and toddler feeding, including issues related to the duration of breastfeeding, the use and quantity of human milk substitutes, the timing and introduction of complementary foods, and overall dietary nutrient adequacy [17]. There is a lot to be desired in the way some infants and toddlers are fed in the UAE, although most are fed appropriately. There were no problems with regard to missed meals, unlike skipped meals reported in older children [18]. There was frequent snacking throughout the day, varying between 3 and 5 times daily. Children were introduced to non-milk complementary foods in the appropriate period recommended by the American Academy of Pediatrics (AAP), but were given juice to consume before the AAP-recommended age of ≥ 6 months. Moreover, cow's milk was given to the children daily before the recommended age of ≥ 12 months. It is clear from this sample that the favorite weaning food was Cerelac, started early, at 4–6 months of age. There is a place for the nutritional improvement of the snacks given to the infants and toddlers as there were some who were fed chips, commercial juices, cakes, custard, and pizza.

It was good to know that a good percentage of infants and toddlers received vegetables and fruits as snacks. Our findings are similar to those of the USA FITS, which found that 63% of infants aged 6–8.9 months and 72% of

Table 3. Snacks eaten by infants and toddlers in the UAE

	Infants aged 5–11.9 months (<i>n</i> = 500)	Toddlers aged 12–24 months (<i>n</i> = 500)
Biscuits	82 (19.2%)	99 (20.6%)
Cheese	51 (11.9%)	183 (28.4%)
Soup	50 (11.7%)	116 (24.3%)
Yoghurt	111 (25.9%)	195 (40.9%)
Oats	19 (4.4%)	43 (9%)
Sandwiches	10 (2.3%)	41 (8.6%)
Cake	12 (2.8%)	59 (12.4%)
Cornflakes	9 (2.1%)	77 (16.1%)
Fruit puree	25 (5.8%)	5 (1%)
Custard	10 (2.3%)	23 (4.8%)
Pizza	0	5 (1%)
Chips	3 (0.7%)	36 (7.5%)
Juice	55 (12.9%)	129 (27%)
Total snacks	85.7%	92%

infants aged 9–14.9 months consumed some vegetables [19]. This period is critical for growth and development, and transitions in food consumption occur in this period thus influencing short- and long-term health. In the Czech Republic, the intake of vegetables is between 62 and 77% during the period 9–24 months of age [20]. Biscuits, yoghurt, and juices are the most common snacks consumed by UAE infants and toddlers. Almost all the infants and toddlers studied received some form of snack. No carbonated drinks were consumed by the infants and toddlers in the sample studied.

Some researchers have reported that mothers of infants who breastfed for longer tend to report greater responsiveness to infant satiety cues ($p \leq 0.01$) and reduced pressuring in feeding complementary foods ($p < 0.05$). The latter was also true for mothers of toddlers who breastfed for longer ($p < 0.01$) [21]. These results suggest that the infant's cues during breastfeeding determine how the mother responds and may help shape maternal feeding approaches as infants enter a period of complementary feeding, even after controlling for a range of demographic characteristics previously associated with breastfeeding behaviors. However, this association might not exist in the toddler age group as responsiveness to feeding cues was not associated with breastfeeding duration in the toddler sample. We have not looked at the infants' satiety cues, but we can say that the infants in this study received adequate amounts of milk or complementary foods as the growth rate was normal [17].

Breastfeeding involves not only food, thereby providing necessary nutrients, but also a sophisticated endocrine signaling system, and it is therefore critical for infants [22]. In the UAE, almost all mothers (98%) initiate breastfeeding [10], however, we found only 60% were breastfeeding infants of 5 months of age. This is a good achievement compared to other countries, where fewer infants are still breastfed at 4–6 months, e.g., 54% in Luxembourg, 37% in The Netherlands, and 41% in Japan [23]; however, it was expected that, in the UAE where, traditionally, breastfeeding continues till babies reach the age of 2 years, the percentage of breastfed infants would be higher. The reason for this lower than expected rate of breastfeeding could be that 29% of the women nowadays are working mothers [24] and their work circumstances may have forced them to abandon breastfeeding earlier than they would have liked, despite the fact that women in the workplace are, by law, provided with breastfeeding periods. Education is a major factor when it comes to studying the length of time mothers continue to breastfeed their infants. Most (95%) new mothers in the UAE are educated [24]. Several studies and reports reveal that a higher education level correlates with a shorter duration of breastfeeding [25, 26]. Previous studies on exclusively breastfeeding in the UAE show conflicting results. The UAE Family Health Survey found that 34% of infants were exclusively breastfed up to 4 months of age [24], while another study found that 46% were exclusively breast fed at 4–6 months [27]. In contrast, Al-Mazroui et al. [8] found that only 4% of infants from the city of Al Ain were exclusively breastfed during the first month of life. Recently, a study on a multicultural population, including Emiratis, reported that the rate of exclusively breastfeeding at 1 and 6 months was 48 and 13%, respectively [6].

On the whole, the foods given to infants and toddlers were appropriate. However, some of the complementary foods reported were juice, sweetened beverages, and cow's milk, and also solid foods such as potatoes. Complementary foods were introduced early at a relatively high rate (90%) in this study compared to the 21% in the Norwegian infant population as well as in Germany and the USA [28, 29]. It is also higher than in other Arab countries such as Bahrain (62%) [30]. In Russia, 59.4% of babies are weaned on fruit juice, followed by fruit puree (18%), and cereals (6.4%) [31]. It is normal for infants and toddlers to have multiple meals and snacks in a day because of their high levels of activity [32]. In this study, generally, infants and toddlers were routinely fed multiple meals a day. Quite a good num-

ber of infants (62.9%) and toddlers (76.7%) were fed vegetables as snacks.

In conclusion, our results provide important evidence for appropriate food intake by the majority of infants and toddlers, except for a few children for whom inappropriate feeding was provided. This study would help in providing guidance to parents and caregivers to increase their awareness about the introduction of appropriate solid foods at an appropriate age. The importance of this study is that it sheds light on the lower than expected breastfeeding rates in infants, indicating that the number of children breastfeeding in the first year of life can be improved. Future research is needed to target the factors associated with such feeding patterns.

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Statement of Ethics

Since the study is a non-invasive one, it did not expose any physical or psychological harm to the participants in anyway. All data collected from the participants were strictly confidential and anonymous. Informed consent was obtained from the primary care givers and ethical approval was obtained from College of Medicine and Health Sciences Research Ethics Committee and permission was obtained from the heads of the primary healthcare centers.

Disclosure Statement

The authors have no conflicts of interest to declare.

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