Surveillance of infant feeding practices in Riyadh city

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The incidence and duration of breast-feeding in Saudi Arabia has been declining in the last decade.^{1,2} The growth pattern of pre-school-children in Saudi Arabia is below the National Center for Health Statistics and Center for Disease Control & Prevention (CDC), USA.^{3,4} Protein-calorie malnutrition is common among bottle-feeding infants and artificial feeding is associated with generalized weakness, delayed wound healing, and decreased resistance to infection. Human milk contains antibodies against certain bacteria and viruses.⁵

The majority of mothers prefer to breast feed their infants. In one study, 81% of mothers believed that breastfeeding was the easiest and the most nutritious method of infant feeding.⁶ Another study showed that 98.3% of mothers supported breastfeeding.⁷ In another national survey, 90% of infants were exclusively breastfed initially, but this figure dropped to 50% at 3 months of age and 10% at 1 year of age.⁸ In a child health survey by the Ministry of Health, 90.2% of infants were breastfed at birth, but that dropped to 81.8% at three months of age.⁹

Mixed feeding with breast and bottle appears to be the popular method among mothers. A national survey from 11 health centers situated across the Kingdom showed that only 21.5% were completely breastfed, 20.6% were fed by artificial methods (bottle or cups) and 57.9% by a combination of breast and artificial methods.¹⁰ Insufficient breast milk was the most common reason cited for the early introduction of artificial milk or termination of breastfeeding. New pregnancy and contraceptive usage were other common reasons. Breast milk was considered harmful for the child when the mother becomes pregnant or uses contraceptives.^{1, 6, 8, 9, 11}

Factors affecting the duration and pattern of breastfeeding have been studied in many surveys. Various factors, such as the maternal age, level of mother's education, area of residence, occupation, parity, sex of the infant, prenatal care, family income, place and type of delivery, contraceptive use and others were found to be associated with breastfeeding. Lower duration of breastfeeding was found in young women when compared with their older counterparts.^{8,10,11,12} Khalil et al, reported that a substantial proportion of preterm infants faced a health problem that negatively affected the initiation and sustainability of breastfeeding.¹³ In one survey, younger women had a shorter duration of breastfeeding (9.3±6.9 months) than the older women did whose duration was more than 11

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months.⁷ Level of education was inversely related with the duration of breastfeeding. Illiteracy of parents, in particular of the mothers, was associated with a longer duration and there was a gradual decline in the duration of breastfeeding with increasing level of education.^{7,8,10,11,12}

Nutrition surveillance refers to the continuous monitoring of key indicators of nutritional status of the population for the purposes of needs assessment, program planning, implementation of appropriate interventions and evaluation of the intervention efforts. The surveillance system should be simple and limited to the collection of a few nutritional indicators. The data collected has to be rapidly analyzed for use by health care providing agencies. Acknowledging the importance of such a system, the Nutrition Department, Ministry of Health, decided to develop and implement a Nutrition Surveillance System in Saudi Arabia. The department asked the World Health Organization for expert consultation on the Nutrition Surveillance System. As a first step, it was decided to undertake the nutritional surveillance of children less than five years old. A pilot Pediatric Nutrition Surveillance System (PNSS) was designed with the help of a WHO consultant from the CDC, USA. A questionnaire was developed and staff was trained for this surveillance program. Cooperation was sought from other departments in the Ministry of Health. This paper is derived from the first annual report of the PNSS. It summarizes the nutritional status and feeding practices of infants and children under 5 years of age in Riyadh City.

Methods

Demographic data and information on infant feeding practices for infants younger than 5 years of age were collected during visits (September 1999 to September 2000) for routine care and vaccination at ten primary health

care centers located in the north, south, east, west and central areas of Riyadh. Information on infant feeding practices included length of breastfeeding, date of starting bottle-feeding, reasons for using bottle-feeding and when weaning started. Birth weight was recorded from the file, if available, or from the mother. The ten primary health care centers were selected by random systematic sampling after stratification by population density, socioeconomic status and geographical location. The data was analyzed using Epi Info version 6, Division of Surveillance and Epidemiology, CDC, USA.¹⁴

Results

The sample included 21,507 infants (<1 year of age and children 1 to 5 years of age) visiting the ten primary health care centers during the year 1999 to 2000. There was a slight preponderance of males (51.8%) (Table 1). Infants represented the largest group, 58.8% of children. The children were predominantly Saudis (92.8%). The educational level of the mothers was no education for 36.4%; primary or intermediate level for 36.9%; high school education (secondary) for 16.9%, and university level for only 9.8%.

Almost all the children (98.9%) were started on breastfeeding during the first week after birth. The percentage who continued on breastfeeding for more than 6 months (excluding those <6 months of age) was 52.7%; for more than 12 months, 30.8%; for more than 18 months, 18.8% and for more than 24 months (older than 24 months), 3.2%. The mean duration of breastfeeding was 6.57 ± 5.71 months (Table 2). This total includes infants who were less than 6 months of age at the time of the survey. When infants under the age of 6 months were excluded, the mean duration of breastfeeding rose to 8.54 ± 6.18 months. The mean duration of breastfeeding was significantly higher among female infants than the

males ($P 0.05$) (Table 2).

The mean age when bottlefeeding was introduced was 1.84 ± 2.49 months. Bottlefeeding was introduced significantly earlier among females than males ($P 0.05$). By the end of the first week, 7.8% of infants were bottlefeeding and by the end of the first month, 77.2% were bottlefeeding. The mean age of weaning was 4.43 ± 1.64 months. There was no significant difference between the weaning age of males and females.

Education had a significant effect on the duration of breastfeeding (Table 3). The mean duration of breastfeeding by the less educated mothers was significantly higher than the more educated mothers. The mean age when bottlefeeding was introduced was influenced by education level. More educated mothers weaned their infants significantly ($P 0.01$) earlier than mothers having no education.

The reason for bottlefeeding most often stated was 'not enough milk' (66.1%) (Figure 1). Only 3.5% and 4.7% of mothers reported that illness of the infant or mother, respectively, was the reason for the introduction of bottle-feeding. 'Becoming pregnant' was the reason for bottle-feeding in 5.1% of infants. The percentage of mothers who introduced bottle-feeding for other reasons was 20.6%.

Discussion

The percentage of children who had never been breastfed in our study (1.4%) is similar to that reported in a survey from Jeddah, Saudi Arabia¹⁵ where it was found that 98% of the children were breastfed. The majority of mothers breastfeed their infants, but many introduce bottle feeding long before the recommended time. In a national cross-sectional study, 93% of infants were being breastfed at 1 month of age, but that rate dropped to 89% at the second month, 84% at the third month and 78% at the sixth month.¹¹ In a national child health survey, the

Table 1. Age and sex distribution of children visiting ten primary health care centers for routine care and vaccination in 1999.

Age Group (months)	Male n (%)	Female n (%)	Total n (%)
Infants			
0-5.9	3981 (35.9)	3622 (34.9)	7603 (35.4)
6-11.9	2626 (23.6)	2391 (23.1)	5017 (23.4)
Children			
12-23.9	3314 (29.6)	3073 (29.8)	6387 (29.7)
24 -35.9	639 (5.8)	693 (6.7)	1332 (6.2)
36-47.9	334 (3.0)	311 (3.0)	645 (3.0)
48-59.9	234 (2.1)	260 (2.5)	494 (2.3)
Total	11 128 (51.8)	10 350 (48.2)	21 478 (100.0)

Table 2. Infant feeding parameters by sex.

Infant feeding parameter (months)	Male	Female	Both
Mean duration of breastfeeding for all children	6.50 ± 5.65*	6.65 ± 5.78*	6.57 ± 5.71
Mean duration of breastfeeding after excluding children less than 6 months	8.43 ± 6.13*	8.6 ± 6.22*	8.54 ± 6.18
Mean age when bottle feeding was introduced	1.85 ± 2.49*	1.84 ± 2.49*	1.84 ± 2.49
Mean age of weaning	4.44 ± 1.61	4.43 ± 1.67	4.43 ± 1.64

* P 0.05 male vs. female

Table 3. Infant feeding parameters by education of the mother.

Infant feeding parameter (months)	No education	Primary & secondary	High school	College & university
Mean duration of breastfeeding for all children	7.31 ± 6.06	6.66 ± 5.77	5.69 ± 5.17 [†]	5.37 ± 5.28*
Mean duration of breastfeeding after excluding children less than 6 months	9.97 ± 6.54	9.25 ± 4.46 [‡]	8.12 ± 6.11 [†]	7.84 ± 6.43*
Mean age when bottle feeding was introduced	1.88 ± 2.68	1.81 ± 2.38	1.70 ± 2.20	1.63 ± 1.82 [‡]
Mean age of weaning	4.47 ± 1.85	4.47 ± 1.5	4.33 ± 1.46	4.26 ± 1.37 [‡]

*P 0.001; [†]P 0.01; [‡] P 0.05 vs no education

Figure 1. Reasons for introducing bottlefeeding.

percentage of children who were given breast milk alone was 55% at one month of age and under 36% at 2 to 3 months of age.¹² In their Saudi Arabian family health survey, Khoja and Farid reported that 13.1% of urban and 11.65% of rural mothers never breastfed,¹⁶ which is similar to the 10% rate reported by Al-Othaimen in infants from eleven health centers throughout the kingdom of Saudi Arabia.¹⁷ Al-Mazrou and Farid reported that 90.1% of the mothers interviewed (6132 subjects from North, South, East, West and Central of Saudi Arabia) had breastfed their last child, which mean that 9.9% of infants had not been breast fed at all. The highest ratio was 14.6% among infant whose mother's age was less than 20 years.⁹ In a survey conducted in 79 primary health care centers in Taif, a large percentage (98%) of mothers had breastfed their infants at birth, but the percentage dropped to 96.5% during the first week of life.¹⁵

Exclusive breastfeeding (only breast milk for the first 4 to 6 months) in our study was 0.8%, which is much less than the reported 12% from Kuwait.¹⁶ Our results showed a negative association between the mother's level of education and the likelihood of the child being exclusively breastfed. We failed to find a study reporting the exclusive breastfeeding rate for the first 4 to 6 months from Saudi Arabia. The percentage of children that were breastfed for more than six months in this study was 34.3%, whereas in another study in the urban and rural Saudi population, the percentage of children that were breastfed for more than six months was 57.2%.¹² In a survey to evaluate the nutritional status of people in the kingdom, it was found that a high percentage (63%) of children were breast fed, 16.5% were breast and bottle fed and 10.7% were bottle fed.¹⁸ In a study from Riyadh, 31.3% of children were breastfed alone, 59.4% were fed with breast and bottle and 9.3% were fed by bottle alone.¹⁹ Another study of 250 children from Riyadh at one month of age revealed that 42% were on mixed feeding, 31% were bottle fed and remaining 27% were totally breastfed.²⁰ In a nationwide survey mentioned earlier,¹⁶ the duration of breastfeeding for the last born child was 12.5 months. Working mothers breastfed their children less than the non- working mothers, 10.0 and 12.1 months, respectively. It was found in a study from

Riyadh that only 10% of mothers had received instruction on infant feeding.²⁰ The data in this study showed that the mean duration of breastfeeding for children older than 6 months was 8.54 ± 6.18 months. The mean duration of breastfeeding was significantly higher among female than male children. In an earlier study from Riyadh, the mean duration of breastfeeding for children between 6 and 8.9 months was 4.66 months and between 9 and 12 months of age was 5.99 months.¹⁹

The mean age when bottle-feeding was introduced in our study was 1.84 ± 2.49 months. Female infants were introduced to bottlefeeding significantly earlier than male infants. Only 7.8% were introduced in the first week, while 77.2% were bottle fed by the end of the first month. Al-Frayh reported that bottle-feeding was started in 27.3 % of infants by one month.¹⁹ Khoja and Farid reported the bottle feeding rate for children less than 12 months was 66% and rate was higher for infants of working mothers than for those for non-working mothers (77% and 63%, respectively). Bottlefeeding was also more common in urban compared to rural populations, and the rate increased with education level.¹⁶

The mean age of weaning in our study was 4.43 ± 1.64 months. There was no significant difference among the weaning age of males and females. The mean weaning age in our study was higher than that from an earlier study in Riyadh (3.45 months).¹⁹ Khoja and Farid, who reported that 1% of children less than 3 months of age were fed with solid food, also reported that the proportion was higher in urban children compared to rural, and the figure increased with education level.

From this and a few other studies^{17,20,21,22} it is obvious that the practice of breastfeeding is increasing, but at the same time the fraction of mothers that practice exclusive breastfeeding is declining. There is a need for strengthening the breastfeeding drive, while stressing that breast milk alone is sufficient for the first six months of life. Another factor responsible for mixed feeding is the mother staying away from the child at the time of feeding. This is the reason for the inverse relationship between education and breastfeeding in our study.

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