

Infant feeding practices of Saudi mothers in five different regions of Saudi Arabia

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هدفت هذه الدراسة المستعرضة إلى تقييم ممارسة تغذية الرضع عند الأمهات السعوديات في خمسة مناطق مختلفة في المملكة العربية السعودية. أعد استبيان خاص لهذا الغرض جرى توزيعه عشوائياً على الأمهات اللواتي لديهن أطفال بأعمار تقل عن سنتين والمراجعات لمشافي الأطفال الرئيسية في خمسة مناطق مختلفة في المملكة. تضمن الاستبيان عمر الأم وعملها ومستواها الثقافي وعدد الأطفال والحالة العائلية والمنطقة و نوع التغذية أو الإرضاع. دلت النتائج على أن حوالي ٤٨,٢٪ يفضلن رضاعة الزجاجة حصراً و ٢٩,٧٪ يفضلن الزجاجة مع رضاعة الثدي و ٢٢٪ يفضلن رضاعة الثدي حصراً. لوحظ أن لاختلاف العوامل السكانية تأثير جوهري على تفضيل الأم لنوع الرضاعة (الدلالة الإحصائية > ٠,٠١). وبالمقارنة مع الدراسات السابقة فهناك انخفاض واضح في رغبة رضاعة الثدي، وقد أظهر التحليل الإحصائي أن ممارسة الرضاعة تتأثر إلى حد كبير بالحالة العائلية والمستوى الثقافي. يمكن الاستنتاج على أن رضاعة الزجاجة هي الأكثر شيوعاً بين الأمهات اللواتي شاركن في هذه الدراسة.

Objective: A cross-sectional study was carried out to determine the infant feeding practices of Saudi mothers in five different regions of the Kingdom of Saudi Arabia. **Materials and Methods:** Self administered questionnaires were randomly distributed to mothers with children aged less than 2 years attending major children's hospitals in five different regions. The questionnaire covered different demographic data such as mother's age, occupation, educational level, number of children, marital status, region, and type of feeding or nursing. **Results:** In general 48.2% of the mothers preferred exclusive bottle feeding, followed by bottle and breast feeding (29.7%) with only 22.0% of the mothers preferring exclusive breast feeding. Statistical test on the effect of the different demographic factors on the mothers' preference of infant feeding were found to be highly significant, (χ_2 test, $P \leq 0.01$). Stepwise Logistic regression test shows that the most significant factors affecting the mothers' infant feeding practices were mothers' education and marital status. **Conclusion:** Bottle feeding was the most common method of infant feeding by all the participating mothers. Medical professionals should educate mothers to increase their awareness of the importance of breast feeding.

INTRODUCTION

Breast feeding is the most nutritive and immunologically supportive way for infant health.¹⁻⁴ Many studies showed that the benefits of breast feeding not only improve the infants' health but also the mothers' health in many different forms, such as reducing the risk of breast and ovarian cancer and other health problems.⁵⁻⁷ Many organizations such as United Nations Children Fund (UNICEF), World Health Organization (WHO) and American Academy of Pediatrics have issued and promoted different programs to support and encourage breast feeding in many countries around the world.^{3,8,9}

Literature review shows that the practice of breast feeding has declined considerably over the last few years and

early introduction of bottled milk and solid food has increased in many parts of the world.¹⁰⁻¹⁶ In the Saudi society breast feeding is considered to be the ideal and the most natural way of nursing infants due to religious and cultural beliefs. However, during the last few decades major developmentals have taken place in Saudi Arabia making it one of the fastest growing economies of the world.¹⁷ This fast progress has had different influence on the lifestyles of many Saudi families. The developmental influence comes into light as more mothers leave their homes either for work or to utilize opportunities to achieve higher education. Many long-established habits and cultural traditions are adapting to the new era. Results of previous studies showed that breast feeding duration exceeded 2 years in some areas of Saudi Arabia.^{18,19} However, recent studies showed a decline in breast feeding between the ages of 6 and 12 months and the introduction of bottle formula as well as solid food has become more frequent at an earlier infant age.^{20,21}

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The common finding between the different studies was the decline in breast feeding. Most of the authors reported that the majority of the mothers (up to 90%) started with breast feeding but the number dropped considerably within the first few months of the infant's age.^{24, 28, 29} Many reasons were given by the mothers to explain the discontinuation of breast feeding practices. These reasons include insufficient breast milk, lack of family support, infant's age, short intervals between births and lack of adequate information on breast feeding.²²⁻²⁶

The decline in breast feeding and the early introduction of bottle feeding with usually different sugary content for a prolonged period (more than 12 months of the infant age) increased the risk of early childhood caries in many societies.^{30,31} It has been reported that many children were used to feeding before/during sleep, nocturnal/nap-time bottle feeding, and consumption of excessive amount of fruit juices/soft drinks from container which resulted in increased nursing caries rate among Saudi infants and toddlers.³²

Therefore the aim of this study was to evaluate the infant feeding practices of Saudi mothers and the variables affecting their selection of feeding methods in five different regions of Saudi Arabia.

METHODS AND MATERIALS

A self-administered Arabic questionnaire was distributed to major children's hospitals in five different regions around the Kingdom of Saudi Arabia who agreed to participate in the study targeting mothers with children aged less than 2 years (in the nursing stage). Children were randomly selected from the booked patients list in the well-baby care clinic over a period of 3 months. The questions covered a variety of factors, including age, education, occupation, marital status, number of children, and actual feeding practices. The sample was divided into 3

groups according to the mode of feeding: exclusive breast feeding, exclusive bottle feeding, or combined breast and bottle feeding.

A total of 1400 questionnaires were distributed as follows: 400 in the Central region represented by the city of Riyadh, 250 in the Western region (Jeddah and Makkah), and 250 in the Eastern region (Dammam and Dhahran), 250 in the Southwestern region (Jazan), and 250 in the Northern region (Arar).

All responses were entered into a computer database and analyzed using a Statistical Package for Social Sciences (SPSS version 10). Descriptive statistics were generated on all items and cross tabulation as well as step logistic regression to find the most significant demographic factors that have an effect on the mothers' feeding practices. Chi-square test was performed to evaluate the different variables.

RESULTS

Out of 1400 distributed questionnaires, 912 samples were received, yielding a response rate of 65.14%. A large number of the participating mothers (48.2%) were using bottle formula to feed their infant, followed by bottle and breast combined (29.7%) while 22% practiced breast feeding only (Table 1).

More than half (53.3%) of the participating mothers were between 20 and 30 years of age and 35.1% were between 31 and 40 years. Only 6.8% and 4.6 % were more than 40 and less than 20, respectively. Bottle feeding was the most commonly used method by the mothers in each age group followed by the combination of bottle and breast. Breast feeding was the least commonly used in all age groups. Younger mothers (< 20 years) breast feed their infant more than the older mothers. The statistical test showed insignificant variations in the mothers' feeding practices between the

Table 1. Mothers' age and feeding practices

Mothers' age	Count	Type of feeding			Total
		Breast	Bottle	Both	
< 20	Count	11	19	12	42
	% Within mother's age	26.2%	45.2%	28.6%	100.0%
	% Within type of feeding	5.5%	4.3%	4.4%	4.6%
20-30	Count	93	251	144	488
	% Within mother's age	19.1%	51.4%	29.5%	100.0%
	% Within type of feeding	46.3%	57.0%	53.1%	53.5%
31-40	Count	83	144	93	320
	% Within mother's age	25.9%	45.0%	29.1%	100.0%
	% Within type of feeding	41.3%	32.7%	34.3%	35.1%
> 40	Count	14	26	22	62
	% Within mother's age	22.6%	41.9%	35.5%	100.0%
	% Within type of feeding	7.0%	5.9%	8.1%	6.8%
Total	Count	201	440	271	912
	% Within mother's age	22.0%	48.2%	29.7%	100.0%
	% Within type of feeding	100.0%	100.0%	100.0%	100.0%

$P = 0.26$
Pearson's Chi-square = 7.595

different age groups as P value was 0.26 and Pearson's Chi-square value = 7.595 (Table 1).

Table 2 shows the effect of mother's educational level on the type of feeding. About one third (38.6%) of the total participating mothers were university graduates while high school diploma holders were 22%. In the least educated or illiterate mothers' group, breastfeeding was preferred (42.3%) over the other two options of feeding when compared with the more educated mothers. Bottle feeding was used more by university and high school graduate mothers (59.4% and 46.3% respectively). Pearson's Chi-square test showed significant variations in the mothers' feeding practices according to their educational level, P value ≤ 0.01 and Chi-square was 70.302 (Table 2).

Distribution of responding mothers is shown in Table 3. Most of the mothers from the different regions used bottle feeding over the other two methods. The largest group of mothers which practiced breast feeding was from the Western

Table 2. Mothers' education and feeding practices

Mothers' education	Count	Type of feeding			Total
		Breast	Bottle	Both	
Illiterate	Count	52	39	32	123
	% Within mother's education	42.3%	31.7%	26.0%	100.0%
	% Within type of feeding	25.9%	8.9%	11.8%	13.5%
Primary	Count	36	48	38	112
	% Within mother's education	32.1%	42.9%	30.6%	100.0%
	% Within type of feeding	17.9%	10.9%	10.3%	12.3%
Intermediate	Count	35	51	38	124
	% Within mother's education	28.2%	41.1%	30.6%	100.0%
	% Within type of feeding	17.4%	11.6%	14.0%	13.6%
High School	Count	35	93	73	201
	% Within mother's education	17.4%	46.3%	36.3%	100.0%
	% Within type of feeding	17.4%	21.1%	26.9%	22.0%
University	Count	43	209	100	352
	% Within mother's education	12.2%	59.4%	28.4%	100.0%
	% Within type of feeding	21.4%	47.5%	36.9%	38.6%
Total	Total Count	201	440	271	912
	% Within mother's education	22.0%	48.2%	29.7%	100.0%
	% Within type of feeding	100.0%	100.0%	100.0%	100.0%

$P < 0.01$
Pearson's Chi-square = 70.302

region (28.4%) and the least group was from the Southwestern region (13.4%). The statistical test showed significant variations in the mothers' feeding practices according to their regions, P value ≤ 0.01 and Pearson's Chi-square = 50.100 (Table 3).

Majority of participating mothers were married (93.3%). The effect of the marital status on the mothers' feeding practices (Table 4) showed that mothers in the married and widow categories preferred bottle feeding (48.5% and 65.5%, respectively) while divorced mothers preferred both bottle and breast feeding (68.8%). The statistical test showed significant variations in the mothers' feeding practices according to

Table 3. Mothers' region and feeding practices

Region	Count	Type of feeding			Total
		Breast	Bottle	Both	
Central	Count	41	189	91	321
	% Within region	12.8%	58.9%	28.3%	100.0%
	% Within type of feeding	20.4%	43.0%	33.6%	35.2%
Western	Count	57	59	49	165
	% Within region	34.5%	35.8%	29.7%	100.0%
	% Within type of feeding	28.4%	13.4%	18.1%	18.1%
Eastern	Count	37	59	34	130
	% Within region	28.5%	45.4%	26.2%	100.0%
	% Within type of feeding	18.4%	13.4%	12.5%	14.3%
Southwestern	Count	27	72	61	160
	% Within region	16.9%	45.0%	38.1%	100.0%
	% Within type of feeding	13.4%	16.4%	22.5%	17.5%
Northern	Count	39	61	36	136
	% Within region	28.7%	44.9%	26.5%	100.0%
	% Within type of feeding	19.4%	13.9%	13.3%	14.9%
Total	Count	201	440	271	912
	% Within region	22.0%	48.2%	29.7%	100.0%
	% Within type of feeding	100.0%	100.0%	100.0%	100.0%

P < 0.01
Pearson's Chi-square = 50.100

Table 4. Mothers' social status and feeding practices

Social status	Count	Type of feeding			Total
		Breast	Bottle	Both	
Married	Count	196	413	242	851
	% Within social status	23.0%	48.5%	28.4%	100.0%
	% Within type of feeding	97.5%	93.9%	89.3%	93.3%
Widow	Count	3	19	7	29
	% Within social status	10.3%	65.5%	24.1%	100.0%
	% Within type of feeding	1.5%	4.3%	2.6%	3.2%
Divorced	Count	2	8	22	32
	% Within social status	6.3%	25.0%	68.8%	100.0%
	% Within type of feeding	1.0%	1.8%	8.1%	3.5%
Total	Count	201	440	271	912
	% Within social status	22.0%	48.2%	29.7%	100.0%
	% Within type of feeding	100.0%	100.0%	100.0%	100.0%

P < 0.01
Pearson's Chi-square = 28.37

their marital status, *P* value ≤ 0.01 and Pearson's Chi-square = 28.371.

The study of the occupational effect on the mothers' feeding practices showed that exclusive breast feeding was more among housewives (29.4%) compared with employed wives (11.0%). Bottle feeding was more among employed wives (57.0%) compared with housewives (42.4%). Using both feeding methods was more among employed 32.1% and 28.2% among housewives. This variation was significant (*P* value ≤ 0.01 and Pearson's Chi-square = 44.66) as shown in Table 5.

A large number of the participating mothers (49.0%) had one to three children and only 5.2% had more than 10 children (Table 6). Mothers with less than 10 children preferred bottle feeding; while mothers with more than 10 children preferred both bottle and breast methods of feeding. Mothers with one to three children practiced breast feeding more than the rest of the mothers. The differences were significant at *P* value ≤ 0.01 and Pearson's Chi-square = 39.39 (Table 6).

Table 5. Mothers' occupation and feeding practices

Occupation	Count	Type of feeding			Total
		Breast	Bottle	Both	
Housewife	Count	161	232	154	547
	% Within mother's job	29.4%	42.4%	28.2%	100.0%
	% Within type of feeding	80.1%	52.7%	56.8%	60.0%
Employed	Count	40	208	117	365
	% Within mother's job	11.0%	57.0%	32.1%	100.0%
	% Within type of feeding	19.9%	47.3%	43.2%	40.0%
Total	Count	201	440	271	912
	% Within mother's job	22.0%	48.2%	29.7%	100.0%
	% Within type of feeding	100.0%	100.0%	100.0%	100.0%

P < 0.01
Pearson's Chi-square = 44.66

Table 6. Number of children and feeding practices

Number of children	Count	Type of feeding			Total
		Breast	Bottle	Both	
1-3	Count	76	225	116	447
	% Within number of children	17.0 %	57.0 %	26.0 %	100.0 %
	% Within type of feeding	37.8 %	58.0 %	42.8 %	49.0 %
4-6	Count	65	128	93	286
	% Within number of children	22.7 %	44.8 %	32.5 %	100.0 %
	% Within type of feeding	32.3 %	29.1 %	34.3 %	31.4 %
7-9	Count	44	45	43	132
	% Within number of children	33.3 %	34.1 %	32.6 %	100.0 %
	% Within type of feeding	21.9 %	10.2 %	15.9 %	14.5 %
10 +	Count	16	12	19	47
	% Within number of children	34.0 %	25.5 %	40.4 %	100.0 %
	% Within type of feeding	8.0 %	2.7 %	7.0 %	5.2 %
Total	Count	201	440	271	912
	% Within number of children	22.0 %	48.2 %	29.7 %	100.0 %
	% Within type of feeding	100.0 %	100.0 %	100.0 %	100.0 %

$P < 0.01$
Pearson's Chi-square = 39.39

Table 7. Age of the child and feeding practices

Age of children	Count	Type of feeding			Total
		Breast	Bottle	Both	
4-6 months	Count	45	38	60	143
	% Within age of child	31.5 %	26.6 %	42.0 %	100.0 %
	% Within type of feeding	22.4 %	8.6 %	22.1 %	15.7 %
7-9 months	Count	23	52	38	113
	% Within age of child	20.4 %	46.0 %	33.6 %	100.0 %
	% Within type of feeding	22.9 %	11.8 %	14.0 %	16.8 %
10- 1 year	Count	35	12	44	153
	% Within age of child	22.9 %	25.5 %	28.8 %	100.0 %
	% Within type of feeding	17.4 %	2.7 %	16.2 %	16.8 %
1 – 2 years	Count	98	276	129	503
	% Within age of child	19.5 %	54.9 %	25.6 %	100.0 %
	% Within type of feeding	48.8 %	62.7 %	47.6 %	55.2 %
Total	Count	201	440	271	912
	% Within age of child	22.0 %	48.2 %	29.7 %	100.0 %
	% Within type of feeding	100.0 %	100.0 %	100.0 %	100.0 %

$P < 0.01$
Pearson's Chi-square = 36.714

Mothers with children 4-6 months of age preferred both breast and bottle feeding 42.0%. Whereas mothers with children between the age of seven months and two years preferred bottle feeding. A large number of mothers with children between the age of 1 and 2 years were still practicing breast feeding (48.8%). Statistical test showed significant variations in the mothers' feeding practices according to the age of their children, P value ≤ 0.01 and Pearson's Chi-square = 36.714 (Table 7).

Multiple regression analysis (stepwise) identified the most significant factors affecting the mothers feeding practices as mother's education and marital status (Table 8). These two variables were significant (P value ≤ 0.01).

Table 8. The stepwise regression analysis model with the different variables

Model	t- test	P values
Constant	9.503	0.00*
Mothers' age	-0.0335	0.738
Mothers' education	3.561	0.00*
Region	-1.163	0.245
Mothers' marital status	4.334	0.00*
Mothers' occupation	1.177	0.239
Number of children	1.524	0.128

*Significant at $P \leq 0.01$

DISCUSSION

Out of the 1400 questionnaires distributed to the mothers only 912 were returned. Some of the mothers refused to participate for different reasons, some others did not return the questionnaires within the collecting data period.

The results of this study support the decline in breast feeding practices by Saudi mothers when compared with previous studies conducted in the country.^{14,19,21} In general nearly half (48.2%) of the mothers in this study used bottle formula, 29.7% used both bottle and breast feeding, while only 22% breast fed their children.

Previous studies showed no significant relationship between the duration of breast feeding and the mother's age.^{24,27} Other studies showed a positive correlation between the mothers' age and practice of breast feeding. The older mothers practiced breastfeeding more than younger mothers.^{19,21} However, results of this study showed that bottle feeding was more commonly used among Saudi mothers in all different age groups. It is important to highlight that breast feeding was the type of feeding used least among the three methods of infant feeding. Breast feeding was practiced more by mothers 20 years of age and mothers between 31-40 years than older mothers. This may be due to the enthusiasm of the young mothers to experience breast feeding. Another explanation could be that younger mothers have more time for their children than older mothers who most probably have other children and therefore have more responsibilities.

Mothers' education apparently has a significant effect on the mothers' feeding practices. The results in this study showed that the group of less educated mothers preferred breastfeeding over the other two options. This is in agreement with other studies^{19,24} that reported a negative correlation between the level of the mother's education and breast feeding. Furthermore, these authors reported that the illiteracy of the mothers was associated with longer breastfeeding duration.^{19, 24, 27} The highly educated mothers with University degree in this study preferred bottle feeding to the other

two methods. This could be explained by the desire of mothers who cherish acquiring higher education to keep pace with speedy development of technology and societal changes in Saudi Arabia, as previously mentioned.

The mother's region has a positive effect on the type of feeding. Results of this study showed that breast feeding was practiced least in the Central region and most in the Western region. However, bottle feeding was practiced by all the mothers from the five different regions more than the other two methods of feeding. Comparing the result of this study with other studies conducted around the Kingdom show significant variations. Each of the regions had a different preference on the type of feeding according to the life style and habits of that region.^{15,20,21,24,28,29} The differences between the different regions is predictable taking in consideration the size of the Kingdom and the effect of the bringing up of the mothers.

Mothers admitted that martial status and family support were factors that either encouraged or discouraged them from practicing breast feeding. This study's results show that married mothers practiced breast feeding more than widowed or divorced mothers as is normal. But in general, bottle feeding practices was the most common method of infant feeding among all groups of mothers. An interesting point here is that none of the previous studies conducted in the Kingdom or in the literature reviewed considered the possibility of a difference in feeding practices between widowed or divorced mothers and married mothers.

Results of this study showed that mothers' occupation had a significant effect on the mothers feeding practices. Breast feeding was reported more by housewives; as a result of the more time they spent with their children. However, bottle feeding was preferred among housewives as well as working mothers,

possibly explained by the mothers' lack of knowledge or interest. The results of this study did not agree with those of Madani who in 1994 reported no significant relationship between the duration of breast feeding and the mother's age or working status.²⁴

Bottle feeding was more commonly used by mothers in general. Results showed that mothers with more than 7 children preferred breast feeding more than mothers with less children. This could be explained by the probability that they may have learned from the value of breast feeding through experience, or due to the change in their economic status as a result of their growing families.

The results of this study also showed that a large number of the mothers (42.0%) preferred to introduce formula to their children at a younger age (4 to 6 months), a finding in agreement with the earlier results of other studies conducted in different parts of the Kingdom.^{14,19-}

²¹ It is interesting to find that 48.8% of mothers with children between the age of one and two years were still practicing breast feeding. Although breast feeding is encouraged for the mothers and child's health but every effort should be made to increase the mothers' awareness of early childhood caries as a result of prolonged nursing breast/ bottle.

It is recommended that every effort should be made to encourage and support breast feeding. At the same time awareness about the appropriate duration of nursing, the gradual weaning and the appropriate cleaning and brushing methods should be explained through media to target affected mothers. Educational health programs should emphasize that the nursing method is beneficial to the oral health of the children if appropriately used.

CONCLUSIONS

1. Bottle feeding was the most common method of infant feeding used by all the participating mothers.
2. Large number of mothers was practicing nursing for prolonged period of time.
3. The most significant variables affecting the mothers' feeding practices were their level of education and marital status.

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