

**BREASTFEEDING
KNOWLEDGE AND PRACTICES
IN JORDAN**

**A SUMMARY REPORT OF THE
RESULTS OF THE HEALTHCOM
BASELINE SURVEY
AUGUST-SEPTEMBER 1988**

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SUMMARY

A survey of 930 women in Jordan showed that, although a large majority of women (91 percent) breastfed their children at some time, they tended to stop breastfeeding when the child was relatively young. Breastfeeding declined steadily after children reached the age of four months. Ninety-two percent of ever breastfed children between the ages of one and four months were still breastfeeding. However, only 60 percent of children between five and eight months of age and 52 percent of children between nine and 12 months of age were still breastfeeding.

Breastfeeding Initiation

Our data show that there is room for improvement in breastfeeding initiation practices in Jordan. Although the majority of mothers reported initiating breastfeeding on the day of the birth (69 percent), only 41 percent initiated in the first six hours. Also, thirty-one percent of mothers who reported breastfeeding said they didn't initiate breastfeeding until after the first day after the birth.

Mothers who gave birth in private hospitals were less likely to initiate breastfeeding in the first six hours than those who gave birth at home or in a public hospital. This can be partly explained by a longer stay after birth in a private hospital compared to a public hospital. However, other differences between private and public hospitals also seem to be related to breastfeeding initiation.

Knowledge about breastfeeding initiation and colostrum was also related to initiation behavior. Mothers with more correct knowledge were significantly more likely to initiate within the first six hours than mothers with less knowledge. The relationship was significant for both rural and urban mothers, and for mothers at all levels of education, but not for mothers from wealthier families. Overall, controlling for other factors, knowledge about initiation and delivery of the child in a private hospital were the major factors related to initiation behavior.

In general, knowledge about colostrum and initiation was quite high -- 66 percent of the mothers correctly answered three or four questions about colostrum and breastfeeding on the day of delivery. However, there seems to be some confusion between colostrum and breastmilk, and whether colostrum or "first milk" is nutritious and important for the child.

The data suggest there is a need for an information program to improve mothers' knowledge about initiation. The data also indicate that improving knowledge could result in improved initiation

practices. In addition, the findings suggest that hospital practice is related to initiation behavior and that a program aimed at hospital personnel may also improve initiation behavior.

Breastfeeding Supplementation

Early supplementation (before four months) was common among mothers in our sample. Almost one-quarter of babies one month old were already receiving supplements, and 41 percent of two-month old babies and 59 percent of three-month old children were supplementing. When mothers were asked when they started giving other foods, 40 percent reported supplementing before four months.

Urban mothers, those from wealthier families, and mothers with college education were more likely to supplement before the child was four months old. In addition, among mothers with some college education, those who delivered their youngest child in a private hospital were more likely to give that child supplements early than those who delivered in a public hospital, although this difference was only significant at $p < .06$.

Questions measuring knowledge and beliefs about supplementation indicated that incorrect knowledge is an issue in Jordan. The majority of mothers (55 percent) believed that babies need food in addition to breastmilk in the first four months of life. Responses to other knowledge questions indicated that at least 30 percent of the women in the sample thought children should receive supplements earlier than is recommended.

Mothers with correct supplementation knowledge were more likely to correctly supplement at four months or later than those with incorrect knowledge (72 percent compared to 53 percent). The knowledge/behavior relationship was significant for both rural and urban women, but not for women with college education or those from wealthier families. This indicates that a communication program may only have an effect among women of lower socioeconomic status. More research is needed to better understand the factors influencing supplementation practices among urban women and those of higher socioeconomic status and the relationship between hospital practice and supplementation.

Overall, we found that there is a role for an information program on breastfeeding initiation and supplementation in Jordan. There seem to be two major audiences for communication efforts -- mothers and mothers-to-be, as well as health professionals who attend to women during and after childbirth.

BACKGROUND AND DESCRIPTION¹

Health Communication for Child Survival (HEALTHCOM) is a five-year communication program designed to assist developing countries promote the widespread use of effective child survival strategies. HEALTHCOM is sponsored by the Office of Health and the Office of Education within the Bureau for Science and Technology of the U.S. Agency for International Development and is administered by the Academy for Educational Development. The program will work in up to 17 countries, using a research and development approach to promote changes in behaviors that affect child health. The Center for International, Health, and Development Communication at the Annenberg School for Communication is responsible for summative evaluation in 15 countries and for providing assistance in formative evaluation when requested.

The HEALTHCOM project in Jordan has focused on two primary areas, effective breastfeeding and child spacing, under the umbrella theme of "The Health of the Mother and the Child." The overall program is under the patronage of Her Majesty the Queen and is located in the Noor al Hussein Foundation. Activities related to breastfeeding and child spacing began in early 1988.

This report presents the findings of the baseline survey on breastfeeding. Because the survey was designed as part of the evaluation of a communication program, the focus of this report will be on examining the evidence for the potential role of communication in changing knowledge and behavior related to breastfeeding initiation and supplementation.

¹ We would like to thank the individuals and organizations in Jordan who contributed to this survey and report. Dr. Sima Bahous, HEALTHCOM Project Director, helped determine the focus of the survey and provided input in developing the questions. Ms. Abeer Hamdan of the Noor al-Hussein Foundation provided invaluable logistic support before and during the data collection. Ms. Anne Roberts of the Academy for Educational Development gave useful input at all stages of the survey, including the final analysis. This activity would not have been possible without the technical and logistic support and assistance of the Noor al-Hussein Foundation and the USAID Mission in Jordan.

Description of the Breastfeeding Campaign

The original focus of the breastfeeding campaign in Jordan was to encourage the extension of nursing from the current ten-month average to 12-18 months. Previous research showed that, while the great majority of mothers value breast feeding and do breastfeed their children, they and medical personnel practice a number of incorrect behaviors. Two of these practices, delayed initiation of breastfeeding and early supplementation, may lead to early and unintended weaning and breastfeeding that offers neither protection from disease for the child nor protection from conception for the mother. Therefore, the breastfeeding campaign in Jordan focuses on immediate initiation of breast feeding (within the first six hours) and later supplementation of breast feeding (at 4-6 months).

The breastfeeding promotional activities under HEALTHCOM consist of two major components. Television and radio messages about breastfeeding initiation and supplementation have been developed and broadcast throughout Jordan. These messages discuss the benefits of breastfeeding, the importance of initiating breastfeeding in the first hours after childbirth, the importance of waiting until four months to supplement, care of the mother to help her breastfeed better, methods for increasing milk supply, and the necessity to breastfeed on demand.

A second component of the HEALTHCOM activity for breastfeeding addressed professionals. In October 1988, HEALTHCOM sponsored a "National Seminar on Breastfeeding Practices" for representatives from health care, communication, education, community and religious groups. Presentations were made about breastfeeding and a series of recommendations were developed by the group to promote modern and scientific breastfeeding practices in Jordan.

Description of the Evaluation

The primary component of the HEALTHCOM evaluation design is a before-after survey of approximately 1000 women of childbearing age. The baseline survey was carried out in August and September 1988, and was supplemented with in-depth interviews with a small sample of women from the same geographic areas. After the campaign, an equivalent sample of women will be interviewed using the same survey instrument.

The goal of the sampling procedure was to obtain a representative sample of women 35 years old or younger who currently had a child two years old or younger. This is the group for which messages about breastfeeding and child spacing will be most relevant.

The sampling was carried out with the assistance of the Jordanian Department of Statistics, which has developed a sampling frame based on the 1979 census. Fifty clusters were systematically chosen from the census lists, 35 urban clusters and 15 rural clusters (70 percent of the population in Jordan lives in urban areas and 30 percent in rural areas)². The urban clusters were selected to represent different socioeconomic groups and the rural clusters were chosen to represent villages of varying sizes.

We wanted a sample of twenty women 35 years and under with a child under two years old from each cluster. Examination of other statistics from Jordan indicated that one out of every three households tends to have a child under two. This suggested that, in order to find 20 households with young children, we would need to start with at least 60 households in a cluster. Therefore, within each cluster, the number of households was counted. If there were fewer than 50 households in a cluster, the cluster was expanded according to a predetermined set of rules. Groups of households were then assigned to each interviewer with the expectation that one out of every three would have an appropriate woman for the sample.

In all, 930 survey interviews were carried out in the 50 clusters chosen. The interviews covered knowledge, attitudes, and practices related to breastfeeding and child spacing, sources of information for breastfeeding and child spacing information, media use, and demographic characteristics. In addition, 33 in-depth interviews were carried out with women from the sample areas. These interviews discussed when and why mothers start supplementing breastfeeding, and social and other constraints to child spacing. The interviewers were female graduates of a two-year social work program. The team supervisors were female graduates of the communication program at Yarmouk University.

² The Hashemite Kingdom of Jordan Department of Statistics (1987). Statistical Yearbook. Amman, Jordan: Department of Statistics Press.

CHARACTERISTICS OF THE SAMPLE

Geographic Characteristics of the Sample

The sample reflects the national rural-urban distribution in Jordan, with 69 percent of the respondents from urban areas, and 31 percent from rural areas. The sample also resembles the national distribution of the population in terms of geographic location. The largest group of women in the sample were from the Amman Governorate (37 percent), followed by women in the northern governorates of Irbid (27 percent) and Zarqa (14 percent). Those remaining came from the northern governorates of Balqaa (7 percent) and Mafraq (4 percent), and the southern governorates of Karak (4 percent) and Ma'an (6 percent).³

Demographic Characteristics of the Sample

During the interviews, a number of questions were asked about the mother, her husband and her household to determine ages, marital and childbearing history, family size, and socioeconomic characteristics.

The age of the women in the sample ranged from 13 to 39 years old (see Table 1). The majority of the mothers were between 21 and 30 years old and the median age of the respondents was between 26 and 27 years. Two mothers had ages out of range (36 and 39 years) and were removed from the sample. Eight had no age data.

Most of the women in our sample had some education beyond the primary level. Twenty-two percent had never been to school at all, another 20 percent completed between one and six years, while the largest group of women (45 percent) had between seven and 12 years of education (see Table 2). Another 12 percent had between 13 and 26 years of school. The average number of years in school was approximately seven years, with a standard deviation of five years.

³ National figures show the following distribution according to governorate: Amman -42 percent, Zarqa -15 percent, Irbid -24 percent, Mafraq -4 percent, Balqaa -7 percent, Karak -6 percent, Tafila -2 percent, and Ma'an -4 percent. (The Hashemite Kingdom of Jordan Department of Statistics (1987). Statistical Yearbook. Amman, Jordan: Department of Statistics Press.)

Table 1
Ages of Women in the Sample

Age	Percent
20 years or less	9.5
21-25 years	34.1
26-30 years	31.8
31-35 years	24.6

(n=920)

We also asked each woman about her husband's age and education. The husbands of the women in our sample ranged in age from 16 to 88 years old. The median age of the husbands in this sample was between 31 and 32 years old. The average difference in age between husbands and their wives was seven years (ranging from one to 53 years).

Husbands had a slightly higher educational level than the respondents. Only 12 percent had no schooling at all, 18 percent had one to six years of schooling, while 50 percent had seven to 12 years, and one-fifth of the men had between 13 and 31 years of education (refer back to Table 2). The mean educational level for husbands was nine years, with a standard deviation of five years.

Table 2
Education of Respondents and their Husbands

Years of Education	Percent of Mothers	Percent of Husbands
0	22.3	11.9
1-6	20.4	17.7
7-12	45.3	50.9
13 or more	12.0	19.5
	(n=927)	(n=921)

Eight hundred and twenty-seven of the mothers were able to give us an estimate of monthly income for the household. In this group, monthly income ranged from 0 to 4000 dinars, with a median of approximately 120 dinars.⁴ Approximately 40 percent of the respondents claimed to have a monthly income of 100 dinars or less, 44 percent had between 101 and 300 dinars, and 16 percent had a monthly household income of 301 dinars or more.

An estimate of per capita income was derived by dividing total monthly income by the reported number of persons in the household. Table 3 shows the distribution of per capita monthly income, which ranged from 0 to 1334 dinars. More than half of the sample had a per capita income of less than 20 dinars a month; 20 percent reported 10 dinars or less per capita, and 34 percent reported between 11 and 20 dinars a month.

Table 3
Monthly Per Capita Income
in Households in the Sample

Per Capita Monthly Income (in Dinars)	Percent of Households
0 to 10	20.3
10.100 to 20	34.3
20.100 to 30	16.9
30.100 to 40	11.9
40.100 to 50	5.7
50.100 to 100	8.5
Over 100	2.4

(n=827)

Other indicators of relative wealth of the household were examined in addition to monthly income by asking the women if there were certain consumer items in their household. Most of the respondents had radios (86 percent), and even more had televisions (93 percent). A third of the respondents said they had a car, while a quarter of the households had telephones, and even fewer (16 percent) had videotape recorders.

⁴ At the time the interviews were carried out, one dinar was the equivalent of approximately \$3.00 U.S.

Use of Health Services

To measure use of health services, the mothers were asked where their youngest child was born and about their last visit to a doctor or clinic. Overall, we found high levels of use of both private and public health services.

Most of the women (60 percent) reported giving birth in a public hospital, while 18 percent went to a private hospital, and 21 percent gave birth at home. During their last birth, 43 percent of the mothers mentioned that a doctor was present during the delivery, and 54 percent said that a midwife was present (see Table 4). Other people present during the birth were the woman's husband, mother-in-law, mother, or other relative.

Table 4

People Present at Birth of Last Child

People Present	Percent of Mothers	Total n of Mothers*
Midwife	53.7	925
Doctor	43.3	927
Husband	23.7	924
Mother-in-law	22.7	927
Mother	17.0	924
Other relative	9.3	924
Other	13.8	923

* This question allowed mothers to give more than one answer. The total number of mothers used to determine the percentage varies slightly because of missing values.

Mothers were also asked when they had last visited a clinic, hospital or doctor about their youngest child or last pregnancy. Approximately one-fifth said they had not been to a health facility at all. The remaining mothers said they had been to a private doctor or hospital (29 percent), public hospital or government clinic (27 percent), or Maternal Child Health (MCH) care clinic (24 percent).

In general, the health facilities seem to be easily accessible to mothers. Mothers who had been to a health facility for their youngest child or last pregnancy were asked how far away that facility was. For these women, facilities were quite close: 35 percent said it was within 10 minutes, while another 54 percent said there was a facility between 11 and 30 minutes away. On average, the

facility was about 20 minutes from the woman's home (with a standard deviation of 16 minutes). Of the mothers who had been to a health facility, most (82 percent) believed that it was not difficult to get there. However, we don't know about the women who had not been to a clinic or doctor. Perhaps they had not been because there was no facility near them.

BREASTFEEDING PRACTICES AND KNOWLEDGE

Survey figures from Jordan have indicated a high level (93-95 percent) of breastfeeding overall, which suggests that convincing mothers to breastfeed is not a problem.⁵ However, these surveys and formative research carried out by HEALTHCOM in Jordan have suggested that there is incorrect knowledge about breastfeeding and incorrect practices, such as late initiation of breastfeeding and early supplementation. In the baseline survey we asked a series of questions on breastfeeding knowledge and practices overall, and particularly those related to initiation and supplementation.

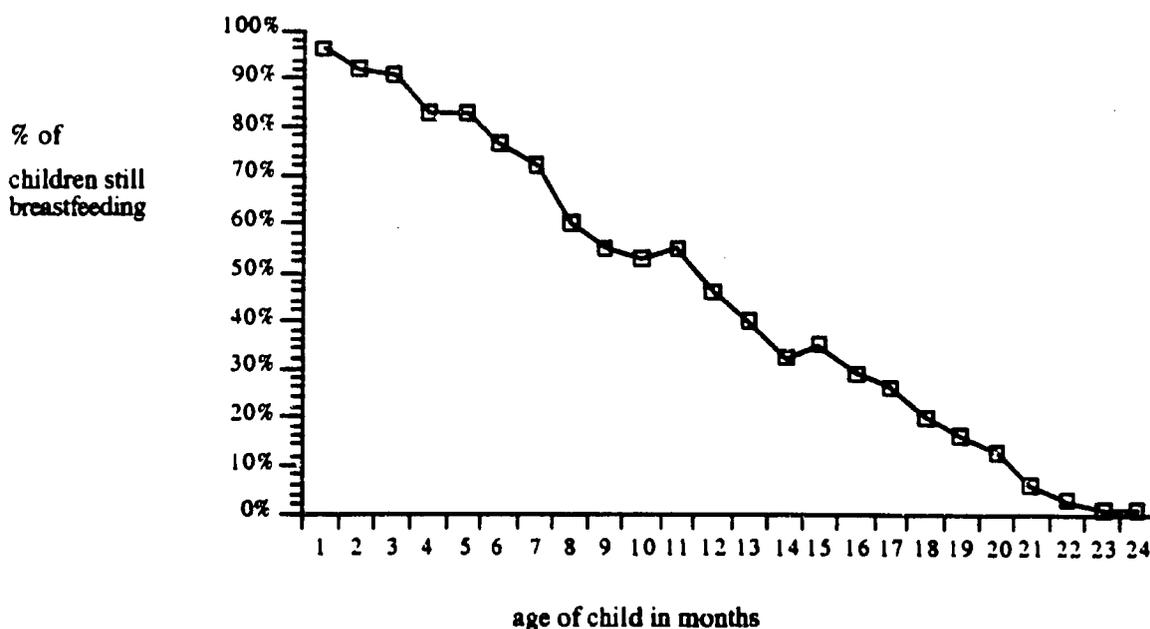
Most mothers in our sample (91 percent)⁶ said that they breastfed their youngest child. Half the sample was still breastfeeding a child at the time of the survey. This supports other findings that the overall level of breastfeeding in Jordan is very high.

However, we found that Jordanian mothers tend to stop breastfeeding their children relatively early. Figure 1 shows the percentage of children of different ages whose mothers said they were still breastfeeding. It is generally recommended that babies be breastfed for two years. In this figure we can see a steady decline in breastfeeding starting after the child reaches four months of age.

⁵ The Jordanian Child Study. (Amman: Ministry of Social Development, 1984) and Jordan Fertility and Family Health Survey 1983- Report of Principal Findings. (Amman: Department of Statistics and Atlanta, Georgia: Centers for Disease Control, 1984.)

⁶ This level is slightly lower than the 95 percent found in other studies in Jordan. We do not think this indicates that breastfeeding levels are decreasing in Jordan. The lower level of breastfeeding in this survey seems to be primarily due to two interviewers. When the figures from these interviewers are removed, the level of breastfeeding goes up to 96 percent.

Figure 1
Percent of children still breastfeeding at different ages



To summarize the data in Figure 1 over larger age groups, 92 percent of the children between 1 and 4 months were still breastfeeding. This dropped to 60 percent of the children between 5 and 8 months, and 52 percent of the children between 9 and 12 months. In children over one year old we continue to see a steep decline in breastfeeding, from 33 percent in children 13 to 16 months old, to 18 percent of children 17 to 20 months old, and 12 percent of children 21 to 24 months old. Although the great majority of mothers in our sample did breastfeed, many reported stopping breastfeeding their children early, and half no longer breastfed a child one year old or older.

Initiation of Breastfeeding

One of the goals of the HEALTHCOM project is to convince mothers to initiate breastfeeding immediately after the birth of the child to help establish correct breastfeeding and to give the child the benefits of colostrum. Earlier research in Jordan has suggested that the majority of mothers

wait one or two days after birth to start breastfeeding, primarily because they believe the milk doesn't come in until that time.⁷

Mothers in our sample who said they had breastfed or who were currently breastfeeding their youngest child were asked when they had initiated breastfeeding. We found that the majority (69 percent) of mothers who breastfed at all reported that they started breastfeeding on the day of birth. Forty-one percent initiated breastfeeding from one to six hours after birth (three percent starting in the first hour). Twenty-eight percent said they initiated breastfeeding seven to 24 hours after birth, and 31 percent waited until after the first day.

If we look at the entire sample (including mothers who didn't breastfeed at all), this indicates that only 63 percent of the women initiated breastfeeding on the first day. Out of all mothers, only three percent initiated breastfeeding "immediately" (here defined as in the first hour after birth) and 38 percent initiated breastfeeding from one to six hours after birth.

What factors are associated with timely initiation of breastfeeding among Jordanian mothers? We looked at two possible explanations -- medical practices and mothers' knowledge about initiation.

Initiation and Location of Child's Birth

We examined initiation of breastfeeding of the youngest child according to where the child was born. As can be seen in Table 5, mothers who gave birth to their youngest child in a private hospital were significantly less likely to initiate breastfeeding in the first six hours after the child's birth. Mothers who gave birth in a public hospital were the most likely to start breastfeeding in the first 24 hours.

Why were mothers who gave birth in private hospitals more likely than those who gave birth in public hospitals to initiate breastfeeding after six hours? It could be that hospital practices differ between private and public hospitals. We hypothesized that perhaps women stayed longer in private hospitals, and therefore were allowed to rest after delivery with someone else caring for the baby in the first day.

⁷ The Jordan Fertility and Family Health Survey, using interviews with a sample of women 15 to 49 years old, reported that only 31 percent of this sample initiated breastfeeding on the first day after birth.

Table 5
Number of Hours after Birth
that Breastfeeding Was Initiated
for Youngest Child by Location of Birth
(of Mothers Who Breastfed at All)

Number of Hours after Birth	Location of Birth			Total*
	Private Hospital	Public Hospital	At Home	
1-6	26.4	45.0	42.2	41.4
7-24	38.5	27.4	23.3	28.1
More than 24	35.1	27.6	34.4	30.5
	(n=148)	(n=499)	(n=180)	(n=845)

*The difference in initiation by location of birth is significant at $p < .05$.

When we examined this, we found that mothers who gave birth in private hospitals were more likely to leave after 24 hours and less likely to leave before 12 hours than women who delivered in public hospitals. Other analyses indicated that, although mothers with a longer hospital stay are more likely to initiate breastfeeding later than those with a shorter stay, length of stay in the hospital is not the only explanation for late initiation. Delivering in a public or private hospital continues to be associated with time of breastfeeding initiation over and above the influence of length of stay. More research is needed to better understand the influence of hospital practices in initiation of breastfeeding.

Initiation and Mother's Knowledge

Another possible explanation for late initiation of breastfeeding could be mothers' knowledge and attitudes about initiation and colostrum. When asked how soon after birth a baby should be breastfed⁸, approximately half the women (51 percent) said in the first six hours and the majority of the women (85 percent) said within the first 24 hours. It appears that most women do know that breastmilk should not be withheld until the second or third day after birth, but some women with correct knowledge do not follow it.

⁸ The question used was, "Some mothers start breastfeeding their babies in the first six hours after birth. Others start breastfeeding after that. In your opinion, what should be done?"

One hypothesis about late initiation was that mothers did not know about colostrum, did not know that it was available in the first milk, and thus did not know the value of breastmilk in the first day. Several questions were asked about the women's knowledge of colostrum. Almost all women (91 percent) said they had heard of colostrum, and 81 percent said that a mother has colostrum in her milk the first day of birth.

However, it seems that there is some confusion between colostrum and breastmilk, and whether colostrum or "first milk" is nutritious and important for the child. Overall, between 62 and 76 percent of the women in the sample correctly answered questions about breastfeeding on the day of birth. Seventy-six percent of the mothers said they believed that the milk in a mother's breast on the first day of a child's birth is nutritious for the child. When asked if they agreed or disagreed with the statement, "Breastmilk is not important for a child on its first day of birth," over one-third of the women either agreed (26 percent) or were not sure (8 percent). When asked to agree or disagree with, "A mother should avoid giving the milk that comes in on the first day," 28 percent agreed and 10 percent were not sure.

Examination of the in-depth interviews suggested that some women don't know that colostrum itself is the first day's milk. Instead, they believe that only the white milk is nutritious, and that this does not come in on the first day of birth, but one or two days later.

To examine mothers' knowledge of initiation and colostrum, we created a scale using the responses to the questions about the importance of breastmilk on the first day, whether a mother should avoid giving breastmilk on the first day, whether the first milk is nutritious, and if the first-day milk contains colostrum (see Table 6 for frequency distribution).⁹

We then compared breastfeeding initiation behavior between mothers according to their knowledge about initiation. We found that mothers with more correct knowledge about initiation were significantly more likely to have initiated breastfeeding in the first six hours than mothers with less knowledge (see Table 7). Approximately 30 percent of the women with two or fewer correct answers on the knowledge scale initiated breastfeeding in the first 6 hours, compared to 42 percent who had three correct answers, and 49 percent who answered all the questions correctly. Approximately half the mothers who answered none or only one of the initiation and colostrum

⁹ Factor analysis indicated that this scale was unidimensional and a reliability test produced an alpha of .60.

Table 6
Breastfeeding Initiation Knowledge Scores

Knowledge Score	Percent of Mothers
0	4.6
1	11.7
2	17.5
3	25.8
4	40.4
(n=915)	

questions said they had started breastfeeding more than 24 hours after the child's birth, a practice the HEALTHCOM program wants to reduce or eliminate.

While the relationship between knowledge and behavior is significant, we cannot specify causal direction. We do not know if correct knowledge led to early initiation, or whether mothers learned about correct initiation after initiating early. Thus, we cannot say with certainty that increasing knowledge about initiation through an information campaign will lead to changes in behavior. However, the findings hold sufficient promise to suggest that increasing such knowledge will be worthwhile.

Table 7
Time of Initiation of Breastfeeding for Youngest Child by Mother's Knowledge About Initiation and Colostrum*

Initiation (Hours after birth)	Knowledge Score				
	0	1	2	3	4
1-6 hours	30.8	28.1	30.9	41.8	49.0
7-24 hours	19.2	19.1	31.7	27.1	29.9
After 24 hours	50.0	52.8	37.4	31.1	21.1
	(n=26)	(n=89)	(n=139)	(n=225)	(n=351)

*Difference in initiation by knowledge is significant at $p < .005$.

We looked at the relationship between knowledge and behavior for different groups of women. Mothers with high breastfeeding initiation knowledge were significantly more likely to initiate breastfeeding early than mothers with low knowledge in both urban and rural areas, at different levels of education, and whether they gave birth in a private or public hospital or at home. In less wealthy families, mothers with high breastfeeding initiation knowledge were more likely to initiate early than mothers with lower knowledge. However, initiation knowledge and behavior were not significantly related in wealthier families.

Other analyses indicate that, controlling for the other factors discussed above, only knowledge about initiation and delivery in a private hospital were independent predictors of initiation behavior.¹⁰ Mothers with higher knowledge were more likely to initiate early, but mothers who delivered in a private hospital were less likely to initiate early.

These findings suggest that a program which increases knowledge about breastfeeding initiation and colostrum could have an impact on when a woman initiates breastfeeding. Providing correct information would benefit both rural and urban mothers, mothers who give birth in private hospitals, public hospitals or at home, and mothers at all socioeconomic levels.

The findings also suggest the need to address health professionals, particularly those in private hospitals. Although later initiation in private hospitals can be partially explained by the tendency for mothers to have a longer stay in a private hospital, other factors also seem to be at work.

Supplementation of Breastfeeding

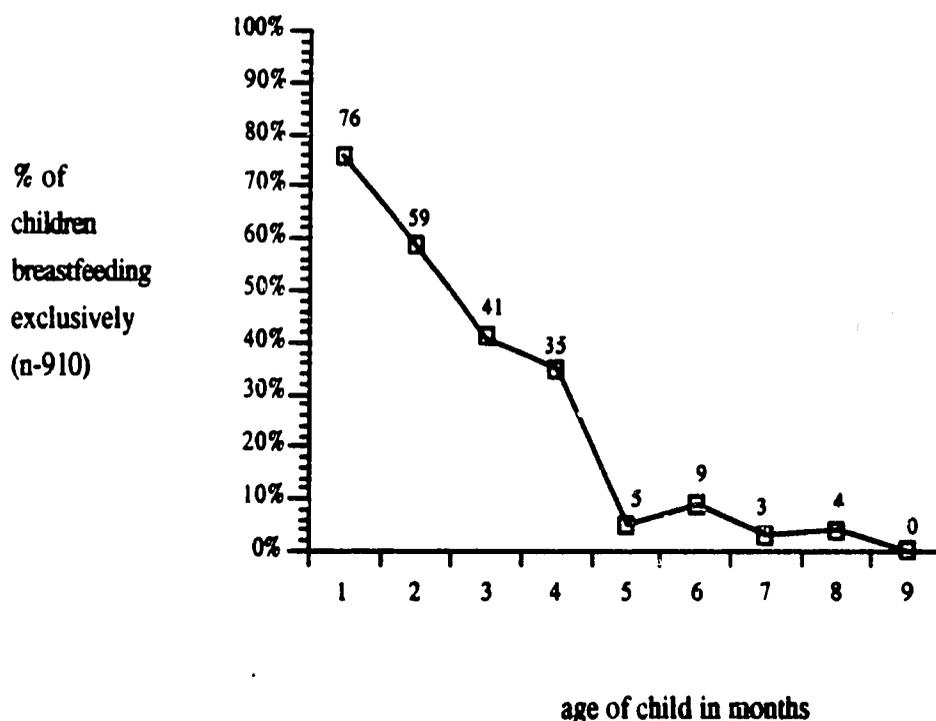
Medical professionals recommend that babies be breastfed exclusively for the first four months and that, for most babies, breastmilk is the best source of nutrition and the only one required during the early months. In addition, exclusive and frequent breastfeeding can protect the baby against diseases and can help prevent a new pregnancy.

¹⁰ Regression analyses were done using time of initiation as the dependent variable and initiation knowledge score, birth in a private hospital, birth at home, wealth, education, and rural/urban residence as independent variables.

We asked the mothers in our sample if they were currently giving their youngest child supplemental foods.¹¹ Figure 2 shows the percent of ever breastfed babies who were being given supplements at each month of age. The graph shows a pattern of early supplementation (children receiving foods other than breast milk before four months of age). Twenty-four percent of the children one month old, 41 percent of children two months old, and 59 percent of children three months old were already receiving other foods.¹² Overall, 40 percent of children one to three months of age were being given other foods. By five months of age, most children were being given foods other than breastmilk.

Figure 2

Percent of ever-breastfed babies who were breastfeeding exclusively
 -- at different ages --



¹¹ The questions was worded, "Are you regularly giving the child any other food besides breast milk, such as powdered milk, cereals, cooked rice, etc.?"

¹² Children who had already been weaned at each of these ages were considered to be receiving other foods.

In addition to examining the ages of children already supplementing, we asked mothers about the age at which they began giving other foods to their baby. Mothers' self reports show a similar trend of early supplementation of breastfeeding. Eighty-six percent of the women who breastfed their youngest child said they were currently giving their child foods in addition to breastmilk. Forty percent of these mothers said they started supplementing before the child was four months old. This measure of supplementation behavior, mother's report of the age of supplementation, will be used in the analyses reported in the following pages.¹³ Children who were not yet supplementing will not be included in the analyses.

When we examined supplementation behavior among different groups of women, we found that early supplementers were more likely to be urban, better educated, and from a wealthier family. Forty-three percent of urban mothers supplemented before four months, compared to 32 percent of rural mothers. Fifty-three percent of mothers with more than high school education supplemented early, compared to 41 percent of mothers with 1-12 years of education, and 31 percent of mothers with no formal education. Forty-eight percent of mothers in the highest wealth category supplemented early, compared to 41 percent in the middle category, and 36 percent in the lowest wealth group.

Possible explanations for these findings are that urban mothers and mothers of higher socioeconomic status may have more access to supplemental foods (particularly formula) and consequently may be more likely to use these foods instead of breastfeeding.

There may also be a certain amount of social pressure to be "modern," which might result in earlier use of formulas and cereals among urban, college-educated, and wealthier mothers.

Another explanation for early supplementation could be that urban and college-educated women are more likely to work outside the home and to be unable to breastfeed on demand. However, we found that only ten percent of our sample was working, thus this is not a likely explanation for early supplementation.

¹³ The mother's assessment of the age at which her youngest child started eating other foods was a clearer measure for the analyses than using the measure of percent of children supplementing in each age group. In the latter case, there were problems in categorizing children aged one or two months. If their mothers had started supplementing at these ages, we would consider their behavior as early supplementation. However, if they had not yet started supplementing, we couldn't necessarily assume that they would wait until the child was four months old to supplement. Thus, we would have had to remove children one to two months old from the analyses.

We also examined the possible role of the medical profession in supplementation behavior by looking at where the child was born. Urban women and women of higher socioeconomic status were more likely to give birth in a private hospital than rural women and women of lower socioeconomic status. Mothers who gave birth in a private hospital were significantly more likely to supplement early than mothers who gave birth elsewhere (51 percent of mothers who delivered in a private hospital supplemented early, compared to 38 percent who delivered in a public hospital and 40 percent who delivered at home). We then examined the relationship between supplementation behavior and medical facility for mothers with different levels of education.

The relationship between supplementation behavior and where the child was born was marginally significant (at $p < .06$) for mothers with college education.¹⁴ Sixty-seven percent of college-educated mothers who gave birth in a private hospital supplemented early, compared to 44 percent who gave birth in a public hospital. For mothers with 1-12 years of education, location of the birth made no difference in later supplementation behavior. We do not know if college-educated mothers were treated differently in private hospitals than mothers with less education, or if they had already decided to give supplements early. More research would be useful to help better understand the attitudes and behavior of urban women and those of higher socioeconomic status, and to understand the role of medical professionals in decisions about breast-feeding supplementation.

Supplementation and Knowledge

In the in-depth interviews, many of the mothers said they had started supplementing early because they or members of their family thought their breastmilk was not sufficient. Supplements were believed to lead to earlier development in the child or to make the baby fatter. To examine this further, we looked at the survey questions measuring mother's knowledge and attitudes about breastfeeding supplementation and about several other related practices.

The majority of mothers believed in early supplementation of breastfeeding. When we asked if a baby should be given foods in addition to breastmilk in its first four months, more than half (55 percent) thought that babies needed food in addition to breastmilk. Thirty-seven percent of the

¹⁴ The lack of significance is probably due to the small number of women in this educational category (81).

mothers said that breastmilk alone was enough, and eight percent answered that "it depends on the child or if there is enough milk."

We also asked mothers to agree or disagree with two statements about breastfeeding supplementation. Fifty-four percent of the mothers agreed that "a baby will be healthier if his mother starts giving him food in addition to breastmilk at two months." However, 70 percent of the mothers also agreed that breastmilk is all a child needs until it is four months old. This inconsistency is probably a function of mothers agreeing to statements to please the interviewers.

These figures suggest that between 46 and 70 percent of mothers actually had correct beliefs about when to start supplementation, and also indicates that at least 30 percent of the mothers thought children should receive supplemental foods earlier than is recommended. This is clearly an area in which mothers could benefit from correct information.

However, early supplementation may also be a strongly held belief, supported by other people important to the mother (her mother, her mother-in-law, her doctor). The in-depth interviews indicated that advice from older female relatives, friends and neighbors, and doctors is important in a woman's decision about when to supplement. In some cases these people had given the mother correct advice, but in others they had told the mother to supplement early.

We hypothesized that low levels of knowledge about supplementation would be related to early supplementation behavior. For these analyses we used as our measure of knowledge mothers' response to the question, "In the first four months of a baby's life, do you think the baby should be given breast milk only or other food in addition to breast milk?"¹⁵

Table 8 shows a significant and positive relationship between supplementation knowledge and behavior. Seventy-two percent of mothers with correct knowledge supplemented on time (at four months or later), compared to 53 percent of mothers with incorrect knowledge. Again, as with the initiation knowledge and behavior results, causal direction cannot be determined. However, the results do show a relationship between knowledge and behavior, suggesting that a program to increase correct knowledge about supplementation might also increase correct behavior.

¹⁵ As with initiation knowledge, we created a scale of supplementation knowledge using the responses to all supplementation questions, but found that the scale was not reliable. Therefore, each knowledge variable was examined alone. Overall, the individual knowledge variables showed similar relationships with supplementation behavior. To avoid repetition, we present the results from only one set of analyses here.

Table 8
Age of Supplementation by Knowledge
about Supplementation*

Age Started Supplementing	Incorrect Knowledge	Correct Knowledge	All Mothers
Less than 4 months	46.7	28.1	46.2
4 months or older	53.3	71.9	59.8
	n=508	n=274	n=782

*Difference in supplementation age is significant at $p < .0001$.

Further analysis indicated that the knowledge/behavior relationship was only significant for certain groups of women. For both urban and rural women, knowledge was significantly related to supplementation behavior. For women with no education or with less than college education, those with correct knowledge about supplementation were more likely to wait until the fourth month to supplement. However, among women with any college education, knowledge was not significantly related to behavior. Similarly, the association between knowledge and supplementation was significant only for mothers in the lowest wealth category. This suggests that increasing mothers' knowledge about supplementation through a communication program is not likely to have an effect for mothers of higher socioeconomic status. More research is needed to better understand the other factors associated with supplementation behavior, particularly among more educated and wealthier women.

Frequency of Breastfeeding

Focus group interviews on breastfeeding in Jordan suggested that one of the main reasons mothers give for stopping breastfeeding or for supplementing is that they don't have enough milk. They may be saying this because it is a socially acceptable response or because incorrect breastfeeding practices have actually reduced the amount of milk they produce. Therefore we asked several questions about frequency of breastfeeding and knowledge about increasing milk supply.

Women who were still breastfeeding a child after one month were asked if they fed the child when they felt he wanted to or according to a specific program.¹⁶ Most of these women said that they fed on demand (90 percent). However, when these mothers were asked if babies should be fed on demand or on a schedule, 25 percent said that babies should be fed on a schedule (compared to the 10 percent who said that they did feed on a schedule). Overall, 25 percent of all women said babies should be fed on a schedule.

Most women (78 percent) agreed that breastfeeding on demand helps keep milk from drying up.¹⁷ Again, this percentage may be overestimating mothers' knowledge and beliefs because some mothers may have agreed in order to be cooperative.

Overall, it seems that the women in the sample did breastfeed on demand, but fewer women were knowledgeable about the benefits of this practice. Breastfeeding on a fixed schedule may not be a big problem in Jordan.

Illness of a child may interrupt breastfeeding and contribute to drying up of milk. We asked if mothers stopped breastfeeding during cases of diarrhea. Of the mothers who were breastfeeding a child at the time of the survey (420), 36 percent said this child had had a case of diarrhea in the last month. Most of the mothers (94 percent) said they continued to breastfeed during that episode. Thus, diarrhea doesn't seem to be a likely contributor to mothers stopping breastfeeding.

One reason mothers who think their milk is not enough may start to supplement early is because they don't know that they can increase the milk in their breasts. Therefore, the women in the sample were asked if a mother could do something to increase her milk and, if yes, what. Fourteen percent of the mothers said their milk couldn't be increased or they didn't know. Of those who answered that a woman could do something, the most commonly suggested correct practices were eating more food (85 percent) and drinking more liquids (27 percent). Very few (7 percent) mentioned that breastfeeding more often would help a woman to increase her milk, which suggests that this is a topic on which women need more information.

¹⁶ Mothers were asked about breastfeeding after one month because it was felt that breastfeeding on a schedule would be unlikely to occur in the baby's first four weeks.

¹⁷ The question was phrased as the statement, "Breastfeeding whenever the child wants keeps breast milk from drying up."

However, when we asked mothers to agree or disagree with the statement, "A mother can increase the amount of breast milk she has in her breasts by breastfeeding more often," most women (83 percent) agreed. This large percentage may be due to mothers' attempts to please the interviewers, but may also indicate that a number of mothers know in the back of their minds that breastmilk can be increased through more frequent breastfeeding, but that they haven't put this into practice. This remains an area in which improvements could be made in women's knowledge.