PN-AB2-306
91901

AGENCY FOR INTERNATIONAL DEVELOPMENT
PPC/CDIE/DI REPORT PROCESSING FORM

ENTER INFORMATION ONLY IF NOT INCLUDED ON COVER OR TITLE PAGE OF DOCUMENT

1. Project/Subproject Number: 931-1018

2. Contract/Grant Number: DPE-5984-Z-00-9018-00

3. Publication Date: 1993

4. Document Title/Translated Title

The Impact of the HEALTHCOM Mass Media Campaign on Timely Initiation of Breastfeeding in Jordan

5. Author(s)

1. Judith McDivitt
2. Robert Hornik
3. Ayman Abulaban

6. Contributing Organization(s)

Academy for Educational Development (HEALTHCOM project)

7. Pagination: 15

8. Report Number:

9. Sponsoring A.I.D. Office: Bureau for R&D/Office of Health

10. Abstract (optional - 250 word limit)

11. Subject Keywords (optional)

1.
2.
3.
4.
5.
6.

12. Supplementary Notes

published in Studies in Family Planning, 1993, 24, vol. 5, 295-309

13. Submitting Official: Willard Shaw

14. Telephone Number: 202-884-8789

15. Today's Date: 4-17-95

DO NOT write below this line

16. DOCID

17. Document Disposition

DOCRD [] INV [] DUPLICATE []

AID 590-7 (10/88)

REPORTS

The Impact of the Healthcom Mass Media Campaign on Timely Initiation of Breastfeeding in Jordan

Judith A. McDivitt, Susan Zimicki, Robert Hornik, and Ayman Abulaban

Initiation of breastfeeding within several hours after a child's birth increases the likelihood of exclusive breastfeeding and longer duration of breastfeeding. However, common beliefs among mothers and health-care providers and routine hospital practices can constrain timely breastfeeding initiation. This article examines the impact of a mass media breastfeeding campaign in Jordan within the context of other activities occurring during and after the child's birth. The campaign had a positive impact on all mothers' knowledge, and on timely initiation of breastfeeding for home and public hospital deliveries, but not for those in private hospitals. The findings indicate that a communication campaign can bring about change in breastfeeding initiation behavior, but that providing mothers with information should be but one part of an integrated program to ensure that hospital and midwife policies and practices support timely initiation. (STUDIES IN FAMILY PLANNING 1993; 24, 5: 295–309)

In addition to the role breastfeeding plays in maintaining infant health and nutrition (Jelliffe and Jelliffe, 1978; Adlakha and Suchindran, 1985; Habicht et al., 1986), the practice also has a positive influence on child health through its contraceptive effect. Longer duration of breastfeeding, and of exclusive and intensive breastfeeding in particular, has been linked to longer postpartum amenorrhea and a longer subsequent birth interval (Gray et al., 1990; Guz and Hobcraft, 1991; Short, 1987), which in turn is associated with lower child mortality (Hobcraft et al., 1983).

In industrialized countries, early initiation of breastfeeding has been shown to predict both exclusive breastfeeding (Kurinj and Shiono, 1991) and more extended breastfeeding (Salariya et al., 1978; Wright and Walker, 1983; Hill, 1991). In these studies, early initiation is most frequently defined as from 10 minutes to six hours after birth, but even initiation within the first 16 hours after birth has been linked with longer duration of breastfeeding (Feinstein et al., 1986). Although research has not been carried out to demonstrate this link in developing countries, early initiation of breastfeeding is recognized as an important practice throughout the world for establishing and prolonging breastfeeding and for providing infants with the health benefits of colostrum (Gonzales, 1990; Matthai, 1983; Winikoff, 1988; United States Agency for International Development, 1990).

Delaying breastfeeding for two to three days and giving prelacteal feedings of sugar, honey, or fluids have been common practices throughout the world for centuries and continue today (Fildes, 1986; Morse et al., 1990). Late initiation has been attributed partially to mothers' beliefs that the mature or "real" milk does not appear for

Judith A. McDivitt, Ph.D. is Assistant Professor, School of Public Health and Tropical Medicine, Tulane University, New Orleans, LA 70112-2699. Susan Zimicki, M.Sc. is Research Director and Robert Hornik, Ph.D. is Professor and Director, Center for International Health and Development Communication, Annenberg School for Communication, University of Pennsylvania, Philadelphia. At the time of writing, Ayman Abulaban, M.D. was an independent consultant to the Noor al Hussein Foundation, Amman, Jordan.

2

several days after birth, and that colostrum has no nutritive value or is even detrimental (Bisharat and Zagha, 1986; Hakim and El-Ashmawy, 1992; Morse et al., 1990).

As more women in developing countries give birth in hospitals, attention has been focused on the role of hospital practices and policies in aiding or constraining successful breastfeeding. Mothers giving birth at home are more likely to breastfeed successfully than those using modern (especially private) medical facilities (Anderson et al., 1984; Potter et al., 1987; Shoham-Yakibovich et al., 1990). Such hospital practices as timing of mother/infant contact, rooming-in (the baby's staying in the room with its mother), routine use of prelacteal and supplemental feedings, and use of anesthesia and other drugs during delivery have been found to be strong determinants of when a mother begins nursing her newborn child, and also of exclusive and long-term breastfeeding (De Chateau and Winberg, 1978; Hull et al., 1990; Matthews, 1989; Reiff and Essock-Vitale, 1985; Winikoff et al., 1986). Correct information and support from health workers and hospital personnel are also important (Hardy et al., 1982; Hull et al., 1990; Shoham-Yakibovich et al., 1990; Winikoff et al., 1987).

A number of interventions to promote breastfeeding have been tried, either singly or in combination, including changing hospital practices and policies (particularly those related to rooming-in), passing legislation related to infant formula and maternity leave, and providing information and support to health-care providers and to breastfeeding mothers (see Jelliffe and Jelliffe, 1988). Education and support programs have focused primarily on training hospital staff and developing hospital- and community-based information and support groups for mothers, and some programs have also used the mass media to teach and motivate mothers. However, there have been few large-scale mass media breastfeeding campaigns and little systematic use of the mass media in larger breastfeeding promotion interventions (Green, 1989; Parlato, 1990). National breastfeeding promotion programs incorporating significant radio and television components in Brazil (Monteiro et al., 1987; Rea and Berquó, 1990), Jamaica (Berg, 1987), and Honduras (Foote et al., 1985) have attributed success in increasing the duration of breastfeeding to the mass media. However, in general, little is known about the potential impact of the mass media on breastfeeding.

This study examines the impact of a research-based intervention that primarily used the broadcast media to promote changes in breastfeeding behavior in Jordan. It examines specifically the role of mass communication in increasing timely initiation of breastfeeding within the context of other activities occurring during and after the child's birth.

Setting

In 1986, the Jordanian Ministry of Health and the United Nations Children's Fund (UNICEF) developed an initiative focusing on breastfeeding promotion. During the first years of this initiative, several projects used the mass media, print materials, or interpersonal channels to promote more effective breastfeeding. In 1988, ministry staff collaborated with UNICEF to develop and implement a mass media campaign on the benefits of breastfeeding. During the same year, two projects related to breastfeeding were initiated with the support of the United States Agency for International Development (USAID). One addressed health providers by assisting the ministry to redesign the primary health-care curriculum for government nursing schools, including that which related to breastfeeding, and to train members of the nursing school faculties in the new curriculum. The other project, the focus of this study, developed a public health communication campaign that addressed mothers directly.

The communication intervention was carried out by the Noor al Hussein Foundation, with technical assistance from the Communication for Child Survival (Healthcom) project. Healthcom was a five-year, USAID-supported program designed to assist developing countries in promoting the use of effective child-survival strategies. The program was implemented in 17 countries, using a research and development approach that incorporated methods from such disciplines as social marketing, behavioral analysis, and anthropology. Although the specific strategies varied from country to country, all Healthcom projects followed the same overall methodology that included preprogram research, systematic planning, extensive pretesting of strategies and materials, use of multiple channels, and monitoring and evaluation (see Rasmuson et al., 1988 and Clift, 1990).

In Jordan, from 1988 to 1990, Healthcom worked with the Noor al Hussein Foundation and the Ministry of Health to increase birth intervals by changing breastfeeding practices. Statistics available during the planning stages of the program showed that Jordan had the shortest birth interval of 27 countries covered by the World Fertility Surveys, and that birth intervals had not changed between 1976 and 1983 (Abdel-Aziz et al., 1986; Hobcraft and MacDonald, 1984). The stability of the birth interval was attributed to "modest levels of both contraceptive use and breastfeeding." (Abdel-Aziz et al., 1986: 204)

Although more than 90 percent of mothers in Jordan breastfeed their babies, the mean duration of breastfeeding was only 11 months in both 1976 and 1983 (Akin et al., 1986; Warren et al., 1990). In 1983, only 47 percent of infants aged three months or younger were reported to be exclusively breastfed, and only 31 percent of all

3

mothers initiated breastfeeding in the first 24 hours after giving birth (Jordan Department of Statistics, 1984). Preliminary research carried out by the Healthcom project evaluators found a similar pattern of delayed breastfeeding initiation and early supplementation (Abulaban et al., 1989). In-depth and focus-group interviews identified a number of factors that could constrain timely initiation: Mothers and health-care providers did not fully understand the function and value of colostrum, women reported delaying the initiation of breastfeeding because they were too tired, and birth attendants took the infant from its mother for a while and gave it glucose or sugar water until the mother had rested (Roberts and Seidel, 1993). In response to these findings, the project planners chose to focus the breastfeeding intervention on behavior that would increase initiation of breastfeeding within six hours of a baby's birth and delay supplementation until it was four months old, two practices that were expected to have a substantial impact on children's health and on breastfeeding duration and birth intervals.

Two major communication activities were developed and implemented: a two-day seminar on lactation management for health professionals and two intensive television and radio campaigns addressing women and their families. The October 1988 seminar, carried out jointly by the Noor al Hussein Foundation, Healthcom, and the Ministry of Health, was attended by 130 people in positions to influence breastfeeding policy, promotion, and practices. These included high-level health professionals (primarily representing the ministry or public health system, but also including representatives of the country's private hospitals and trained midwives),[1] and also representatives from communications, education, community, and religious groups. The seminar highlighted the importance of timely initiation and exclusive breastfeeding. It stressed the role that medical professionals play in providing support for timely initiation and delayed supplementation through their own attitudes and behavior and through hospital policies related to rooming-in, prelacteal and supplementary feeding, and bottle-feeding. At the end of the seminar, the participants made recommendations for legislation to support breastfeeding; educational programs for schoolchildren, women, and health-care providers; and changes in hospital policies and practices.

During the two mass media campaigns (broadcast from May 15 to July 15, 1989, and from mid-March through April, 1990), the government radio and television stations broadcast spots daily. Each day, two different television spots and three different radio spots were aired, selected from nine television and seven radio spots that had been developed. The messages consisted of dramas, testimonials, and advice from a fictitious female doctor, Dr. Huda, to encourage mothers to start breastfeeding as soon after the child's birth as possible. The most frequent message in the initiation spots was "initiate breastfeeding within the first hours after birth." The messages also detailed the benefits of timely initiation for the mother and the baby, and stressed the importance and benefits of colostrum. Messages about breastfeeding supplementation stressed that breast milk is all that a child needs for his or her first four months of life. They also provided advice on managing common breastfeeding problems (for example, insufficient milk and breast pain). The link between breastfeeding and birth spacing was not mentioned specifically in the messages broadcast during the period studied.[2]

Methodology

Two surveys were carried out, one in August and September 1988 (before the seminar and media campaigns) and the second in July and August 1990 (after the campaigns). Mothers of children aged two years and younger were interviewed in Arabic by trained female interviewers using a questionnaire that covered knowledge, attitudes, and practices related to breastfeeding and child spacing; sources used by women to obtain information on child care; media use; and demographic characteristics. The questionnaire used in the 1990 survey was essentially the same as that used in the baseline, with the addition of questions measuring exposure to the communication campaign and more detailed questions on events occurring around the time of the child's birth (for example, use of anesthesia and feeding before breastfeeding).

Sampling was carried out with the assistance of the Jordanian Department of Statistics, using a sampling frame based on the 1979 National Housing and Population Census. First, a systematic random sample of 50 census blocks, 35 urban and 15 rural, was selected. Because of financial and time constraints, all interviews in a block had to be completed in a day, and it was not possible to interview a strictly random sample of households in each block. Instead, a quota sample of households was selected, with each interviewer assigned a group of households and a starting point on the edge of her group. A woman was eligible to be interviewed if she was 35 years old or younger and currently had a child aged two years or younger. Although the resulting sample is not strictly representative of all mothers of young children, it does represent those for whom a campaign about both selected topics, breastfeeding and child spacing, would be most relevant.

In all, 930 interviews were carried out in the baseline survey and 966 in the follow-up. For this study, the sub-

set of women who could have responded to the communication activities was chosen. For the 1990 survey, this subset consisted of women with a child born after the breastfeeding seminar (20 months old or younger at the time of the second interview). The two data sets were made comparable by selecting mothers with children 20 months and younger from both surveys, resulting in samples of 800 mothers in 1988 and 777 in 1990.

Although the sampling procedures used in 1988 and 1990 were expected to be identical, a significantly greater proportion of the women interviewed in 1990 were from urban areas (specifically from the Amman governorate), were of higher socioeconomic status, and were more likely to have given birth in a private hospital than those in 1988 (see Table 1). As these differences seemed to reflect sampling biases rather than real demographic changes in Jordan during the two years between the surveys, the samples were weighted, using the weighting procedure of the Statistical Package for the Social Sciences to match distributions on residence, mother's education, and household economic status. Although we did not weight specifically by site of last birth, the weighting procedure did eliminate the difference in this variable between the two samples. After weighting, the only demographic characteristic that differed between the 1988 and 1990 samples was age of the mother: Mothers in the 1990 sample were slightly older (with a mean of 27.2 years) than were those in the 1988 sample (with a mean of 26.6 years; difference significant at $p<.05$).

Measures

Timing of breastfeeding initiation was determined by asking the mothers about their youngest child. The series of questions included, in order: (1) whether the mother had ever breastfed the child, (2) whether she started breastfeeding on the first day after the child was born and, if so, (3) how many hours after delivery she started breastfeeding. The responses resulted in a measure of time of breastfeeding initiation ranging from within one hour of birth to 24 hours or more, with mothers who never breastfed being eliminated from the analyses. Because the goal of the ministry and project staff was to increase initiation within six hours after birth, this variable was classified into two categories: timely initiation (mother reported initiating within six hours) and late initiation (after six hours).

Table 1 Demographic characteristics of mothers with children aged 20 months and younger before and after the Healthcom activities on breastfeeding, before weighting, Jordan, 1988 and 1990

Characteristics	1988	1990
Urban resident (%)*	69.9	73.5
Amman governorate resident (%)***	32.8	46.5
Family owns one or more: videocassette recorder (VCR), telephone, car (%)**	44.6	51.2
Mean years of education***	7.3	8.5
Mean age (years)	26.7	27.1
Mean parity	4.1	3.9
Mean age of youngest (index) child (months)	9.7	9.8
Youngest child male (%)	56.1	54.2
Youngest child born in:***		
Private hospital (%)	18.0	29.6
Public hospital (%)	60.9	53.4
Home (%)	21.1	17.0
(N)	(800)	(777)

*Differences between 1988 and 1990 samples significant at $p<.05$.
**Differences between 1988 and 1990 samples significant at $p<.01$.
***Differences between 1988 and 1990 samples significant at $p<.0001$.

Supplementation of breastfeeding was measured by asking each mother who had breastfed whether her infant was still breastfeeding and, if so, whether she was regularly giving the child any other food besides breast milk, such as powdered milk, cereals, or cooked rice. Infants up to four months of age who were not receiving supplements regularly were so categorized, whereas those in this age group who were being given supplemental foods were considered as being given supplements earlier than is recommended.

In a later part of the interview, the mothers were asked questions to measure their knowledge about breastfeeding initiation. Those who said breastfeeding should start from immediately to six hours after birth were coded as having correct knowledge about when a child should start breastfeeding; all others (those reporting other times, those who said that when they began breastfeeding depended on the doctor or the hospital, and those who did not know) were coded as having incorrect knowledge.

A second measure of knowledge was designed as a scale incorporating the responses to questions about having heard of colostrum and agreeing that breast milk contains colostrum on the first day after delivery, disagreeing that breast milk is not important on the first day of birth, disagreeing that a mother should avoid giving "first-day" milk, and agreeing that the milk in a mother's breast on the day of birth is nutritious for the child. The scale was unidimensional and reliable (Cronbach's alpha=.63). The two measures of knowledge were significantly correlated at $r=.19$ ($p<.0001$).

Exposure to the breastfeeding program was measured in three ways. A general measure of mass media exposure was developed from questions asking mothers how many times a week they listened to Jordan Radio or watched Jordan TV. Mothers listening or watching two or more days a week were coded as being exposed to that channel, while those listening or watching one day a week or not at all were coded as not being exposed to that channel. Respondents were then categorized according to the number of channels to which they were exposed: neither Radio Jordan nor Jordan TV, one of the two channels, or both.

Exposure to the campaign messages was measured more specifically by a scale comprising responses to five questions in the 1990 survey about (1) hearing any messages on Radio Jordan in which a female doctor talked about breastfeeding, (2) recognizing the name of the doctor in the messages, (3) seeing short messages on Jordan TV about breastfeeding, (4) recognizing the song played in all the spots, and (5) being able to describe the picture that accompanied the song in the television messages. The resulting scale was reliable (Cronbach's alpha=.67). Although factor analysis identified two factors, one reflecting television exposure and the other radio exposure, the scale was used as a single measure because we were interested in overall mass media exposure, not exposure to one channel or the other.

A third measure of program exposure grouped mothers into three categories: (1) baseline—those giving birth before the start of the program's activities, (2) seminar only—those giving birth after the seminar but before the mass media campaign, and (3) seminar plus media—those giving birth after the start of the mass media campaign in mid-May 1989.

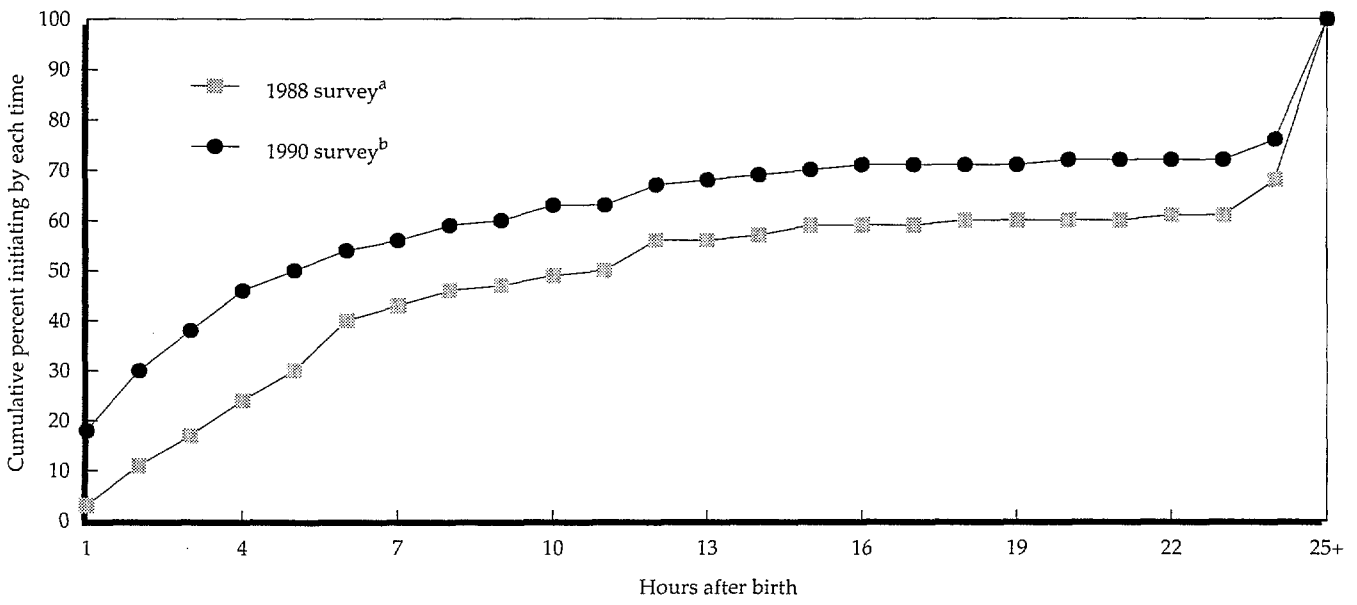
Results

Three behavioral outcomes were measured: change in whether the mother breastfed or not, change in early supplementation, and change in timely initiation. Between the 1988 and 1990 surveys, reported initiation of breastfeeding increased significantly, from 90.5 percent to 97.2 percent (Chi-square significant at p<.0001). This increase may have been either the result of pre-existing trends or a side effect of the campaign, but it was not the main objective of the campaign. There was no significant decrease during the campaign in early (before four months) supplementation of breastfeeding. Among breastfeeding children aged three months and younger at the time of the interview (those who should be receiving only breast milk), 58 percent were not receiving regular supplements in 1988, compared to 60 percent in 1990.

Among mothers who breastfed at all (the group used for most of the following analyses), timely initiation increased significantly between 1988 and 1990, from 40 percent to 54 percent. Figure 1 shows a shift toward earlier initiation of breastfeeding between the 1988 and 1990 surveys (difference significant at p<.001 using the Kolmogorov-Smirnov 2-sample test). The increase in immediate initiation was particularly dramatic. For mothers of children born after the start of the program's activities, 18 percent reported initiating breastfeeding within one hour after the birth, compared to 3 percent who had done so before.

Knowledge about breastfeeding initiation increased substantially. Knowledge that a mother should initiate breastfeeding within six hours of her baby's birth increased from 51 percent to 75 percent (Chi-square significant at p<.0001). Mothers' correct responses to all four questions used in the colostrum/first-milk scale increased from 40 percent to 72 percent (Chi-square significant at p<.0001).

Figure 1 Timing of breastfeeding initiation in Jordan of children aged 20 months or younger, according to 1988 and 1990 surveys



[a] N=716.
[b] N=750.

Exposure to the two channels used in the breastfeeding intervention was extensive in both 1988 and 1990. Only 5 percent of mothers in either survey had exposure to neither channel, and 72 percent of mothers in 1988 and 73 percent in 1990 were exposed to both channels at least twice a week (the difference between 1988 and 1990 was not statistically significant). In light of this response, it is not surprising that exposure to the campaign messages was very high: 85 percent of respondents in the 1990 sample had scores of 3–5 on the campaign-exposure scale, out of a possible 5.

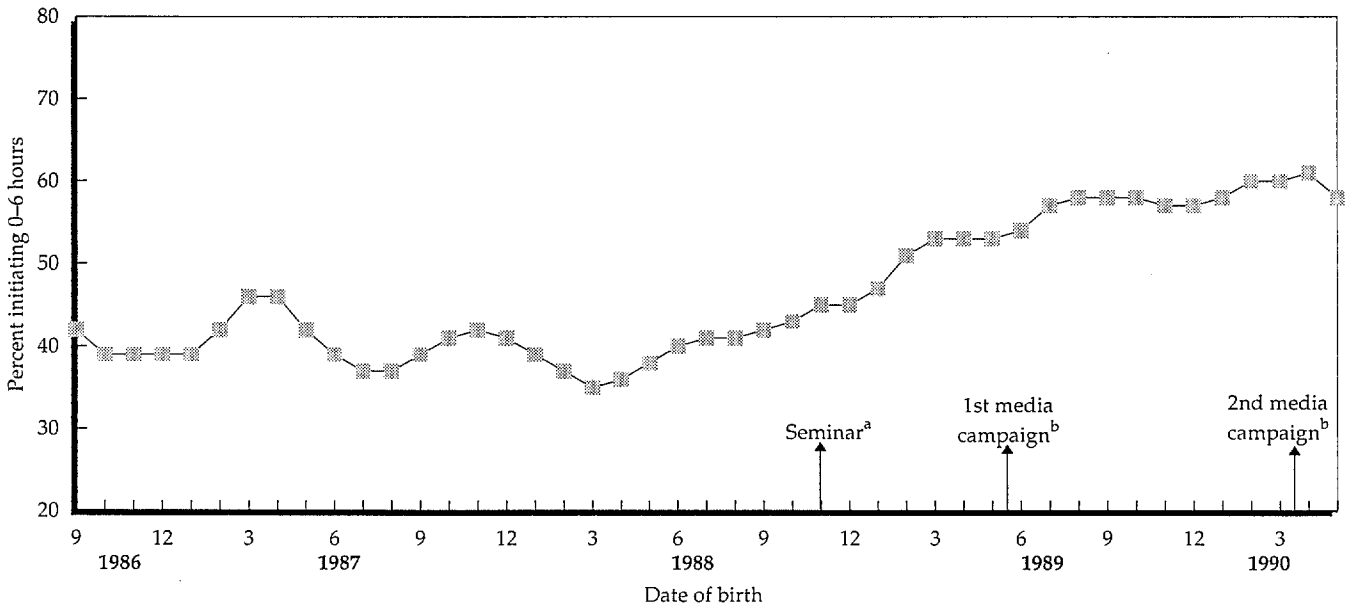
In 1990, campaign exposure showed a low but significant correlation with the knowledge scale (partial correlation was .12, $p<.005$), even after controlling for demographic characteristics (age and education of the mother, parity, urban or rural residence, relative wealth, and site of the youngest child's birth). Exposure was not significantly related to knowing that breastfeeding should start within six hours of birth. The low correlation between campaign exposure and the knowledge scale and the lack of association of exposure with knowing when to start breastfeeding may both be due in part to the lack of variance in all these variables. After the campaign, knowledge levels were high, and campaign exposure was very high. Even the few mothers with a score of 1 or 2 on the campaign exposure scale recognized specific parts of the mass media messages.

These findings suggested that the intervention had had an impact on timely initiation of breastfeeding. However, because of the length of time between the two surveys, the use of independent samples, and the lack of a control group, a number of alternative explanations had to be considered.

Because the two surveys were conducted almost two years apart, timely initiation may already have been on the rise and the increase seen in 1990 may have been part of an ongoing secular trend toward earlier initiation. The percentage of mothers initiating within six hours was plotted over time (month of the child's birth) using the Tukey smooth 53R'HH method (Hartwig and Dearing, 1979). As seen in Figure 2, before the start of the breastfeeding seminar in late October 1988, timely initiation fluctuated, rising and falling around a mean of 40 to 45 percent. Initiation within six hours had started climbing even before the seminar. However, timely initiation levels did not fall again, as would have been expected given the previous pattern. After the seminar, timely initiation continued to climb steadily for more than eight months, leveling off at a mean of 60 percent after the first mass media campaign. The apparent decrease in timely initiation in May 1990 may be an artifact of the smoothing process,[3] or may reflect another of the frequent fluctuations seen throughout the figure.

The sharp increase in timely initiation after the breastfeeding seminar was unexpected. The seminar was a relatively minor component of a much larger mass media program. Although the seminar received extensive coverage in the broadcast and print media, it could hardly have produced such a large change in individual mothers' behavior, unless those attending the seminar

Figure 2 Mothers' initiation of breastfeeding within six hours of infant's birth, by date of birth, Jordan, 1986–90



[a] Seminar (17–18 October 1988).
[b] First media campaign started (5/15/89).
[c] Second media campaign started (3/15/90).

instituted almost immediate changes in hospital policies or practices. No evidence exists in project records or from reports of Ministry of Health staff that such changes took place just after the seminar, although more gradual changes in public hospital practices occurred throughout the time that the project was active.

Given the intensity of the media campaign, we expected to see the greatest change in timely initiation after the start of the broadcasts. Instead, the results raise the question as to whether the campaign had any impact on behavior, or whether the change in timely initiation starting after the seminar began a linear trend upward.

To examine whether the mass media campaign made an independent contribution to the increase, logistic regression analyses were carried out predicting timely initiation and incorporating demographic characteristics associated with media exposure in this sample[4] and with breastfeeding practices in studies in Jordan and in other developing countries. These analyses provide further evidence that changes in initiation practices resulted from the intervention and particularly from the media campaign. The first model in Table 2 controls for demographic predictors of breastfeeding initiation: urban residence, a scale of relative wealth, mother's education, age, parity, and sex and site of birth of the infant. It then adds measures of program exposure: whether the youngest child was born after the health-professional seminar (seminar only), whether the child was born after the start of the mass media campaign (seminar plus media), and whether the mother was exposed to the channels used in the campaign (media exposure). The media-exposure variable was used instead of the more specific campaign-exposure variable, because the latter was measured only in the 1990 survey. Among mothers interviewed in 1990, campaign exposure was significantly correlated with the more general mass media-exposure variable (r=.64, p<.0001), indicating that media exposure was an acceptable substitute for campaign exposure.

Table 2 Logistic regression showing odds ratios for initiating breastfeeding within six hours, by demographic characteristics and mother's exposure to program, Jordan, 1988–90

	Odds ratio	
Characteristics[a]	Model 1[b]	Model 2[c]
Urban resident	.67**	.66**
Family owns one or more: VCR, telephone, car (none)	1.09	1.08
Education = 10 or more years	1.02	1.02
Age = 26–35 years (15–25)	.77	.77
Parity = 2+ (1)	1.62**	1.64**
Index child = female	.98	.97
Birth in private hospital	.26**	.26**
Birth in public hospital	1.01	1.02
Exposure to media channels	1.29	1.02
Seminar only	1.66**	1.64**
Seminar and media	2.28**	1.41
Interaction: media exposure with seminar and media campaign	na	1.93*
(N)	(1,419)	(1,419)

na = not applicable.
*Significant at p<.05. **Significant at p<.005.
[a]The reference categories are shown in parentheses. [b]Model 1 uses control variables and measures of exposure. [c]Model 2 adds interaction between media exposure and seminar/mass media campaign.

The adjusted odds ratios for having given birth after the seminar and for having given birth after both the seminar and the launch of the media campaign are both statistically significant, with the latter substantially larger. Media exposure did not add significantly to the prediction of timely initiation over and above these other measures.

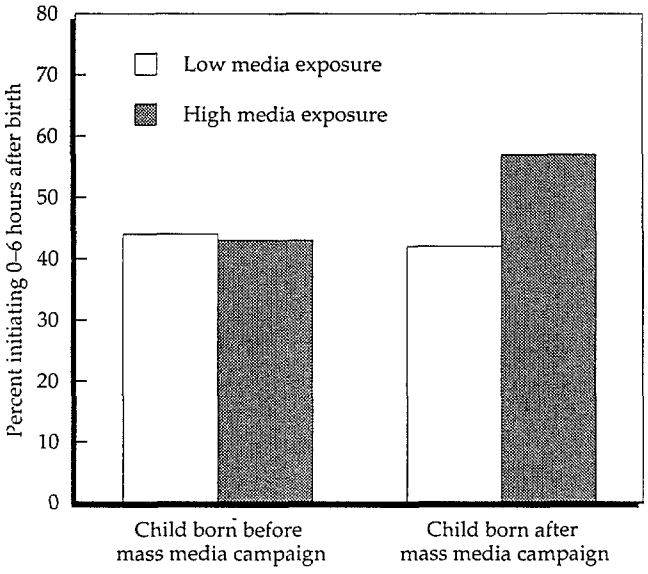
The second model in Table 2 specifically incorporates the effects of media exposure after the start of the mass media campaign by adding the interaction between media exposure and seminar plus media. This interaction term significantly predicted timely initiation, and adding it to the model reduced the odds ratio of seminar plus media to nonsignificance. Women with high media exposure were significantly more likely to initiate breastfeeding within six hours only if they gave birth after the start of the mass media campaign. Before the start of the media campaign, breastfeeding within six hours was initiated by approximately 45 percent of mothers, regardless of whether they had low or high media exposure (see Figure 3). After the start of the television and radio messages, 42 percent of mothers with low media exposure initiated breastfeeding within six hours, compared with 57 percent of those with high media exposure.

Site of Birth and Timely Initiation

Changes in timely initiation practices differed substantially according to where the child was born. The increase in initiation of breastfeeding within six hours occurred only among mothers who gave birth in a public hospital or at home, as shown in Table 3. Mothers giving birth in private hospitals showed significantly lower rates of timely initiation before the communication program and no significant improvement after it ended, despite large increases in knowledge about breastfeeding and high exposure to the channels used and to the mass media campaign itself. The campaign had a significant impact on change in initiation only for mothers who gave birth at home and in public hospitals (see Table 4). Other factors, particularly hospital policies and practices, seemed to limit mothers' putting their knowledge to use in private hospitals.

As Table 5 shows, logistic regression analyses of the 1990 data indicate that most of the hospital or midwife practices found to be associated with appropriate breastfeeding in other studies showed the same associations with timely initiation in Jordan. After controlling for the demographic characteristics used in previous analyses

Figure 3 Change in mothers' timely initiation of breastfeeding, by media exposure, controlling for demographic characteristics, Jordan, retrospective surveys conducted in 1988 and 1990



and for each of the other practices, significant predictors were rooming-in, delivery without use of anesthesia, withholding of supplementary feedings during the baby's first three days, the mother's being advised by hospital personnel or midwives to initiate breastfeeding immediately or within several hours after birth, and her giving birth during the day or early evening. An unexpected finding was that the mother's having been given formula to take home, used here as an indicator of hospital policy toward breastfeeding, was a strong positive predictor of timely initiation. The interaction of this variable with other hospital or midwife practices seems to be the basis of this association. When this variable was entered into the regression model alone (after controlling for the demographic characteristics, but not other practices), the odds ratio was .91 and was not statistically significant. When similar analyses were carried out for each of the other practices, all those identified as significant predictors in Table 5 were also significant predictors when they were entered alone (not shown).

As Table 6 shows, practices surrounding delivery, as well as breastfeeding policies and practices, differed significantly according to the type of hospital involved. Private hospitals were significantly more likely than public hospitals to have used anesthesia, to have kept the baby in a nursery, and to have given the infant liquid other than breast milk. Perhaps most important, the majority of mothers in private hospitals did not hold their babies within the first six hours after birth.

The substantial change in timely initiation for public hospital births suggests that a change occurred not only in mothers' knowledge, but in hospital practices as well. A comparison of mothers' reports of what happened during and after the delivery for births occurring before and after the mass media campaign suggests that there may have been a change in public hospital policies related to use of glucose water and formula.[5] Mothers' reports of supplementary feeding in the first three days after birth decreased from 69 percent for the seminar-only group to 57 percent for the seminar-plus-media group (Chi-square significant at $p<.05$). This decrease is supported by a tendency toward a decrease in prelacteal feeding, from 40.2 percent to 30.3 percent ($p<.08$). Mothers' reports of specific practices occurring in private hospitals showed no changes (as expected). We also saw no change for the public hospital practices of rooming-in, timely mother-infant contact, or use of anesthesia.

Mothers in the 1990 sample who gave birth at home did so in a context supportive of timely initiation of

Table 3 Percentage of mothers with correct breastfeeding initiation behavior and knowledge before (1988) and after (1990) the Healthcom campaign, and percentage exposed to the campaign, by site of the child's birth, Jordan

	Private hospital		Public hospital		Home		Total	
Mothers' behavior and knowledge[a]	**1988**	**1990**	**1988**	**1990**	**1988**	**1990**	**1988**	**1990**
Initiated breastfeeding within six hours[b]	25.3	23.4	43.8	65.3	41.9	65.0	39.9	54.3
(N)	(149)	(192)	(421)	(414)	(134)	(137)	(716)	(750)
Said babies should start breastfeeding in the first six hours after birth	47.9	64.9	54.1	79.5	47.9	78.8	51.2	75.4
(N)	(169)	(202)	(459)	(427)	(146)	(141)	(786)	(777)
Knew about colostrum and first-day breastfeeding[c]	44.4	74.3	41.5	70.8	29.8	72.8	39.9	71.9
(N)	(174)	(197)	(458)	(421)	(143)	(137)	(787)	(761)
Exposed to both channels used in campaign[d]	72.4	78.7	75.0	73.1	62.2	66.6	72.0	73.4
(N)	(175)	(202)	(463)	(427)	(149)	(141)	(800)	(777)
Mean score on five-point radio and TV exposure scale[e]	na	3.95	na	3.73	na	3.50	na	3.75
(N)		(201)		(419)		(141)		(760)

na = data not available.

[a]All differences in knowledge and behavior between 1988 and 1990 were significant at $p<.05$, except for behavior in private hospitals. [b]Data apply only to mothers who breastfed. [c]These mothers knew all four items on the scale of knowledge for this subject. [d]Differences between 1988 and 1990 were not statistically significant. Differences in media exposure between sites were significant at $p<.05$ in 1988 and in 1990. [e]Differences in campaign exposure score between sites were significant at $p<.05$.

9

Table 4 Logistic regression showing odds ratios of mothers initiating breastfeeding within six hours of delivery, by exposure to the program, according to the site of the child's birth, Jordan, 1988–90

	Where index child was born[a]		
Exposure	Private hospital (N = 327)	Public hospital (N = 804)	Home (N = 207)
Exposure to media channels	2.24	.86	1.05
Seminar only	1.00	1.60*	2.79**
Seminar plus media	1.89	1.46	1.20
Interaction: media exposure with seminar plus media campaign	.52	2.47*	3.27*

*Significant at p<.05. **Significant at p<.01.
[a]Odds ratios from logistic regression analyses, after controlling for mother's age and education, parity (for first-time and experienced mothers), residence (rural and urban), ownership of household items, sex of child, site of birth, and other program exposure variables in the equation.

breastfeeding: All newborns stayed in their mother's room, 81 percent of mothers held their babies within six hours, and no anesthesia was used during the births. Because these are common characteristics of home births throughout the world (Mandl, 1988; Winikoff, 1988), it is unlikely that the increase in timely initiation in home births occurred because of a change in these practices. Instead, mothers who gave birth at home seem to have had the opportunity to respond positively to their high exposure to the mass media campaign and to their new knowledge about breastfeeding initiation.

Other Predictors of Timely Initiation

The regression analyses also indicate that urban mothers and those initiating breastfeeding with a first child were less likely to start breastfeeding within six hours than were rural mothers and experienced mothers, who already had at least one child. The question then arose as to whether the different subgroups of women showed different rates of change during the program. All mothers had high media and campaign exposure and showed large and significant increases in the colostrum/first-milk knowledge scale and also in knowledge of when breastfeeding should be initiated, regardless of their area of residence or parity.

Table 5 Logistic regression showing odds ratios for the influence of different events occurring around the time of birth on breastfeeding initiation within six hours of birth, controlling for demographic characteristics, Jordan, 1990

Events	Odds ratio
Mother had medical problem during birth	1.01
Mother tired after birth	.91
Child had medical problems during or after birth	1.01
No anesthesia used during delivery[a]	2.62**
Child born between 6 AM and 8 PM	1.75**
Child stayed in mother's room	3.87**
Doctor, nurse, or midwife told mother to breastfeed within a few hours after birth	2.06**
No supplementary feedings given to child during first three days	2.22**
Mother given formula to take home[a]	2.90*
(N)	(654)

*Significant at p<.05. **Significant at p<.01.
[a]Mothers who gave birth at home were not asked these questions. For these two variables, these mothers were coded as receiving no anesthesia and as not having been given formula to take home.

Table 6 Percentage of events occurring at the time of birth, by where the child was born, Jordan, 1990

	Site of child's birth		
Events	Home	Private hospital	Public hospital
Anesthesia used during birth**	na	35.8	8.3
Mother had medical problem during birth	15.9	21.8	17.3
Mother tired after birth	55.5	66.3	59.3
Child had medical problems during or after birth*	4.6	15.1	13.0
Child stayed in mother's room**	100.0	73.8	94.4
Mother held child within six hours**	81.0	35.5	76.2
Child born between 6 AM and 8 PM	65.3	70.8	63.3
Doctor, nurse, or midwife told mother to breastfeed within a few hours after birth	20.8	25.5	26.3
Child given supplementary feeding during first three days**	74.2	71.5	60.6
Baby given prelacteal feeding**	57.9	49.5	33.4
Mother given formula to take home**	na	13.3	2.8
(N)	(137)	(201)	(427)

na = question not applicable.
*Chi-square of differences between sites of birth significant at p<.01.
**Chi-square significant at p<.005.

However, while urban mothers showed a significant increase in timely initiation between 1988 and 1990 (from 39 percent to 48 percent, Chi-square significant at p<.005), mothers living outside the cities showed a larger increase (from 43 percent to 68 percent, significant at p<.0001). During the program, timely initiation increased significantly for experienced mothers (from 41 percent to 57 percent, significant at p<.0001), but not for first-time mothers (34 percent initiated within six hours in 1988, compared with 42 percent in 1990). Controlling for site of birth and other demographic characteristics did not change these results.

Parity, residence, and where the child was born were all independent predictors of timely initiation of breastfeeding and of change in timing of initiation during the two years of the study's duration. However, these three factors were also significantly interrelated (rural women had higher parity and tended to give birth in public hospitals, and urban mothers had lower parity and were more likely than rural women to give birth in a private hospital) and might have had interactive effects on timing of initiation. After controlling for the independent effects of residence, parity, and where the child was born, we found that rural mothers with some child-rearing experience showed a significantly greater change in the timing of breastfeeding initiation during the program than urban mothers and rural first-time mothers, as shown in Table 7.[6] While these results are intriguing, small sample sizes for

rural and first-time mothers did not allow for further examination of the interactions between these variables.

Discussion and Conclusions

The question of particular interest in this study was whether a television and radio campaign to teach individual mothers about breastfeeding initiation and about the benefits of colostrum could influence timely initiation of breastfeeding. Although the project staff also planned and helped to implement a two-day lactation-management seminar for health professionals, the program relied primarily on the mass media to reach current and potential mothers and others who might influence their attitudes and behavior (for example, their mothers and mothers-in-law, friends, husbands, and health professionals). The two intensive television and radio campaigns carried out over a period of one year reached almost all of the mothers in the sample.

Knowledge about timely initiation of breastfeeding and about the benefits of colostrum and early breastfeeding increased dramatically during the two years of the program's life. Much of this change can be attributed to the program's mass media efforts: No other large-scale public education programs during this period specifically addressed the items measured in the knowledge scale, and exposure to the campaign was significantly associated with higher scores on the colostrum/first-milk knowledge scale. Although causal direction in the relationship between knowing when one should initiate and actual time of initiation cannot be clearly determined (mothers could have learned when to initiate from the experience of initiating after the birth), the high levels of knowledge but low levels of timely initiation in private hospitals support the conclusion that mothers' knowledge was influenced by the mass media campaign, and not only by those attending the birth.

Timely initiation also increased significantly, but only for public hospital and home births. Although the analyses indicate that the communication activities contributed to the increase in timely initiation, sorting out the unique effects of this program within the context of the Ministry of Health's activities between September 1988 and August 1990 is difficult. As noted earlier, during this time, the ministry and UNICEF carried out a general mass media campaign concerning breastfeeding. However, this campaign more likely contributed to the increase in breastfeeding per se, than to the increase in timely initiation, because it carried general messages on the benefits of breastfeeding and it did not specifically address timing.

Other activities may have made a greater contribution to change and may explain the rise in timely initiation after the seminar. During the time Healthcom was active in Jordan, gradual changes were taking place in public hospital policies and practices that supported immediate initiation of breastfeeding, particularly increased rooming-in, earlier mother-infant contact, and decreased use of glucose supplements. The project staff worked closely with the Ministry of Health in defining the policy on timely breastfeeding initiation and, partly through the seminar, in trying to bring about changes in individual hospital policies and practices. Also, at the time the Healthcom project was active, another project was helping the ministry to revise the curriculum for training nurses in public and military hospitals. This curriculum recommended initiation of breastfeeding in the delivery room. The staff from this project developed the curriculum with the Ministry of Health, public hospital administrators and senior nursing faculty, and this collaboration may have contributed to any changes in public hospital policies or practices that occurred in 1988 and 1989.[7]

Although all of these activities probably had some impact on timing of initiation by providing a more supportive context, there is evidence that the mass media campaign made an independent contribution. First, media exposure was a significant predictor of the increase in timely initiation after the start of the campaign, beyond the impact of any changes that may have been taking place in the public hospitals.

Second, there was a substantial change in timely initiation for children born at home that was related to media exposure and that should not have been affected by changes in the public hospital system. Mothers giving birth at home may have benefited the most from the mass media campaign. Starting from a lower level of knowledge about breastfeeding initiation and colostrum, they reached the same levels of knowledge as the other groups by 1990 and made substantial gains in timely initiation. Because these women are dispersed throughout the population and cannot easily be given information about breastfeeding initiation by means of a hospital-based pro-

Table 7 Change in the percentage of mothers who initiated breastfeeding within six hours, by parity and residence, Jordan, 1988 and 1990

	1988		1990	
Parity and residence	Percent	(N)	Percent	(N)
Index child = first child				
Urban	27.1	(97)	35.8	(102)
Rural	52.8	(33)	66.1	(25)
One child or more born before index child				
Urban	41.2	(415)	51.2	(420)
Rural*	40.5	(166)	68.4	(204)

*Significant at p<.05, controlling for site of birth, parity, residence, and time of birth relative to Healthcom campaign.

gram, the mass media may be the most effective way of reaching them. In other countries, where home births are more common than in Jordan and where health facilities are less accessible, use of the mass media in breastfeeding programs could have a substantial overall impact.

This study shows that a research-based, intensive mass media campaign can play a positive role in improving timely initiation of breastfeeding. However, it also highlights the importance of integrating a number of different approaches when designing breastfeeding programs. The authors of studies of other breastfeeding programs (Matthai, 1983; Vincente et al., 1986; Winikoff et al., 1987; Scrimshaw et al., 1987) conclude that the impact of a communication program and an individual mother's ability to act on new information or knowledge depend on concurrent change in factors beyond her control, factors related to hospital policies, medical and nursing school curricula, and economic and political considerations, among others.

The present study provides information on the first of these, the role of hospital practices, in supporting or constraining timely initiation. We identified many of the same barriers to successful breastfeeding found in previous research. This study differs from others in that most of these factors were measured in the same survey, allowing us to examine the relative importance of each in multivariate analyses. One notable finding is that delayed initiation was influenced more by policies or routine practices than by doctors' or nurses' responses to the special characteristics of a particular birth. Specifically, the mother's or newborn's medical problems and the mother's reported fatigue were unrelated to timely initiation of breastfeeding. All of the factors measuring routine practices (use of anesthesia, rooming-in, and supplementary feeding) had a significant and substantial association with timely initiation. Rooming-in was particularly important; after controlling for site of birth and other hospital or midwife practices, an infant who stayed in his or her mother's room was almost four times more likely to have started nursing within six hours than an infant who was taken to a nursery.

One significant factor rarely examined in other studies (an exception is Gunnlaugsson et al., 1992) is the time of the infant's birth. Gunnlaugsson and colleagues found a positive association between giving birth between 6:00 P.M. and 12:00 A.M. and earlier initiation of breastfeeding in periurban Guinea Bissau. In Jordan, we found that babies born during the night (between 9:00 P.M. and 6:00 A.M.) were less likely to have begun to nurse early, perhaps because the infants were taken to a nursery and not brought to their mothers before the morning shift or because no staff or family member was available to help the mother learn to breastfeed.

In addition to the support provided the mother by positive hospital policies and practices, her being advised to initiate breastfeeding early by a doctor, nurse, or midwife was important. However, of the supportive activities that might occur during or after birth, receiving information about when to initiate breastfeeding was the one least frequently reported by mothers, regardless of where the child was born. Although rooming-in, early mother-infant contact, and other factors provide a favorable context for starting to breastfeed their infants early, mothers also are encouraged to do so by supportive face-to-face advice from a health professional. This may be particularly important for first-time mothers.

Private hospitals were less likely to follow practices supporting timely initiation of breastfeeding, and mothers giving birth in these hospitals showed no change in the practice despite their high levels of exposure to the campaign and their great increase in knowledge. Whether mothers giving birth in private hospitals wanted to initiate soon after birth but were discouraged from doing so by the hospital routines is not clear. Nor is it clear whether the same factors leading mothers to give birth in private hospitals (for example, socioeconomic status) also influenced their breastfeeding decisions, as hypothesized by Potter et al. (1987) and Lindenberg et al. (1990). This study and a 1983 survey (Obermeyer and Potter, 1991) found that Jordanian mothers delivering in private hospitals had more education, were more likely to live in urban areas and particularly the capital city, and had a higher standard of living than those who delivered elsewhere.

The private hospital system in Jordan provides maternity services to approximately one-fifth of the population, but Obermeyer and Potter (1991) also found that many more women had used private facilities for prenatal care, even if they subsequently had given birth in public hospitals or at home. The private medical system often is not included in public health efforts in developing countries. However, private physicians and nurses who provide prenatal care potentially could be another important group influencing mothers to change their breastfeeding practices.

In addition to developing strategies that include the medical community, those designing and implementing breastfeeding promotion programs may need to develop different approaches for different subgroups of women. In this study, regardless of where the child was born, greater change was found among rural mothers and experienced mothers (and particularly among experienced rural mothers). These differences do not seem to occur because of lack of exposure or knowledge, since mothers in all of these subgroups had high campaign exposure and showed substantial changes in knowledge.

Mothers in rural areas and those with child-rearing experience may have been more open to the campaign's information or may have had more confidence or motivation to respond to it than did urban mothers and, particularly, first-time mothers. Further research concerning the influence of parity and residence on timing of initiation may provide information that will improve future breastfeeding promotion programs.

Generalizing the results of this study to the situations in other developing countries must be done with care. Almost all mothers in Jordan initiate breastfeeding, and these results may not be applicable to countries with lower levels of initiation. In addition, Jordan is primarily an urban country, with good access to high-quality health care and to the mass media, even in rural areas. These findings may not apply to agrarian countries, or to cities in countries that have a less developed infrastructure. However, the concerns about breastfeeding in Jordan, the constraints to appropriate breastfeeding, and the potential solutions for improving breastfeeding practices are similar to those documented in studies in urban areas in other developing countries (Gonzales, 1990; Hardy et al., 1982; Hull et al., 1989 and 1990).

The samples in this study included only women aged 35 years and younger (to evaluate the anticipated child-spacing communication activities). Older, more experienced women may react differently to new information about breastfeeding. In this study, age of the mother was not associated with change in timely initiation, but parity had a positive association. Including women older than 35 in the samples might have shown an even greater impact of the program.

We cannot generalize the results about the effect of mass media promotion on breastfeeding initiation to other breastfeeding practices, such as supplementation or duration. In Jordan, mothers' knowledge about delaying supplementation increased significantly during this time (McDivitt, 1991), but supplementation behavior seems to have remained stable. Supplementation is a different kind of behavior than timely initiation and is affected by different influences. We hypothesize that the other factors supporting a mother's ongoing decision not to supplement and her receptivity to information about delayed supplementation did not change or did not change sufficiently during this program.

Although timely initiation of breastfeeding was chosen as a focus of the media campaign partly because of its potential to increase exclusive and lengthy breastfeeding, we cannot make any conclusions about whether increasing timely breastfeeding initiation in Jordan resulted in longer exclusive breastfeeding or longer birth intervals. This study was designed with methods and measures appropriate to examine the impact of the communication activities, rather than the impact of timely initiation on other behavior. In light of the importance of exclusive breastfeeding in children's health and in birth spacing, more research is needed on the link between early breastfeeding initiation and exclusive breastfeeding and on the behavioral, social, and cultural factors that encourage or discourage a mother from breastfeeding exclusively. Most of the related research has been carried out in the United States or the United Kingdom; research on this topic is needed in developing countries.

Several conclusions can be drawn from this study. Communication and social marketing programs attempting to change breastfeeding initiation behavior must consider not only the mother, but also her situation and the other people around her, who also may have to change to support her new behavior. Carefully planned and pretested mass media campaigns, such as that in Jordan, can reach a wide audience and teach mothers, their relatives and neighbors, and perhaps even health providers about correct breastfeeding practices. If hospital policies and routines do not support, or even allow, timely breastfeeding, the mother will find it hard to breastfeed her baby immediately, even if she knows that she should and wishes to do so. Providing mothers with information about initiation and colostrum should be only one part of a larger, integrated program that also addresses policymakers and hospital administrators and staff. However, in situations where the context supports timely initiation of breastfeeding or where concurrent changes are made to improve the context, mass media campaigns can play a positive role.

Notes

1 In Jordan, births take place in public hospitals (run by the Ministry of Health or the military), private hospitals, or at home (where they are attended by a government-trained midwife or a traditional midwife). A more detailed description of the maternity and prenatal health-care systems in Jordan can be found in Obermeyer and Potter (1991).

2 A series of spots addressing birth spacing was developed for a later phase but, because of perceived cultural sensitivity surrounding the topic, they were not broadcast.

3 The raw data for Figure 2 showed a great deal of fluctuation in reported time of initiation from month to month, but a general pattern of continued increase in timely initiation. Before smoothing, to make the trend more understandable, we eliminated the months of the most recent births in both samples (September 1988 and July 1990) from the raw data, because only a small number of births had occurred in these months by the time the interviews took place. (No children in the follow-up sample were born in the few days of interviews in August 1990.) One disadvantage of the smoothing method we used is that the first and last points (August 1988 and June 1990) are not smoothed at all (and were not plotted on the figure), and the first and last four points plotted are less

13

smoothed (based on fewer raw data points) than the rest of the curve and, therefore, are less stable. Thus, the apparent fall in timely initiation after the start of the second campaign may be an artifact.

4 In the samples used in these studies, mothers with higher media exposure and (in the 1990 sample) those with higher campaign exposure were significantly more likely ($p < .05$) to live in an urban area, to have more belongings such as a car or video cassette recorder, have a higher level of education, be younger, and have given birth in a hospital (rather than at home) than mothers with lower exposure to the media in general or to the campaign messages specifically. Mothers interviewed in 1990 who had high campaign exposure had fewer children than those with low campaign exposure (a relationship that was not statistically significant for the more general media exposure variable).

5 Stronger support would have been provided by comparing these practices between the 1988 and 1990 samples. However, these variables were not measured in the baseline survey. In addition, we were unable to find documentation concerning the official ministry policy on breastfeeding initiation from 1988 through 1990. Support for a conclusion that change occurred in public hospitals comes from verbal reports by ministry staff of decreases in prelacteal feeding and increases in rooming-in and early mother-infant contact during the project.

6 A reduced version of the logistic regression analyses from Table 2 was carried out for initiation within six hours, controlling for site of birth, whether the child was born before the start of the Healthcom campaign or after, and three dummy variables representing (1) first-time mothers from rural areas, (2) urban mothers with at least one previous child, and (3) rural mothers with at least one other child, with first-time urban mothers as the reference group. We added the interaction between each of these three variables and time of birth relative to the start of the Healthcom activities. The results show that, after controlling for site of the child's birth and the direct effects of residence and parity, only the interaction between rural, experienced mothers and relative time of birth significantly predicted timely initiation (odds ratio= 2.21, $p<.05$).

7 Representatives of the midwives and of the private hospital system participated in the seminar, but no further activities were carried out with these groups during 1988–90.

Acknowledgments

The authors appreciate the comments of Alan Andreason, Ann Ashworth, Susan McCombie, and Anne Roberts, the Healthcom resident advisor in Jordan. We are grateful to Kefah Abdel-Rahman, Fatos Goksen, Abeer Hamdan, Yoshimi Nishino, and Karin Wilkins for their assistance with the research. We also wish to thank Sima Bahous, the Healthcom Project Director at the Noor al Hussein Foundation, and Charlotte Ferguson and Penny Hatcher of the Primary Health Care Nursing Development Project, for providing information about other breastfeeding-promotion activities occurring in Jordan during the Healthcom project. This research was funded by the Healthcom Project of the Office of Health, Bureau for Research and Development, of the United States Agency for International Development (USAID) and by the USAID Mission in Amman. The project is conducted by the Academy for Educational Development and its other subcontractors—Applied Communication Technology, Birch & Davis International, the Futures Group, the Johns Hopkins University, and Porter Novelli. This text does not represent the views or opinions of the Agency for International Development.

References

Abdel-Aziz, Abdallah, John E. Anderson, Leo Morris, Phyllis Wingo, and Bohran Shrydeh. 1986. "Family planning in Jordan: 1983 survey data." *Studies in Family Planning* 17,4: 199–206.

Abulaban, Ayman, Judith A. McDivitt, Karin Wilkins, Katherine Dusenbury, and Fatos Goksen-Erelcin. 1989. "Breastfeeding Practices and Knowledge in Jordan: A Summary Report of the Results of the Healthcom Evaluation Baseline Survey, August-September 1988." *Working Paper* No. 120. Philadelphia: Center for International Health and Development Communication, Annenberg School for Communication, University of Pennsylvania.

Adlakha, Arjun L. and C.M. Suchindran. 1985. "Factors affecting infant and child mortality." *Journal of Biosocial Science* 17: 481–496.

Akin, John S., Richard E. Bilsborrow, David K. Guilkey, and Barry M. Popkin. 1986. "Breastfeeding patterns and determinants in the Near East: An analysis for four countries." *Population Studies* 40,2: 247–262.

Anderson, John D., Walter Rodrigues, and Antonio Marcio Tavaras Thomé. 1984. "Breastfeeding and use of the health care system in Bahia State, Brazil: Three multivariate analyses." *Studies in Family Planning* 15,3: 127–135.

Berg, Alan. 1987. *Malnutrition: What Can Be Done?* Baltimore, MD: The Johns Hopkins University Press.

Bisharat, Leila and Hisham Zagha. 1986. "Health and Population in Squatter Areas of Amman: A Reassessment after Four Years of Upgrading." Amman, Jordan: Urban Development Department.

Clift, Elayne. 1990. "HEALTHCOM: A communication methodology for health in the Third World." *Health Education Research* 5,1: 99–106.

De Chateau, P. and L. Winberg. 1978. "Immediate postpartum suckling contact and duration of breastfeeding." *Journal of Maternal and Child Health* 3: 392–395.

Feinstein, Joel M., Jay E. Berkelhamer, Mary Ellen Gruszka, Cynthia A. Wong, and Ann E. Carey. 1986. "Factors related to early termination of breast-feeding in an urban population." *Pediatrics* 78,2: 210–215.

Fildes, Valerie A. 1986. *Breasts, Bottles and Babies: A History of Infant Feeding*. Edinburgh: Edinburgh University Press.

Foote, Dennis R., Leslie Hughes-Lind, Carl Kendall, Reynaldo Martorell, Judith A. McDivitt, Leslie Snyder, Susan M. Stone, and J. Douglas Storey. 1985. *The Mass Media and Health Practices Evaluation in Honduras: The Final Report of the Major Findings*. Menlo Park, CA: Applied Communication Technology.

Gonzales, R.B. 1990. "A large scale rooming-in program in a developing country: The Dr. José Fabella Memorial Hospital experience." *International Journal of Gynecology and Obstetrics* 31, Supplement 1: 31–34.

Gray, Ronald H., Oona M. Campbell, R. Apelo, Susan S. Eslami, Howard Zacur, Rebecca M. Ramos, Judith C. Gehret, and Miriam H. Labbok. 1990. "Risk of ovulation during lactation." *Lancet* 335, 8,680: 25–29.

Green, Cynthia P. 1989. *Media Promotion of Breastfeeding: A Decade's Ex-*

perience. Washington, DC: Academy for Educational Development.

Gunnlaugsson, Beir, Maria Clotilde Da Silva, and Lars Smedman. 1992. "Determinants of delayed initiation of breastfeeding: A community and hospital study from Guinea-Bissau." *International Journal of Epidemiology* 21, 5: 935–940.

Guz, Deborah and John Hobcraft. 1991. "Breastfeeding and fertility: A comparative analysis." *Population Studies* 45,1: 91–108.

Habicht, Jean-Pierre, Julie DaVanzo, and William P. Butz. 1986. "Does breastfeeding really save lives, or are apparent benefits due to biases?" *American Journal of Epidemiology* 123, 2: 279–290.

Hakim, Iman A. and Iman A. El-Ashmawy. 1992. "Breast-feeding patterns in a rural village in Giza, Egypt." *American Journal of Public Health* 82,5: 731–732.

Hardy, Ellen E., Ana M. Vichi, Regina C. Sarmento, Lucila E. Moreira, and Celia M. Bosqueiro. 1982. "Breastfeeding promotion: Effect of an educational program in Brazil." *Studies in Family Planning* 13, 3: 79–86.

Hartwig, Frederick and Brian E. Dearing. 1979. *Exploratory Data Analysis*. Newbury Park, CA: Sage Publications.

Hill, Pamela D. 1991. "Predictors of breast-feeding duration among WIC and non-WIC mothers." *Public Health Nursing* 8,1: 46–52.

Hobcraft, John and J. MacDonald. 1984. "Birth intervals." *World Fertility Survey Comparative Studies, Cross National Summaries No. 28*. Voorburg: International Statistical Institute.

Hobcraft, John N., J. MacDonald, and Shea Rutstein. 1983. "Child-spacing effects on infant and early child mortality." *Population Index* 49,4: 585–618.

Hull, Valerie, Shyam Thapa, and Hadi Pratomo. 1990. "Breast-feeding in the modern health sector in Indonesia: The mother's perspective." *Social Science and Medicine*, 30, 5: 625–633.

Hull, Valerie J., Shyam Thapa, and Gulardi Wiknjosastro. 1989. "Breastfeeding and health professionals: A study in hospitals in Indonesia." *Social Science and Medicine*, 28, 4: 355–364.

Jelliffe, Derrick B. and E.F. Patrice Jelliffe. 1978. *Human Milk in the Modern World*. Oxford: Oxford University Press.

——— (eds.). 1988. *Programmes to Promote Breastfeeding*. Oxford: Oxford University Press.

Jordan Department of Statistics. 1984. *Jordan Fertility and Family Health Survey, 1983: Report of Principal Findings*. Amman, Jordan: Department of Statistics.

Kurinj, Natalie and Patricia H. Shiono. 1991. "Early formula supplementation of breast-feeding." *Pediatrics* 88, 4: 745–750.

Lindenberg, C.S., R.C. Artola, and V.J. Estrada. 1990. "Determinants of early infant weaning: A multivariate approach." *International Journal of Nursing Studies* 27, 1: 35–41.

Mandl, Pierre-E. 1988. "Rooming-in: History, advantages, and methods." In *Programmes to Promote Breastfeeding*. Eds. D.B. Jelliffe and E.F.P. Jelliffe. Oxford: Oxford University Press.

Matthai, Jacob. 1983. "The Brazilian national breast-feeding programme." *Assignment Children* 61/62: 225–247.

Matthews, M. Kay. 1989. "The relationship between maternal labor analgesia and delay in the initiation of breastfeeding in healthy neonates in the early neonatal period." *Midwifery* 5: 3–10.

McDivitt, Judith A. 1991. *The Healthcom Project in Jordan: Final Case Study Evaluation Report*. Philadelphia: Center for International Health and Development Communication, Annenberg School for Communication, University of Pennsylvania.

Monteiro, Carlos Augusto, Hilda P.P. Zuniga, Maria Helena D'A. Benicio, Marina Ferreira Rea, Eliete S. Tudisco, and Dirce M. Sigulem. 1987. "The recent revival of breast-feeding in the City of São Paolo, Brazil." *American Journal of Public Health* 77, 8: 964–966.

Morse, Janice, Corinne Jehle, and Diane Gamble. 1990. "Initiating breastfeeding: A world survey of the timing of postpartum breastfeeding." *International Journal of Nursing Studies* 27,3 : 303–313.

Obermeyer, Carla Makhlouf and Joseph E. Potter. 1991. "Maternal health care utilization in Jordan: A study of patterns and determinants." *Studies in Family Planning* 22, 3: 177–187.

Parlato, M.B. 1990. "The use of mass media to promote breastfeeding." *International Journal of Gynecology and Obstetrics* 31, Supplement 1: 105–110.

Potter, Joseph E., Octavio Mojarro, and Leopoldo Nuñez. 1987. "The influence of maternal health care on the prevalence and duration of breastfeeding in rural Mexico." *Studies in Family Planning* 18, 6: 309–319.

Rasmuson, Mark R., Renata E. Seidel, William A. Smith, and Elizabeth Mills Booth. 1988. *Communication for Child Survival*. Washington, DC: Academy for Educational Development.

Rea, M.F. and E.S. Berquó. 1990. "Impact of the Brazilian national breast-feeding programme on mothers in Greater São Paulo." *Bulletin of the World Health Organization* 68, 3: 365–371.

Reiff, Michael I. and Susan M. Essock-Vitale. 1985. "Hospital influences on early infant-feeding practices." *Pediatrics*, 76, 6: 872-879.

Roberts, Anne and Renata Seidel. 1993. "Breastfeeding practices in Jordan: Designing effective messages." In *Notes from the Field in Communication for Child Survival*. Ed. R. E. Seidel. Washington, DC: Academy for Educational Development.

Salariya, E.M., P.M. Easton, and J.I. Cater. 1978. "Duration of breastfeeding after early initiation and frequent feeding." *Lancet* ii: 1,141–1,143.

Scrimshaw, Susan C.M., Patricia L. Engle, Lola Arnold, and Karen Haynes. 1987. "Factors affecting breastfeeding among women of Mexican origin or descent in Los Angeles." *American Journal of Public Health* 77, 4: 467–470.

Shoham-Yakibovich, Ilana, Joseph S. Pliskin, and Daniel Carr. 1990. "Infant feeding practices: An evaluation of the impact of a health education course." *American Journal of Public Health* 80, 6: 732–734.

Short, Roger. 1987. "The biological basis for the contraceptive effects of breast feeding." *International Journal of Gynaecology and Obstetrics* 25, Supplement: 207–217.

United States Agency for International Development (USAID). 1990. *Breastfeeding: A Report on A.I.D. Programs*. Washington, DC: USAID.

Vincente, L.M., O.C. Valdecanas, J.A. Casin, J.B. Dorado, and M.P. Octaviano. 1986. "Breastfeeding knowledge and practice among mothers in metro Manila." *Philippine Journal of Nutrition*: 36–47.

Warren, Charles W., Fahad Hiyari, Phyllis A. Wingo, Abdallah M. Abdel-Aziz, and Leo Morris. 1990. "Fertility and family planning in Jordan: Results from the 1985 Jordan Husbands' Fertility Survey." *Studies in Family Planning* 21, 1: 33–39.

Winikoff, Beverly. 1988. "Modification of hospital practices to remove obstacles to successful breastfeeding." In *Programmes to Promote*

15

Breastfeeding. Eds. D.B. Jelliffe and E.F.P. Jelliffe. Oxford: Oxford University Press.

Winikoff, Beverly, Virginia Hight Laukaran, Deborah Myers, and Richard Stone. 1986. "Dynamics of infant feeding: Mothers, professionals, and the institutional context in a large urban hospital." *Pediatrics* 77, 3: 357–365.

Winikoff, Beverly, Deborah Meyers, Virginia Hight Laukaran, and Richard Stone. 1987. "Overcoming obstacles to breast-feeding in a large municipal hospital: Applications of lessons learned." *Pediatrics* 80, 3: 423–433.

Wright, H.J. and P.C. Walker. 1983. "Prediction of duration of breast feeding in primiparas." *Journal of Epidemiology and Community Health* 37,2: 89–94.

110