

93

FNR

536

DO NUTRITION EDUCATION PROGRAMS WORK?
A Field Experiment in Rural Bangladesh

Abu Yusuf Choudhury, MSc¹

Laila Arjumand Banu, MSc¹

K.M.A. Aziz, PhD²

A.M. Mustaqul Huq, MBBS¹

A.M.R. Chowdhury, PhD³

-
- 1 Program for the Introduction and Adaptation of Contraceptive Technology, Bangladesh (PIACT, B)
 - 2 International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR, B)
 - 3 Bangladesh Rural Advancement Committee (BRAC)

Running head: Do nutrition education programs work?

Correspondence and proofs to: Mr. Abu Yusuf Choudhury
Director
PIACT, Bangladesh
1/7 Block-A, Road No. 5
Lalmatia Housing Estate
Dhaka 1207, Bangladesh
Tel: 317683/324940
Telex: 642762 AVS BJ
Fax: 880-2-832915

51

ABSTRACT

Malnutrition among pre-school-aged children is a serious health problem in Bangladesh. Although inadequate food availability is an important cause of malnutrition, several other factors are also important determinants, such as cultural beliefs and practices, ~~ignorance about~~ ^{lack of knowledge of} prevention and ^{of malnutrition} treatment and maternal and child health status. ^{and purchasing power}

A four-cell intervention study was carried out in rural Bangladesh to examine the effect of nutrition education on four specific nutritional interventions: causes, prevention and treatment of nutritional diseases, feeding during pregnancy, colostrum feeding, and appropriate weaning. The first cell received nutritional education once, the second twice and the third thrice, while the fourth cell was retained as a comparison area receiving no education whatsoever.

A pre-intervention survey found that most mothers were ignorant or held wrong beliefs about the causes, prevention and treatment of nutritional diseases. Only 10 percent of the mothers believed that more food should be taken by women during pregnancy; two-thirds of mothers did not feed colostrum to their youngest living child; and hardly any child below 2 years of age were fed pulse/vegetable-based diet. The post-survey data found that the education program had a significant impact in improving the mothers' knowledge about the causes, prevention and treatment of nutritional diseases. Most mothers reported feeding colostrum to their newborns; over 40% of the mothers reported that more food should be taken during pregnancy, and around 40 to 50% of the

children below 2 years of age were given pulse or vegetable-based foods.

This intervention study demonstrated that nutrition education programs could be useful. Conducted properly such programs should be extended to other parts of Bangladesh for the benefit of rural mothers and children.

INTRODUCTION

As in many developing countries, malnutrition in pre-school-aged children is a serious problem in Bangladesh. Several surveys carried out in Bangladesh have reported high rates of stunting (42% to 74%) and wasting (6% to 22%) in children 6-71 months of age. These nutritional indices in Bangladesh have not improved over the past decade [1-4].

Although inadequate food availability is an important reason for malnutrition, several other factors such as cultural beliefs, ignorance about its causes, prevention and treatment, maternal health during pregnancy, weaning food practices, etc., are also important determinants of malnutrition (5). Malnutrition in Bangladesh is more common in children under two years of age (than over two). It is also not due to poverty alone, but is intimately related to many sociocultural factors.

Although much is known about the causes of malnutrition in Bangladesh, it is of great importance to develop and evaluate practical and effective intervention programs for preventing malnutrition. The total eradication of malnutrition will involve complex social, economic and political reforms and is not likely to be feasible in the immediate future. Appropriate nutrition education program directed to mothers may go a long way in improving the nutritional status of the children. From this perspective, PIACT/PATH, Bangladesh, a non-government organization (NGO), developed and implemented a nutrition education program in a rural area of Bangladesh. This paper presents the results of this program in terms of its

effectiveness in changing nutritional knowledge, attitude, and practice.

METHODS

Intervention Messages

The following messages were delivered to the mothers by female workers:

Message 1: Information on the signs, symptoms and causes of the three nutritional conditions (viz., marasmus, kwashiorkor and night blindness) and detail how to prevent and treat them.

Message 2: Increased food intake by women during pregnancy.

Message 3: Importance of feeding colostrum to newborns and the value of breastfeeding for an extended period -- at least for two years.

Message 4: The benefits of giving weaning food to children from their fifth month of age.

Intervention Strategy

Trained female workers delivered the above messages to the target mothers (ever married women aged 15-49 years) individually at the mothers' house. Illustrated booklet, particularly developed for the project was used to make the teaching sessions more lively and effective.

Group sessions (of 2-4 mothers) were organized to demonstrate the preparation of selected weaning food. The participant mothers prepared the food themselves with the participation of field workers. Five different types of weaning foods were promoted: Milk-semolina, milk-banana-rice, *khichuri* (rice, lentils and vegetables gruel), egg-banana and ripe papaya. However, only the preparation of *khichuri* was demonstrated, because the ingredients for this were available to households from most socio-economic groups. The ingredients for *khichuri* were provided mostly by participating women.

Trained male workers also organized group meetings with male members of the community for reinforcement of the teaching by female workers. In addition, posters and leaflets depicting the messages were posted and distributed in the intervention areas.

Study Population

Sonargaon, an upazila (sub-district) with a population of 220,000 in central Bangladesh, was selected for the project. Four of the 11 unions under the upazila were selected. Aminpur, Baiddyer Bazar and Barodi, all contiguous, received the intervention while Jampur (5 kms away from the others) was treated as a comparison area.

The number of households with target women in different unions were as follows: Aminpur (2,152), Baiddyer Bazar (2,300), Barodi (2,646) and Jampur (2,573).

The teaching at the household level was provided at varying number of times. It was provided 3 times (with an interval of 3-4 months) in Aminpur, 2 times (with an interval of 2 months) in Baiddyer Bazar and once only in Barodi.

A total of 6,737 oral teaching sessions were held in the three areas during the first round, 3,932 in the two areas during the second round and 1,804 in one area during the third round. Overall the teaching program covered approximately 88% of the target women in the three unions. The remaining 12% were not present in their houses during the teaching sessions. Each teaching session continued for approximately 45 minutes.

The number of food demonstration sessions held in the first, second and third round were, respectively, 2,704, 1,585 and 842. Each food demonstration session, on average, needed 75 minutes.

Evaluation

Pre- and post-intervention knowledge, attitude and practice (KAP) surveys formed the main methods of evaluation and were done in the intervention and comparison unions. Although random statistical sampling produced a sample size of 1,375, a total of 1,453 and 1,374 mothers were interviewed in the pre- and post-intervention surveys respectively in the four unions. Independent samples were drawn for each union using random procedures.

A structured questionnaire was used for both pre- and post-intervention surveys. However, additional information pertaining to the intervention program was added in the post-intervention survey.

RESULTS

Knowledge About Specific Diseases

Marasmus: In the pre-survey, only 5-12% of the mothers related marasmus to an inadequate intake of food and a large number of them mentioned causes such as "faulty life style of mothers during pregnancy" (17 to 21%) or "taking of dirty food by the children (4 to 16%)" or had no idea (27 to 41%). The project taught mothers that marasmus (called "*haddisar rog*" locally) was caused by inadequate intake of food.

The post-survey recorded a significant rise in this knowledge and the increase was positively correlated with the number of times the teaching was imparted. On the other hand, in the union where no teaching was done, there was no change in this knowledge (Fig.1a).

When asked about the treatment of marasmus, approximately 90% of mothers in the pre-survey mentioned modern (allopathic) or traditional medicines. Following the project which taught mothers that the treatment was the feeding of adequate quantity of foods such as rice, fish, lentils, vegetables, bread, etc., the situation improved. Mothers mentioned food much more in the post-survey. This change in knowledge was more prominent in the unions where the teaching was done more than once (49 to 95%) and there was little change in knowledge in the comparison union (Fig. 1b).

Kwashiorkor and Night blindness: Very similar results were obtained by teaching mothers about the causes and treatments of kwashiorkor and night blindness. Fig. 2a and 2b show the increase in the knowledge of mothers on kwashiorkor and Fig. 3a and 3b show the increase in the knowledge on night blindness.

Knowledge About Pregnant Mothers' Diet

The second message of the project taught mothers about the need for increased food intake during pregnancy. While in the pre-survey only 9-14% mothers believed that pregnant mothers should eat more than the normal amount of food, this proportion increased to 30-50% following teaching. It is, however, interesting to note that the proportion of mothers who thought that pregnant mothers should eat less than normal amount of food did not change much following the teaching (Table 1).

Feeding of Colostrum

In both pre- and post-surveys mothers were asked whether their youngest child was given colostrum (the first milk) after birth. Less than 40% mothers in each union mentioned that they fed colostrum to their youngest babies. The project told mothers about the benefits of feeding colostrum. It was found through the post-survey that this teaching had an impact on behavior as 78 to 100% mothers who had delivered babies between the teaching and the post-survey fed colostrum to their babies. This change in behavior was positively correlated with the number of times the teaching was imparted (Fig. 4).

Perception About Weaning Food Age

The project instructed mothers that weaning foods should be started from the age of 5 months. Before the intervention, only about 10% mothers mentioned this as the appropriate weaning age. But this proportion increased following the teaching. As Fig. 5 shows, this increase was most marked (from 7% to 55%) in the union where the teaching was done three times. There was some change in the comparison union also.

Types of Weaning Food

The pre-survey data revealed that among the weaning foods introduced to the children, rice powder occurred most frequently (28 to 57%) followed by softened rice (15 to 24%) (Table 2). In a large majority of cases, some salt/sugar/molasses were added to these foods, and sometimes milk was added.

The intervention program instructed mothers on the preparation/use of the following five weaning foods: milk-semolina, milk-rice-banana, *khichuri* (rice-lentils gruel), egg-banana and ripe papaya.

After the intervention, a large majority of the mothers (26 to 84%) added milk with rice powder and softened rice. The proportion of children feeding milk-based foods increased with the number of interventions.

Types of Foods Given Currently

Cooked rice powder was a common weaning food for children aged below 12 months. Before the intervention it was salt/sugar/

molasses which were added to the rice powder before serving. But after the intervention a new ingredient e.g. milk was included. Similarly, softened cooked rice (with salt/sugar/molasses) was the most common food for children aged 12 months or over. After the intervention, in majority cases, milk/pulses/vegetables were added (Fig. 6a, 6b, & 6c). An increase in the level of feeding milk/pulses/vegetable-based foods was also observed in the comparison area too but it was far below the increases in the intervention unions.

Furthermore, after the intervention, fish-based foods was given in some cases (6 to 8%) but not before a child had reached 12 months of age. Meat was hardly fed to the children.

DISCUSSION

This paper reports the outcome of a nutrition education program in a rural area of Bangladesh. Mothers in three areas were given four specific messages related to their children's nutrition. In the first area mothers were instructed only once, in the second twice, and in the third thrice. The fourth area studied was used for comparison.

The pre-intervention survey data revealed that:

- o Most mothers in the four unions were ignorant or held wrong beliefs about the causes and treatments of nutritional diseases--marasmus, kwashiorkor and night blindness.

- o Only about 9-13% of the mothers believed that more food should be taken during pregnancy. Large majority of mothers believed that pregnant women should take normal or less than normal amount of food.
- o About two-thirds of the mothers did not feed colostrum to their youngest living child because they believed that it caused diarrhea to the newborns or it was bad for their health.
- o 32 to 46% of the mothers did not introduce weaning food to their youngest living child until the child was 6 months.
- o Children aged below 2 years of age were rarely fed pulse or vegetable-based foods.

The results of post-intervention survey revealed that the education program had a significant impact in changing mothers' knowledge about the causes, prevention and cure of nutritional diseases. There was noticeable increments (30 to 51%) in the proportion of women believing that they should take more food during pregnancy. Most mothers (78 to 100%) fed colostrum to the newborns; the perception about the age of introducing weaning food to the children improved significantly; and 40 to 50% of the children aged 12 months or over were fed pulse or vegetable-based weaning foods.

These results suggest the value of nutrition education as an intervention. It is important that such programs be extended to

other areas of Bangladesh for greater benefit to the rural mothers and children.

The time interval between the intervention and evaluation of the program was less than 6 months. Although positive results were achieved through the intervention, it would be interesting to see whether such results were sustained over time; whether more mothers begin to adopt the messages after seeing their benefits; and the impact of the program on nutritional status of the children. In this connection, it is worth mentioning that BRAC carried out a nation-wide program in Bangladesh to teach mothers about a simple cure for watery diarrhea using household ingredients and they also found a very ^{initial} high retention of knowledge. But this knowledge tended to taper off over time (6).

This study has also confirmed the value of repeated teaching. Mothers who were exposed to repeated teaching did better than those who had received teaching only once.

The other thing that this study has proved is the rationality of mothers' action. It seems that mothers did not accept "everything" that were taught to them by outside agents. They appeared to accept those messages readily which were not in direct conflict with their traditional beliefs or those which did not take mothers' extra time. For example, the project asked mothers to use selected weaning food, but they (the mothers) did not accept all these "prescriptions". In some instances they adapted the prescriptions to suit their conveniences. One of the weaning foods promoted was *khichuri*. However, this was least

accepted. Anthropological investigations found that preparation of *khichuri* required extra time and effort which the mothers could not afford. Instead, the mothers managed rice from family preparation, mashed it and mixed with other family preparations such as *dal* (lentil) and vegetable curries. This shows once again the value of intensive pilot studies on people's culture, beliefs, constraints, etc. for better programming (7).

Although 40 to 50% of the children reportedly were fed pulse or vegetable-based weaning foods after the intervention, those were rarely fed to the children aged below 12 months. More studies along these lines are warranted to understand the reasons thereof and to learn how to deal with this problem.

REFERENCES

1. Bangladesh Bureau of Statistics. Report of the Child Nutrition Status Module. Bangladesh Household Expenditure Survey, 1985-86, Dhaka, 1985.
2. Helen Keller International and Institute of Public Health Nutrition. Bangladesh Nutritional Blindness Study 1982-83, New York, 1985.
3. Institute of Nutrition and Food Science. Nutrition Survey of Bangladesh 1975-76, Dhaka: University of Dhaka, 1977.
4. Institute of Nutrition and Food Science. Nutrition Survey of Bangladesh 1982-83, Dhaka: University of Dhaka, 1983.
5. Choudhury, AY, ~~et al.~~ "Formative Research to Aid Communication Development for Promotion of Vitamin-A Rich Foods and Capsules", Dhaka: PIACT, Bangladesh, 1988, ~~Mimeo~~
6. Chowdhury AMR, Vaughan JP and Abed FH, Use and safety of homemade ORS in rural Bangladesh. ~~International Journal of~~ ¹⁹⁸⁵ Epidemiology, 17:655-665, ~~1988~~
7. Chowdhury AMR and Vaughan JP. Diarrhoea perception and the use of homemade ORT in rural Bangladesh. ¹⁹⁸⁵ Journal of Diarrhoeal Diseases Research, 6:6-14, ~~1988~~.

ACKNOWLEDEGMENT

The authors express their gratitude to Mr. AKM Mainul Islam, Research officer, PIACT, Bangladesh, for his assistance in different stages of this study. They are also grateful to Professor Lincoln Chen of the Harvard University for his editorial comments on an earlier version of this paper. The International Development Research Centre (IDRC), Canada, deserves special thanks for a grant which made this study possible. Finally it is to the people, particularly the mothers, of the study areas who spared time and shared their information, to whom the authors owe a special debt.

Fig.1a: Proportion of mothers reporting correctly the causes of marasmus

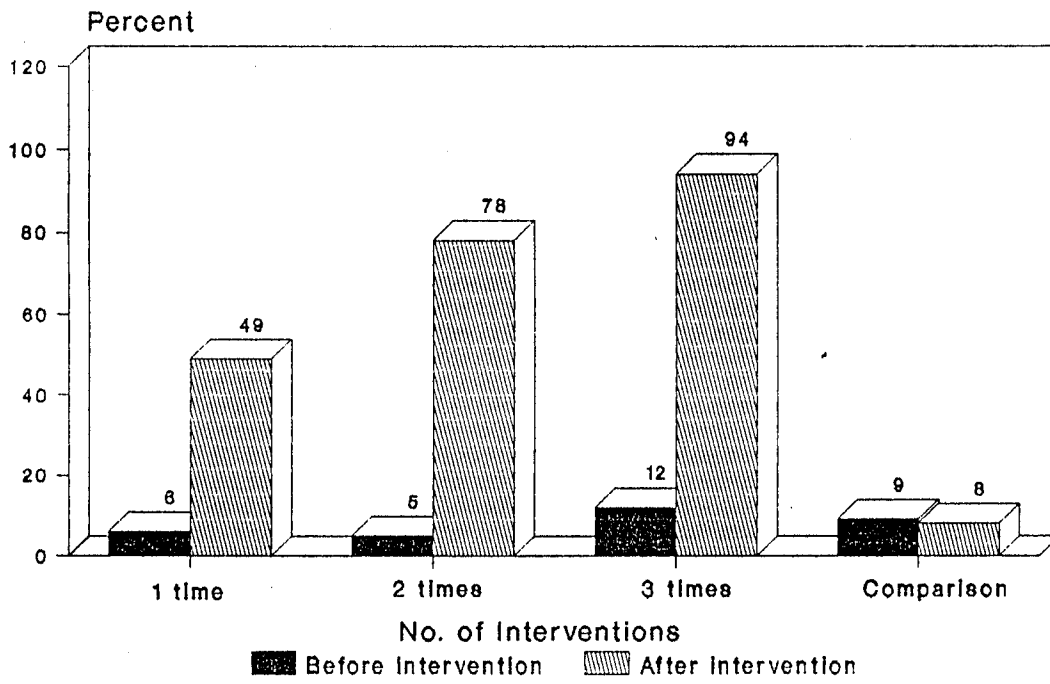


Fig.1b: Proportion of mothers reporting correctly the treatment for marasmus

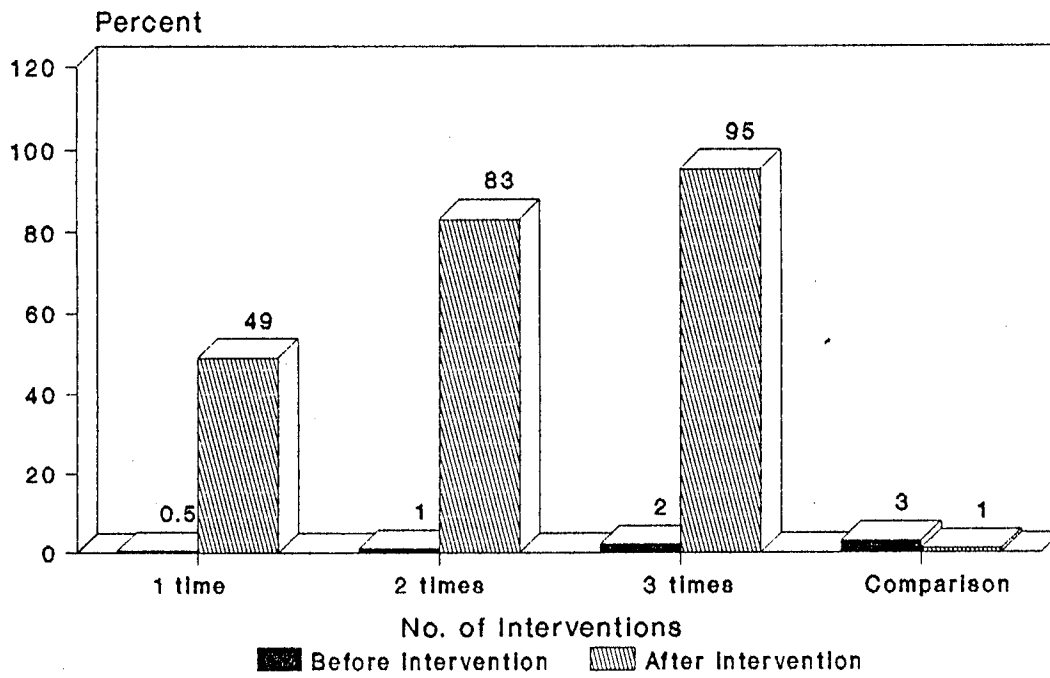


Fig.2a: Proportion of mothers reporting correctly the causes of kwashiorkor

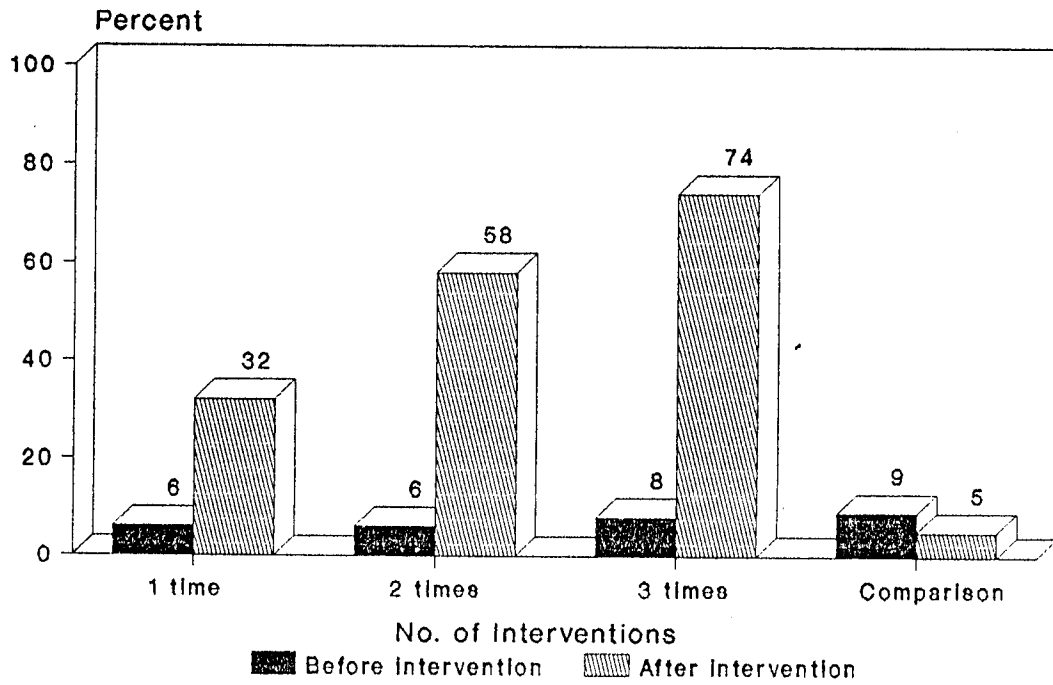


Fig.2b: Proportion of mothers reporting correctly the treatment for kwashiorko

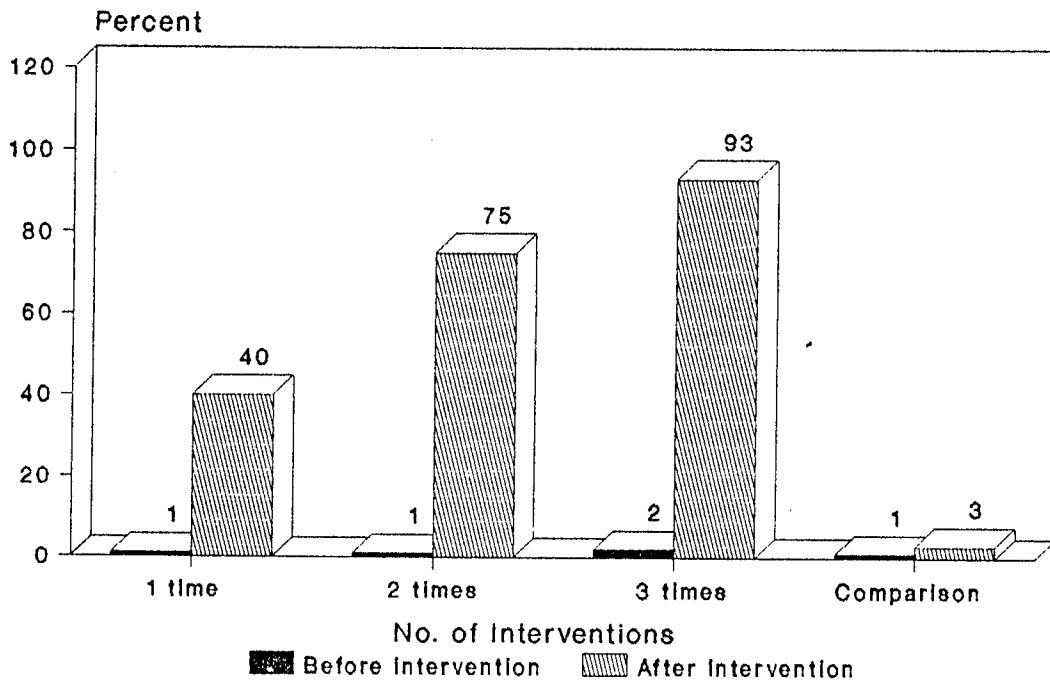


Fig.3a: Proportion of mothers reporting correctly the causes of night blindness

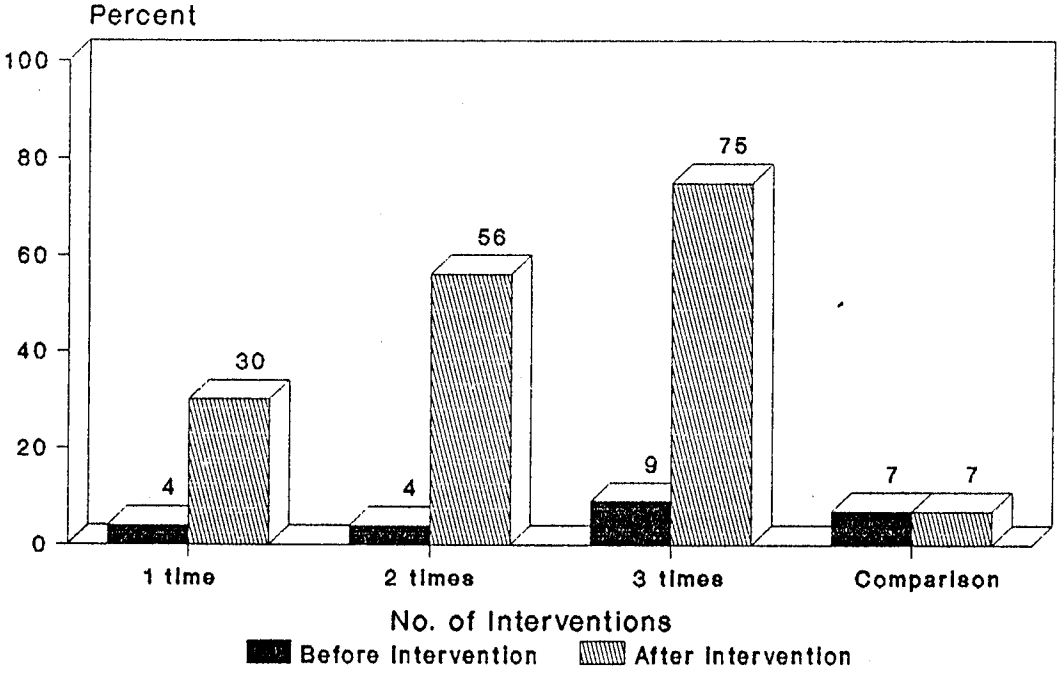


Fig.3b: Proportion of mothers reporting correctly the treatment for night blindness

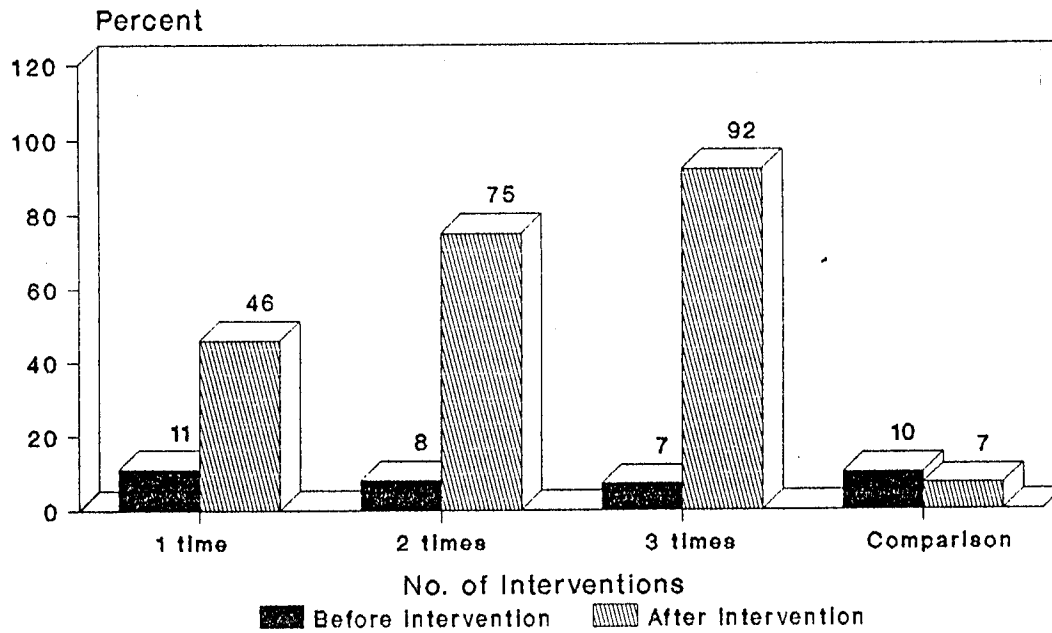


Fig.4: Proportion of newborns reportedly fed colostrum

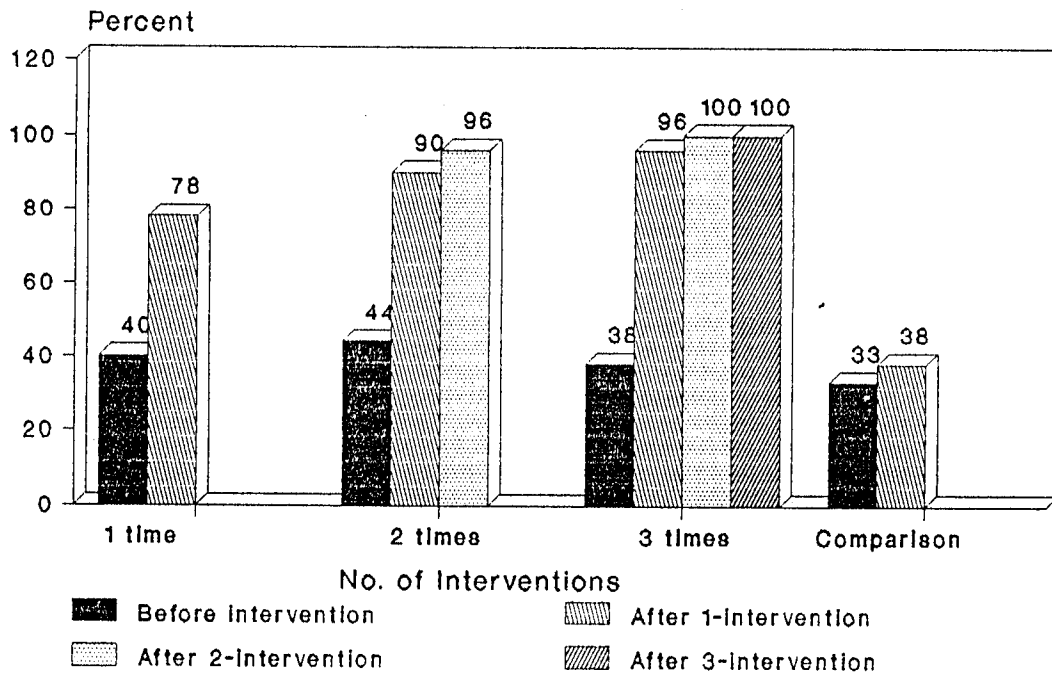


Fig.5: Proportion of mothers perceiving to begin weaning food exactly from 5 months

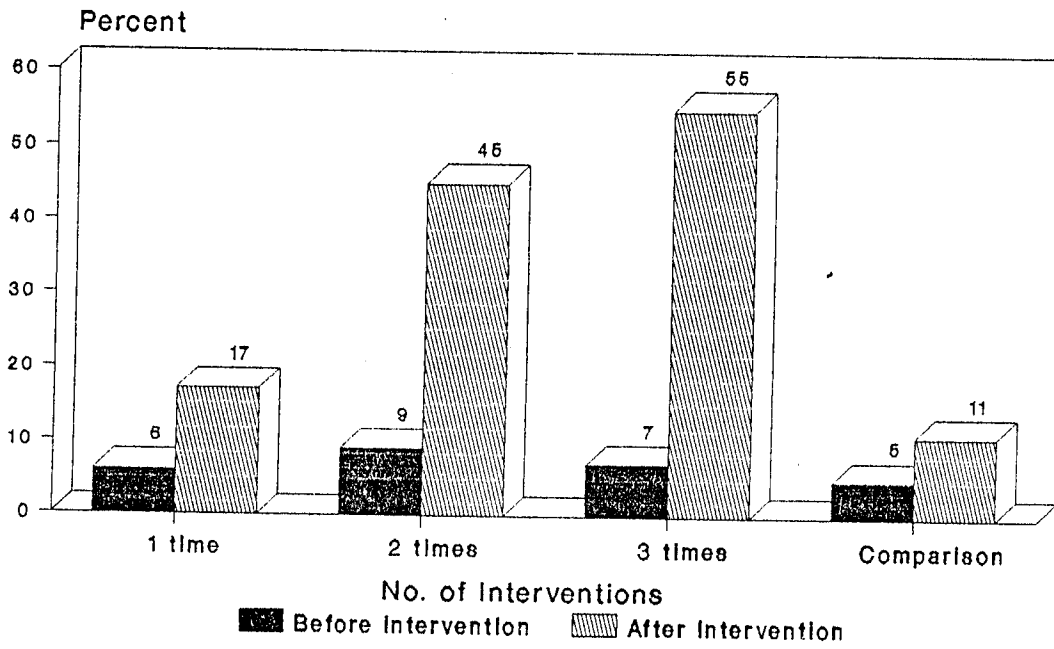


Fig.6a: Proportion of children fed milk-based foods

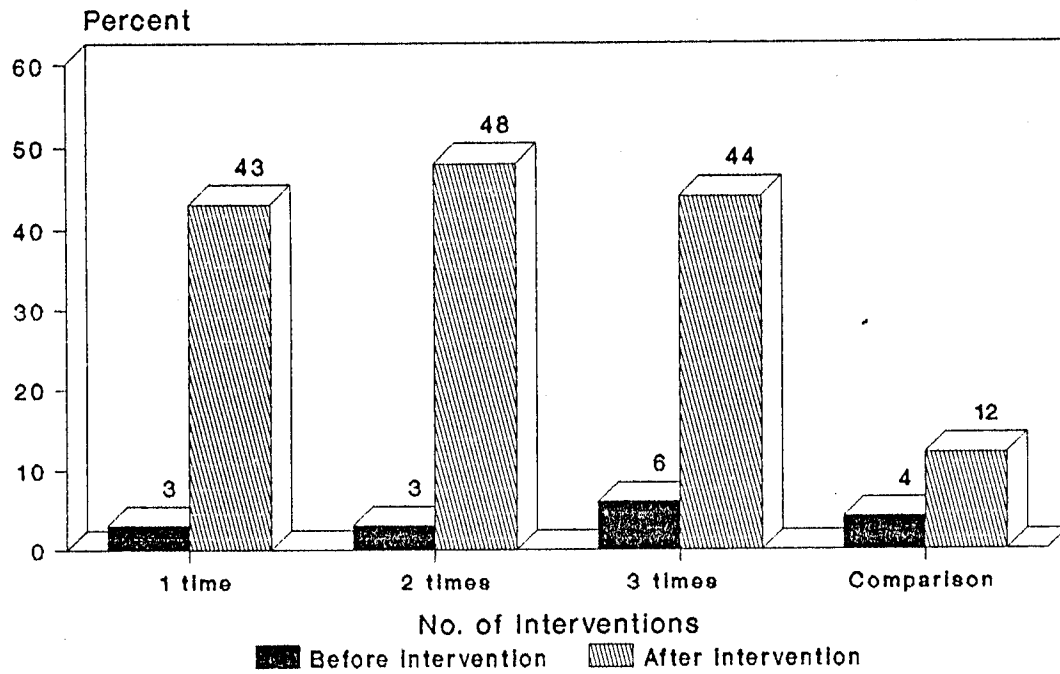


Fig.6c: Proportion of children fed vegetable-based foods

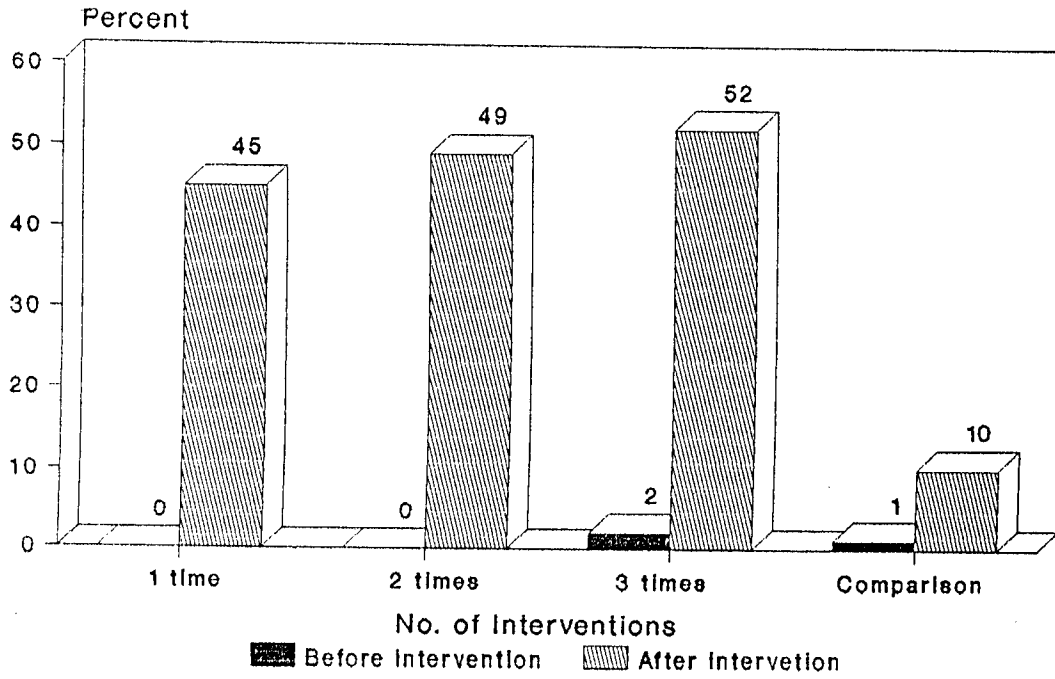


Fig.6c: Proportion of children fed vegetable-based foods

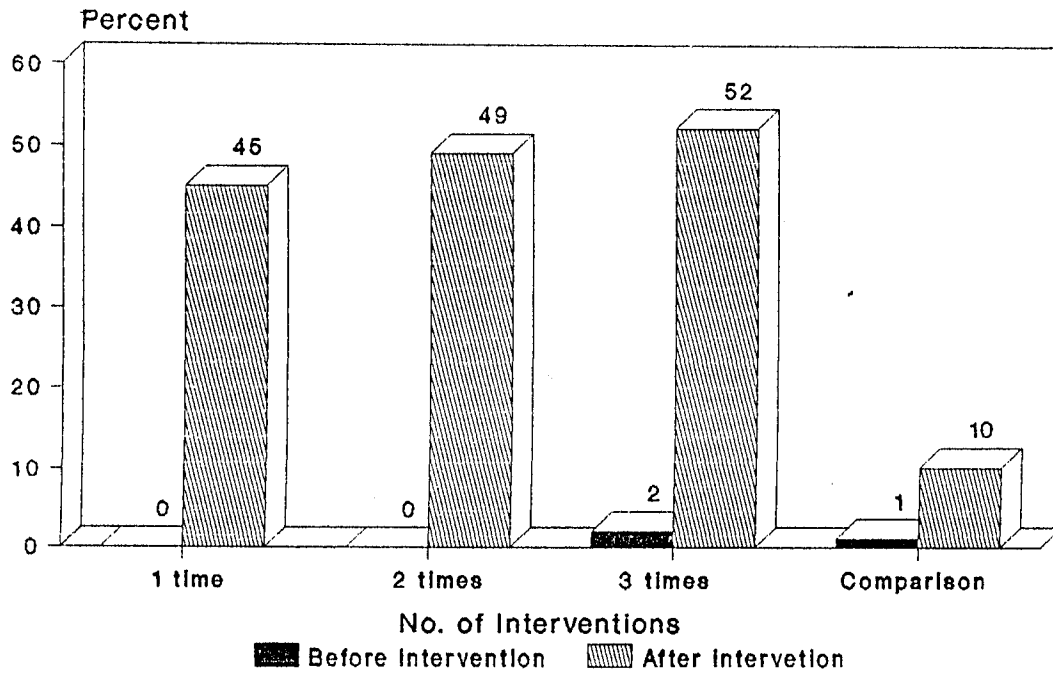


Table 1: Percentage distribution of mothers by their perception of the quantity of food to be taken during pregnancy, by union and pre- and post-intervention KAP surveys

Perception about quantity of food	Intervention unions						Comparison union	
	One-time inter-vention union		Two-times inter-vention union		Three-times inter-vention union		Pre	Post
	Pre	Post	Pre	Post	Pre	Post		
Increased	8.7	30.0	12.2	46.3	14.4	50.6	13.4	11.9
Less quantity	22.6	16.8	20.8	16.7	18.7	13.1	21.6	25.4
Normal quantity	67.7	52.3	64.7	37.0	65.1	34.7	61.8	58.5
Don't know	1.0	1.6	2.6	0	1.8	1.6	3.2	4.2
Total: (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
(N)	(416)	(427)	(385)	(318)	(278)	(245)	(380)	(384)

Table 2: Percentage distribution of mothers by the type of weaning foods given to the youngest living by child union and pre- and post-intervention KAP surveys

Names of foods	Intervention unions						Comparison union	
	One-time inter- vention union		Two-times inter- vention union		Three-times inter- vention union		Pre	Post
	Pre	Post	Pre	Post	Pre	Post		
Semolina (adding salt/ sugar/molasses)	0.4	0.3	0.4	-	5.4	1.6	1.7	-
Semolina (adding milk)	0.7	5.4	2.6	12.5	5.6	32.6	0.9	0.8
Rice powder (adding salt/ sugar/molasses)	38.2	10.6	25.5	8.9	20.7	2.1	35.3	45.7
Rice powder (adding milk)	18.6	72.0	14.5	60.9	7.3	51.9	10.5	20.6
Softened rice (adding milk)	1.8	7.6	0.9	13.1	2.2	8.0	3.0	5.3
Softened rice (adding salt/ sugar/molasses)	13.0	2.4	14.9	1.6	12.3	1.1	20.5	28.5
<i>Khichuri</i> (rice-lentils gruel)	-	-	-	1.2	0.6	1.6	1.7	0.4
Barley/sago	0.4	0.6	0.9	2.0	2.2	2.7	0	0
Others ^{1/}	48.0	1.1	64.3	0.8	67.6	0.5	52.8	1.7
Total: (%)	121.1	100.0	124.0	101.0	123.9	102.1	126.4	103.0
(N)	(285)	(329)	(235)	(245)	(179)	(187)	(228)	(247)

Note: Percentage total exceeds 100 because of multiple responses.

^{1/}Others mostly included biscuits, bread, banana, other fruits, sweets, egg, potato, puffed rice, flattened rice, etc. which were given to the children occasionally. These occurred frequently in the pre-survey, but in the post-survey these were less popular.