

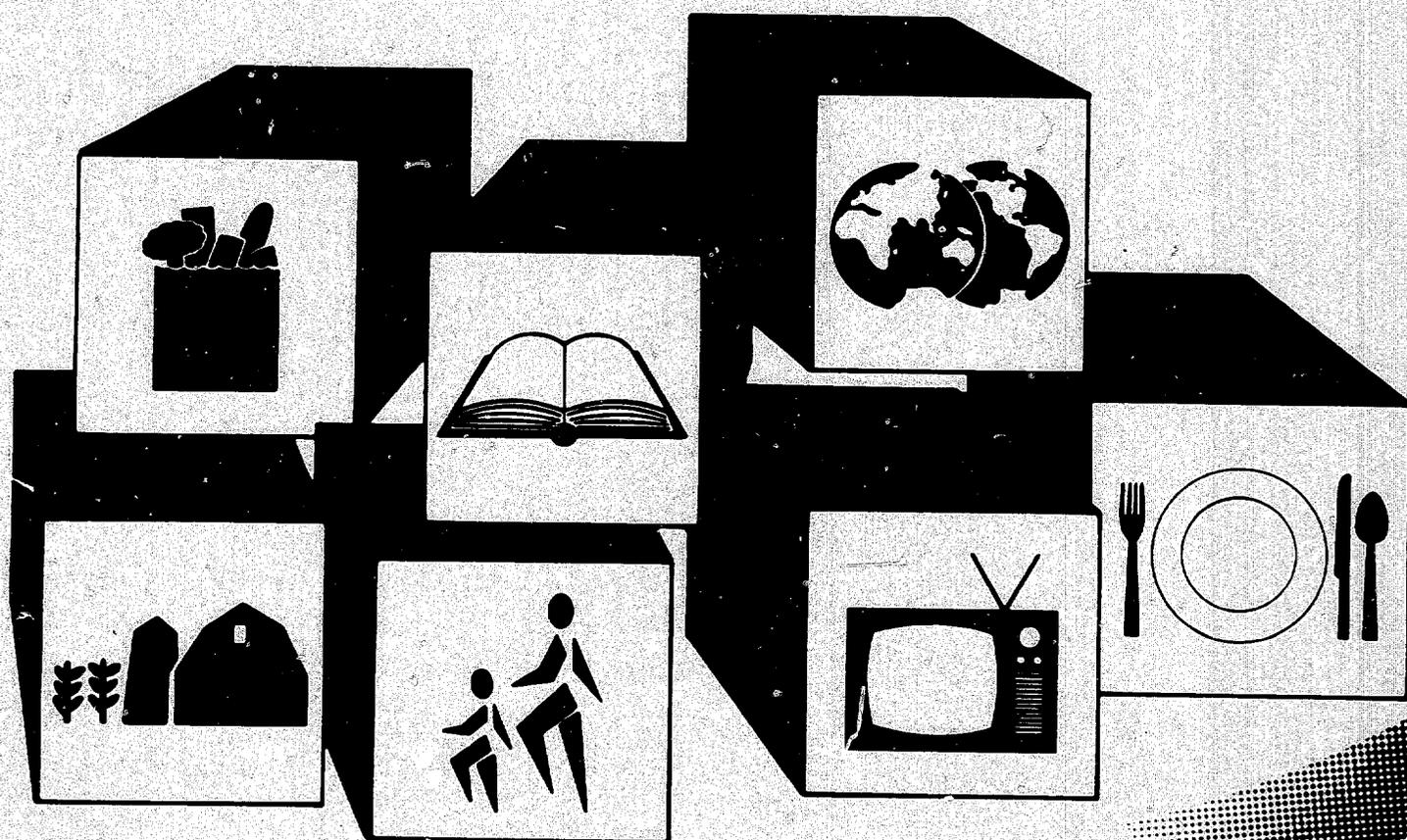
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- Dietary Management of Diarrhea in Gambia
- Nutrition Awareness of Preschool Children
- Psycho-Social Factors Influencing Dietary Change
- College Students' Perception of Nutrition Messages



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Dietary Management of Diarrhea: The Gambian Experience

MARK RASMUSON,¹ RENATA SEIDEL,¹ AND HADDY GABBIDON²

¹ HEALTHCOM Project, The Academy for Educational Development, 1255 23rd Street, NW, Washington, DC 20037; and ² Department of Medical and Health Services, Ministry of Health, The Gambia

ABSTRACT Malnutrition is part of the vicious cycle involving diarrhea and dehydration that contributes to high levels of morbidity and mortality among infants and children in developing countries. Oral rehydration solution (ORS) — a simple solution of water, sugar, and essential salts — can prevent most deaths due to dehydration. A further important element of proper diarrhea management is continued feeding. A nationwide project in The Gambia, West Africa, combined radio broadcasts with local health worker training and simple printed materials to teach rural women oral rehydration therapy (ORT), how they can use it at home, and how to monitor their children's progress during episodes of diarrhea. An independent evaluation included approximately 1000 women from twenty villages. After one year, approximately half of the women surveyed appeared to have learned the formula for mixing the sugar-salt solution and to have begun using it, while fewer than a third had adopted the "give solid foods" message. Accordingly, the second year of the program emphasized feeding messages. The percentage of children whose mothers said they stopped breastfeeding when the children were suffering from diarrhea dropped 8.8% in the first year to less than 2% during the second year, but rose somewhat following the campaign. After the first year's campaign, the number of children not fed solid foods or liquids besides breast milk during diarrheal bouts dropped from 32% to between 10 and 17%; the number of children given the same diet or one with more liquids rose from 59% to 82-85%. After the second year's campaign, 92-98% said they continued to feed their children during diarrheal bouts. These levels dropped slightly after the messages ended. Other percentages reflected a similar pattern of learning and partial forgetting. Measurable improvements in feeding behavior may be derived from an intensive, multi-media communication approach within one to two years. As with other health practices, however, newly learned feeding practices must be immediately and regularly reinforced to be maintained over time.

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INTRODUCTION

Malnutrition is part of the vicious cycle involving diarrhea and dehydration that contributes to the high levels

of morbidity and mortality among infants and children in many developing countries (1, 2). In 1980, approximately five million children under the age of five died as a consequence of diarrheal diseases due to a variety of causes. Infants with low birthweight, and infants and children who are undernourished, tend to have more prolonged and more severe episodes of diarrhea and are more likely to die from it (2-4). Diarrhea, in turn, can undermine nutritional status and impair growth (2, 3, 5, 6).

From 60-70% of diarrheal deaths are due to dehydration (1). The majority of these deaths are preventable through the use of oral rehydration solution (ORS) — a simple mixture of water, sugar, and essential salts. ORS can be administered by cup or spoon, and helps to replace lost liquid and to restore the body's ability to absorb fluid. Whereas, previously, dehydration was treated with intravenous therapy and required costly equipment, as well as specially trained workers, it can now be prevented and treated inexpensively and effectively in the clinic or at home. The World Health Organization (WHO) and UNICEF recommend the use of prepackaged ORS salts containing sodium chloride, sodium bicarbonate, potassium, chloride, and glucose (1). Some national programs recommend the use of home-mixed solutions made from readily available ingredients, when prepackaged ORS is not produced locally.

Another important element of proper diarrhea management is continued feeding, both during and after episodes, to replace nutrient loss due to vomiting and malabsorption (1-10). Until recently, the medical profession recommended resting the bowel during diarrhea (11). In many developing countries, purging or withholding of breast milk or food is a common treatment for diarrhea (5, 12). However, the World Health Organization states that:

... fasting has been shown to reduce further the ability of the small intestine to absorb a variety of nutrients. Even during acute diarrhea, 60% of the normal absorption of nutrients occurs. This is particularly

Address for correspondence: Mark Rasmuson, Director, or Renata Seidel, Editor, HEALTHCOM Project, The Academy for Educational Development, 1255 23rd Street, NW, Washington, DC 20037.

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true for fats and oils, which can provide a large amount of energy for the quantity eaten (7).

The results reported in this paper were part of a project initiated in 1978 to apply communication and social marketing techniques to the promotion of oral rehydration therapy (ORT) and related child survival practices. The original project began work in Honduras and The Gambia, and focused primarily on ORT and the control of diarrhea. Today, the expanded project includes a variety of child survival technologies (particularly immunization, infant nutrition, and personal hygiene), and operates in fifteen countries worldwide.

In The Gambia, during the period 1981-1984, the project focused on those most at risk from diarrheal disease, children under the age of five. Through radio broadcasts, combined with local health worker training and the use of simple printed materials, rural women were taught what oral rehydration therapy is, how to mix a water-sugar-salt solution and administer it at home, and how to monitor their children's progress during episodes of diarrhea. Special emphasis was also given to feeding practices during bouts of diarrhea. The nutrition goals of the project were to discourage mothers from withholding food from children with diarrhea and to promote feeding during and after diarrheal episodes.

METHODS

Overall structure of the project. The intervention began in February 1982 and lasted a little over two years. Five nationwide campaigns were correlated with the two major seasons (the dry season beginning in December/January, and the wet season beginning in June). The campaign used radio broadcasts, health workers, and printed materials to convey a range of health messages (see Figure 1). The targeted audience included rural mothers, grandmothers, and older female siblings of children under the age of five. The peak of the campaign's first year's activity was a highly publicized national educational lottery over Radio Gambia. The project distributed 150,000 handbills illustrating how to prepare the sugar-salt solution, broadcast radio programs explaining how to mix and administer ORS, and awarded prizes at local "Happy Baby" contests, based on a knowledge of the ORS formula and how to administer it. Over 180 health center workers received five days of training in diarrhea prevention and treatment. Six hundred fifty "Red Flag" volunteers (identified by a flag hung outside their homes) were trained to assist mothers in understanding and using the mixing flyers, and provided advice regarding feeding. The second year of the campaign emphasized feeding during diarrheal bouts, and the third year promoted diarrhea prevention measures such as the protection of wells, handwashing, and compound hygiene.

First year feeding messages. The first year of the intervention was organized around the concept of a "special diet for diarrhea." Messages promoted a threefold response to a bout of diarrhea: (1) preventive oral rehydration using a home-mixed sugar-salt solution; (2) continuation of breastfeeding; and (3) feeding of solid foods both during and after the bout, and giving *extra* food once the bout subsides. This latter feeding message addressed the nutritional problem of wasting that occurs among Gambian children — the most worrisome aspect of the chronic diarrhea they suffer during the rainy season — and discouraged the practice common among Gambian women of reverting from solid foods to watery gruels of little nutritional value in feeding their sick children.

Revised feeding messages. After a mid-project evaluation, the project staff reformulated the feeding messages for the second year and made feeding the primary focus of the 1983 rainy season phase of the campaign. Over a period of about four months, eight new radio programs were broadcast promoting new feeding practices, 1,000 posters were displayed in health centers, and 50,000 feeding flyers were distributed to mothers. About 100 health center workers received three additional days of training emphasizing nutrition.

The list of revised feeding messages was as follows:

- Continued breastfeeding.
- Give sugar-salt solution to prevent dehydration and to restore appetite. Remember the 3-8-1 formula (3 Julpearl brand soda bottles of water, 8 Julpearl caps of sugar, and 1 cap of salt).
- Try to give the child small, frequent feedings, even if he or she has little appetite.
- Add some sugar or milk to the child's pap (rice or millet gruel) at the time of feeding to increase its palatability.
- Once the child's appetite has returned, give solid foods like *nyankatango* (*mbahal*), *nyelengo* (*nyeieng*), *futo* (*chere*), and *mani fajiringo* (*malo bunye bañal*) to restore weight and power. (Local dishes are described later in the paper.)
- Oil, sugar, milk, and pounded groundnuts add extra power to foods. Add some of these to the child's food to increase its power.
- Give an extra meal to the child for at least two days after the diarrhea has ended, and *keep giving extra food until his or her weight and power are fully restored.*

These revised messages reflected the following changes in emphasis from the project's first-year messages:

1) *The new emphasis differentiated between feeding a child during diarrhea and feeding after diarrhea, and promoted the use of solid foods during the latter phase.* Rather than telling mothers to give solid foods to a child at a time when he or she may have little or no appetite,

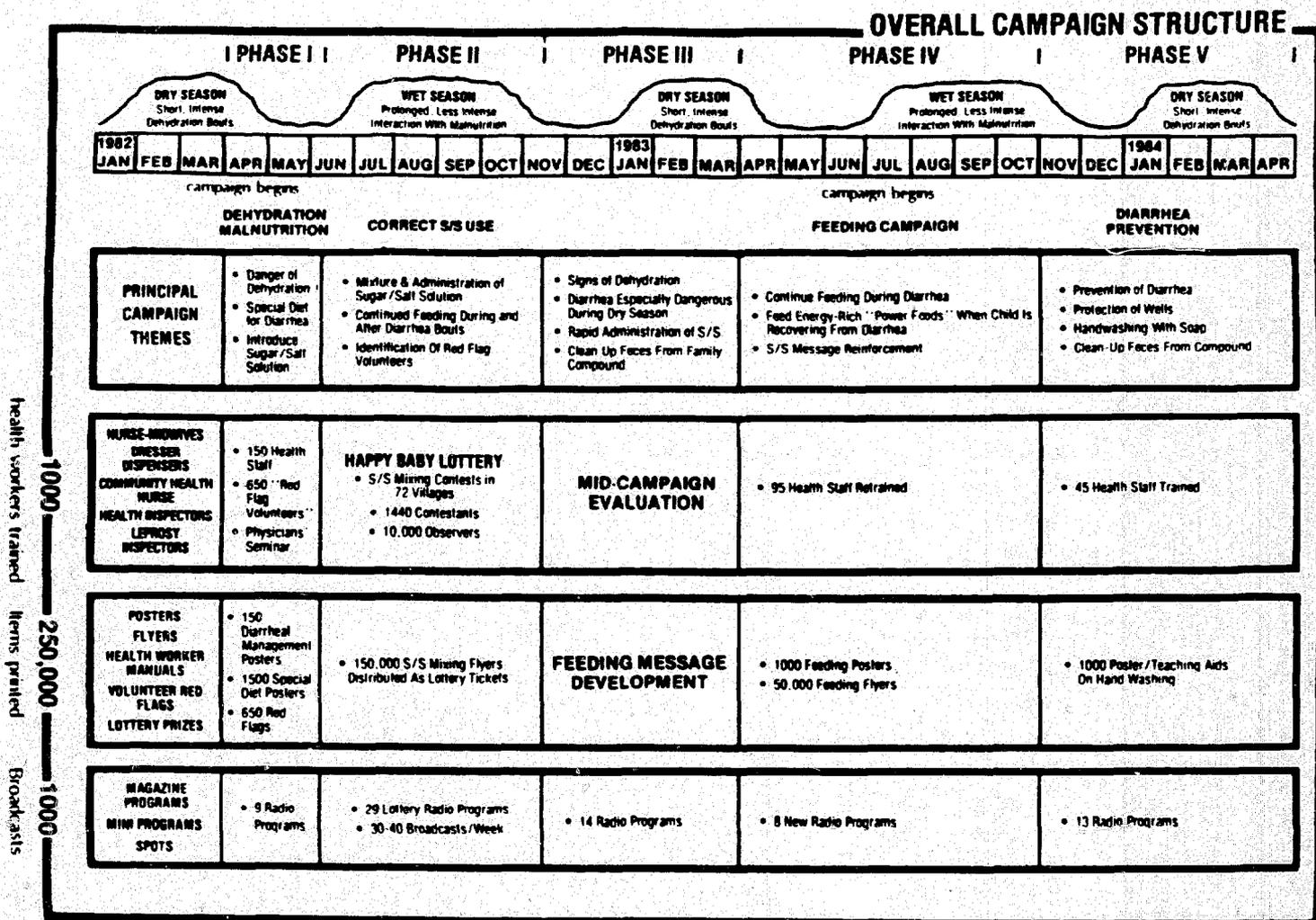


Figure 1: Overview of the campaign, 1982-1984.

the messages acknowledged the difficulty a mother may have in feeding her sick child and gave several practical suggestions for encouraging the child to eat *something*. These included giving small, frequent feedings and adding sugar or milk to the pap to improve its flavor and increase its energy value. Mothers were also encouraged to continue breastfeeding their sick children, which a very high majority of Gambian mothers already did. Solid foods were then encouraged as an important and appropriate "catch-up diet," once the child was getting better and recovering his or her appetite.

2) *Solid foods were promoted as a source of "power" (strength) and weight gain for a child.* A slogan was developed in the Mandinka and Wolof languages for use in both radio programs and graphic materials which said, "When your baby is recovering from diarrhea, give him solid foods to restore his power!" The message continued to contrast *powerful* solid foods with *weak* watery paps. This emphasis built on the researchers' finding that Gambian mothers most commonly cite loss of weight and strength as symptoms of diarrhea and causes of great concern.

3) *The full restoration of weight and power was em-*

phasized as the guideline for how long to give extra food to a children recovering from diarrhea. This decision was made after failing to agree on a specific number of extra days or meals to recommend that would be neither too few to be effective nor too many as to seem unrealistic in the Gambian context. WHO, for example, recommends an *extra* meal every day for at least a week (7), but the researchers felt that this recommendation would be rejected as unrealistic by Gambian rural women, who spend most of the day during the rainy months working in the fields away from their children. During the rainy season children have been found to suffer from diarrhea approximately 25% of the time (3). The researchers also felt confident that most Gambian mothers are very sensitive to their children's weight gain and loss, perhaps because a high percentage of them regularly attend MCH clinics where their children's weights are charted on "road-to-health" cards.

The final decision was to advise mothers to give an extra meal to the child for *at least* two days after a bout of diarrhea and, more importantly, to *continue giving extra solid foods* until his or her weight and strength are fully restored.

4) *A number of specific local dishes that are particularly energy-rich were recommended:*

- *mani-fajiringo/maio bunye bahal*: dehusked rice is boiled, sometimes after preliminary steaming, and then the water content is reduced by a final steaming. Fajiringo is usually served with the groundnut sauce *durango*.
- *futo/chere*: finely powdered flour is steamed twice, almost to dryness. Futo is eaten with added water or a thin sauce, *dajiwo*, often the water in which fish has been cooked.
- *nyankatango/mbahal*: fajiringo that has been cooked once is steamed with groundnuts, and often fish are cooked on top of it.
- *nyelengo/nyeleng*: dehusked, whole cereal is steamed. This food is usually served with a sauce made from groundnuts and leaves.

These dishes were recommended on the basis of their high energy content. All of them have a gross energy content in the range of 125-200 kcal/100 g, expressed on a fresh weight basis, depending on which sauces or other ingredients are added to the dish. This compares very favorably with the rice or millet paps that mothers commonly feed their infants, which are about 88% water and have energy contents in the range of 35-60 kcal/100g.

5) *In addition to these recommendations of specific dishes, the messages also promoted a number of ingredients that would enrich the energy value of a child's food.* These included sugar, milk, oil, and groundnuts. In the past, nutrition education of Gambian mothers has concentrated almost entirely on expensive (mostly unaffordable) protein-rich foods such as meat and eggs.

Evaluation methodology. Concurrent with the intervention, Stanford University (and later Applied Communication Technology) conducted an extensive, independent impact evaluation under a separate contract. Most of the quantitative data reported in this paper are derived from the results of that study, detailed reports of which are available from Applied Communication Technology (13).

The overall design entailed repeated measures on a panel of approximately 1000 women from twenty villages, over a period of approximately two years, beginning immediately prior to the start of the intervention. The measures covered a wide range of variables, including demographic and socioeconomic status indicators, exposure and access to intervention channels and materials, knowledge of relevant general information and campaign content, measurement of diarrheal morbidity among children and mothers' responses to it, changes in other behaviors targeted by the intervention, and anthropometric measures of children. These variables were grouped into different instruments, which were administered to mothers by evaluation field workers — four

local women who took up residence in different villages and visited their respective five-village clusters approximately once a month. One instrument was administered on each visit and was repeated after an interval of two to six months, with other instruments and repeat administrations filling the other visits. In this paper, the cycle of repeated administration of a given instrument is called a wave.

The sampling plan was multi-tiered, with purposive sampling of clusters of communities, random sampling of compounds within communities, and random selection of women within compounds, subject to weighting by the number of residents in the compound. Communities were selected to ensure inclusion of the full range of rural characteristics and service levels found in The Gambia, with consideration given to regional and tribal representation and logistic efficiency. One of the initial steps was to develop a list of "stratification variables," factors expected to be related in some way to the outcomes assessed. These included availability of health care services, tribal identity, language preference, radio coverage, location relative to the river and the main roads, administrative division, type of livelihood, types of nonhealth community services available, and size of community. There were several major constraints. Research communities had to be close enough together to enable a single field data collector to live in one of the communities and travel to those nearby. Villages had to be within the four administrative units having access to Radio Gambia, the government radio station.

Women between 15 and 45 years of age were eligible to be sampled, and the sample drawn at the beginning of the evaluation was retained throughout the study without replacement. The problems of measurement in scattered communities made follow-up visits difficult or impossible if the mother was not in the home when the interviewer arrived; hence, a varying subsample of 800 mothers was interviewed in each wave.

The evaluation also undertook an observation study to see if the mothers' behavior conformed to their self-reported behavior. In August 1983, during the height of the rainy season when diarrhea was most prevalent, interviewers sought out actual cases of diarrhea among the children of the sample's women. The observed feeding practices support the reliability of the levels derived from self-reported data (14).

RESULTS AND DISCUSSION

First year results. In 1983 the project conducted an evaluation to assess the progress after one year of the campaign and to guide the development of second year messages. At about the same time, Stanford University/Applied Communication Technology produced its initial set of data from their own evaluation of the campaign's

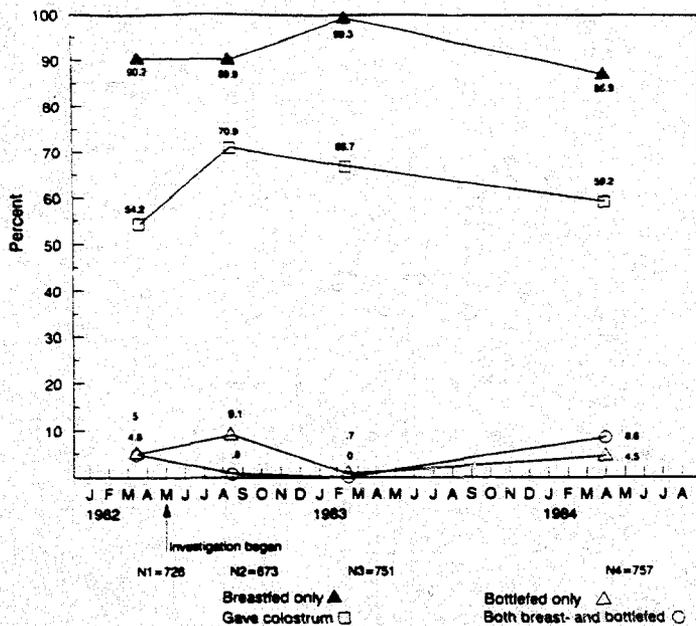


Figure 2: Breast- and bottle-feeding of youngest child in the first months of life, May 1982 to April 1984.

effect on the knowledge and adoption by Gambian mothers of the key health messages. The two evaluations indicated the same pattern of response to the "diet for diarrhea" messages: while 66% of rural women interviewed could recite the campaign's formula for mixing sugar-salt solution and 47% reported using it, only 21% had adopted the advice to "give-solid-foods-during-and-after-diarrhea."

Several explanations for this discrepancy were considered, including the obvious possibility that the ORT messages had been more widely adopted because they had received much greater exposure during the first year. Another plausible interpretation was that the solid foods message was too crudely formulated. "Give solid foods during diarrhea" was very possibly contraindicated in the minds of many mothers by the anorexia children often suffer during diarrhea. A sick child may be reluctant to take any kind of food, let alone solid foods. The message also, obviously, did not apply to an unweaned child.

Overall results — breastfeeding. The evaluation conducted by Stanford University/Applied Communication Technology questioned mothers about their practices during the current or most recent opportunity to engage in new breastfeeding behaviors, i.e., what they did with their youngest child (15). Figure 2 shows that the percentage of mothers reporting that they bottlefed their infants exclusively remained under 10% throughout the campaign. The percentage of mothers reporting that, during the first months of their youngest child's life, they only breastfed him or her increased by approximately 8% in the course of the project — up to a high of 99.3% in February 1983 and dropping to a low of 86.9% in

1984. The percentage of women who claimed they were giving their infants colostrum, or first milk, rather than discarding it rose from 54% in 1982 to a high of 70.9% in 1983, and dropped to 59.2% by April of 1984.

Figure 3 shows the percentage of children under the age of two whose mothers reported that they stopped breastfeeding when a child had diarrhea — a practice which the campaign discouraged. This percentage dropped from 8.8% before the campaign to 0-2% during the 1983 rainy season. It stayed at this level for approximately a year, but climbed to a high of 12.3% by April of 1984.

It is unclear why this upswing in stopping breastfeeding during diarrhea occurred during 1984. It may be associated with impaired health status and increased dry season workload during the 1983-84 drought, or may be related to the shift in the campaign to sanitation issues during the last phase of the campaign. However, it parallels information indicating lower rates of breastfeeding in general during the 1984 drought (16).

Overall results — feeding during diarrhea. The 1982 rainy season diet campaign appeared to effectively communicate messages about continued feeding and promotion of liquids during children's bouts of diarrhea. Figure 4 shows that the number of children not fed solid foods or liquids besides breast milk during diarrhea dropped from 31.7% to a range of between 10.3 and 16.7% for a period of at least seven months, while the number of children given the same diet or more liquids rose from an initial 58.9% to a range of between 82 and 84.7% for the same period of time.

After the campaign ceased its diet emphasis in October 1982, women seemed to resume their past child feeding behavior: 56% of the children suffering from diarrhea were fed the same diet or more liquids in March 1983, and 27.2% of the children were not fed solid foods or liquids besides breast milk during diarrhea. Then, with the resumption of diet messages in the summer of 1983, nearly all children (92.4-97.8%) with diarrhea were reportedly given solid foods or supplemental liquids. These levels dropped again after the messages ended in the dry season, but not as much as they had after the first year. Thus, at the beginning of the rains in 1984, 85% of the children were given the same diet or more liquids, and 14.6% were not fed solid foods or liquids besides breast milk during diarrhea bouts.

Other evidence also points toward a "forgetting effect," once feeding messages ceased. Figure 5 shows that between the 1983 rainy season (when the feeding campaign was conducted) and the 1984 dry season, the percentage of women interviewed who fed their children less than normal after diarrhea increased from 16.4% to 22.7%. In addition, fewer women increased the amount of foods given to children recovering from diarrhea. The percentage of women giving the same diet or more foods

Figure 3: Percentage of children under two years old who stopped receiving breast milk during their most recent bouts of diarrhea.

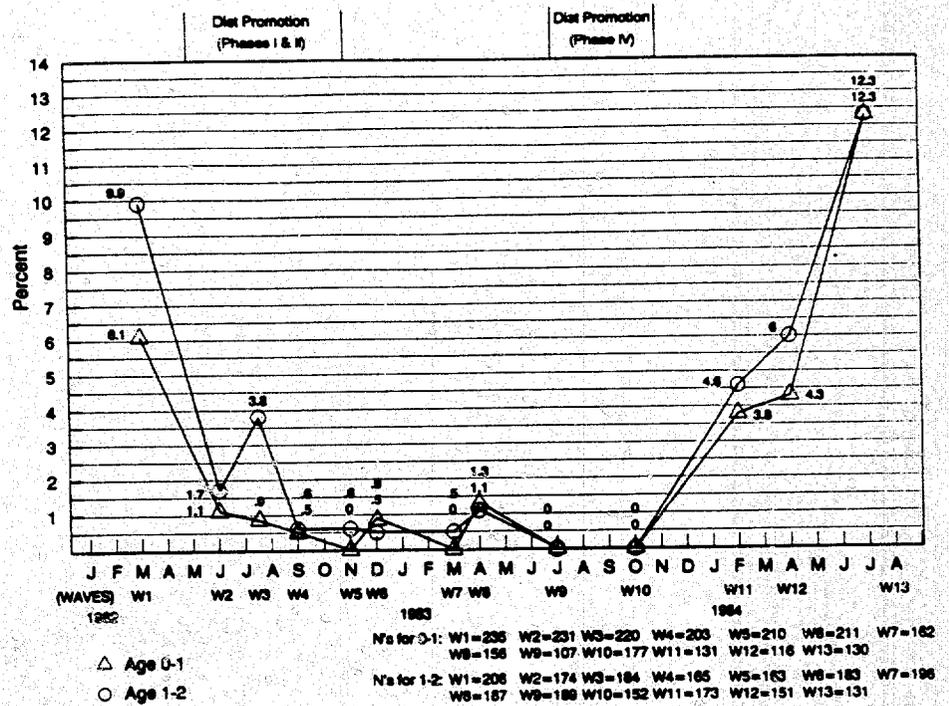
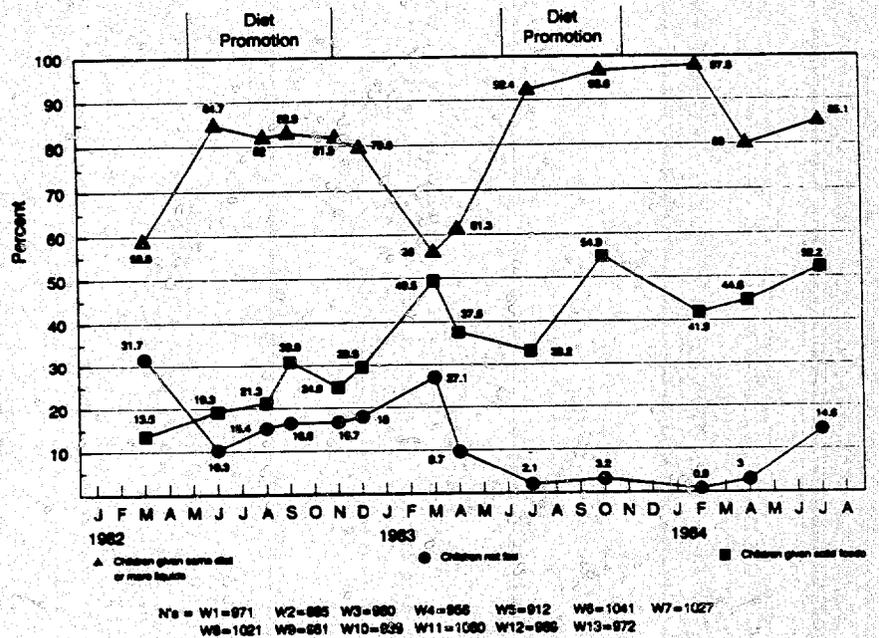


Figure 4: Feeding during diarrhea, aside from breastfeeding.



dropped slightly between September and February, from 83.6% to 77.3%.

During the 1983 rainy season, towards the end of the second campaign, 72.8% of the women gave either solids alone, or solids and pap together to their ill children. Only 13.2% reportedly gave paps alone to their children. By the following February, 50.8% of the women said they gave solids alone, or solids and paps together, and 46.3% gave only paps. Some of the deterioration here may be due to food shortages during the drought, in addition to the decrease in frequency of feeding messages. Looking at the composition of solid foods given to

ill children, rice and groundnut porridge — two foods in short supply by February 1984 — dropped in consumption while coos (millet) increased (Figure 6). "Power foods" like fish and meat were rarely mentioned at either time by the women.

Discussion. Gambian women seemed to respond to those feeding messages that the campaign emphasized the most, but showed signs of forgetting or ceasing practices when the messages stopped. After the second round of feeding messages, there was generally less forgetting. This may have been due to more effective message con-

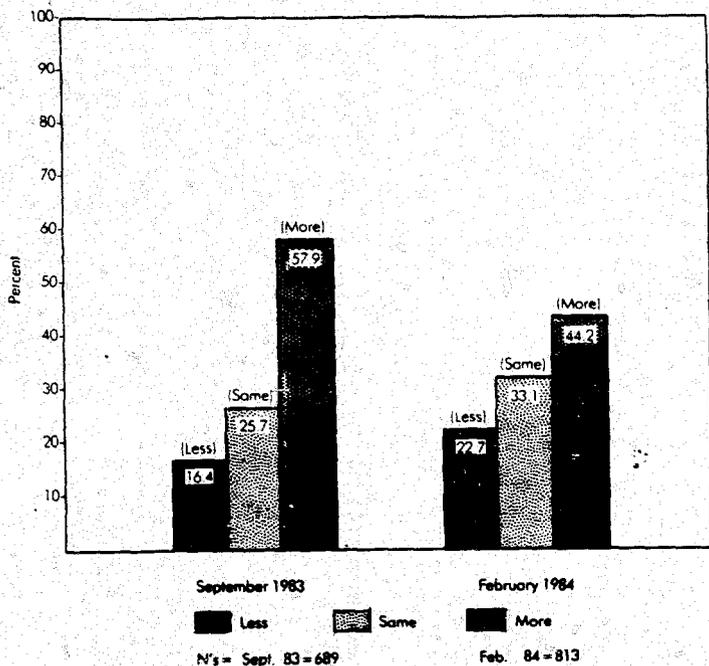


Figure 5: Mothers' reports on the amount of food given to a recovering child, in contrast to a healthy child.

struction or to the fact that the second year was building on the first year's base, or a combination of these factors.

Most women learned not to withhold all food from their ill children, which was one of the primary objectives of the campaign. After the emphasis on feeding during the second rainy season campaign, few children were denied food altogether, but only half received solid foods. This percentage, however, was an improvement over the low of 10% at the start of the project. Campaign messages perhaps should have been more specific about the proper age at which to give children solid foods. Of those children eating paps, half had sugar, milk, or some other supplement added to the pap.

After the first campaign began, and continuing for about one year, few mothers stopped breastfeeding children who had diarrhea. However, in 1984, breastfeeding for both well and ill children fell to levels lower than those at the start of the campaign. This situation may have been caused by effects of the 1984 drought. These results highlight the need for pretesting of messages and long-term exposure through several media. Monitoring of midcourse effectiveness allowed this program to tailor messages more appropriately to the mothers' concerns and to the environment.

Although the systematic evaluation of nutrition education programs has become more common in the last decade (17), few of these programs have focused on the relationship of feeding to diarrheal disease. Moreover, measures of changes in nutrition-related behavior — whether observed or self-reported — are still rare (5, 17-19). On the other hand, promotion of changes in caretaker behavior hold the most promise for improving management of diarrhea and related nutritional problems (5, 20).

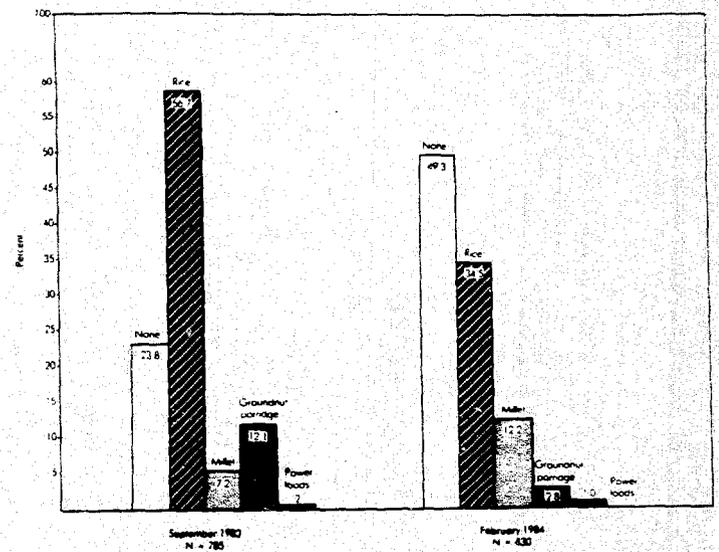


Figure 6: Types of solid foods that mothers reported feeding to sick children.

A WHO review of supplementary feeding programs found that several of them had a significant impact on mortality in general, but concluded that their high costs and logistic and managerial complexity made such interventions unlikely to be effective approaches for national diarrheal disease control programs (2). Numerous studies have shown the effectiveness of promoting breastfeeding, and the impact of this practice on diarrhea morbidity and mortality among infants up to six months (21). As other foods are introduced, both the frequency and severity of diarrhea increases (2). Weaning practices are therefore a critical, if complex, area for intervention.

Several programs sponsored by CARE in the early 1970s (Republic of Korea and India) used multiple media to communicate messages regarding improved weaning practices. Although these programs showed large changes in awareness and knowledge, there was little evidence of changes in practice (22, 23). Other programs have demonstrated modest short-term changes in self-reported behavior. Manoff International, Inc. conducted year-long nutrition projects, via radio, in the Philippines and Nicaragua in the 1970s (24). In Nicaragua the proportion of mothers surveyed who reported feeding their children during diarrhea increased by 10%, but the common practice of giving purges did not change. In the Philippines large percentages of mothers reported positive attitudes toward adding oil, vegetables, and fish to their children's diet (74%, 82%, and 81%, respectively); however, much smaller percentages reported actually changing their practices (24%, 7%, and 12%), and the amounts added were small in comparison to dietary need (5). The greatest response to messages was in the first six months (25). The ORT program in Egypt incorporated simple "continue breastfeeding or feeding" advice into its mass media programs beginning in 1985. Within three months, the number of mothers who reported following