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**Operations Research to Train Volunteer
Health Workers In Home Management of
Acute Respiratory Infections**

**Operations Research to Train Volunteer Health Workers in
Home Management of Acute Respiratory Infections**

Final Report

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PREFACE

Over the past decade, national and international commitment to extending basic health services to underserved urban and rural populations in developing countries has led to major investment in primary health care (PHC) and child survival program strategies. However, these programs continue to face persistent problems with underutilization of services, lack of knowledge and acceptance of home-based interventions, and at times, inadequate quality of services provided. Typically, program managers lack specific information about how service delivery activities and support functions such as supervision, are routinely carried out.

While surveys and evaluations have tended to focus on measuring program inputs (such as training and supplies), outputs (such as number of services delivered) and outcomes (such as changes in morbidity rates), relatively little attention has been devoted to analyzing the performance of the activities that produce a given outcome. Yet, opportunities to improve the effectiveness of PHC and child survival programs at the operational level clearly depend on strengthening these service delivery and support processes.

Responding to the need for better information on the process of service delivery, the Agency for International Development has launched, through the Primary Health Care Operations Research Project (PRICOR) Project, a major international effort to document and analyze the activities of PHC programs in developing countries. PRICOR was established in 1981 under a cooperative agreement with the AID Office of Health to help developing countries improve their PHC and child survival programs through practical, decision-oriented management studies and operations research. In its second phase, a major PRICOR objective is to develop new and innovative ways of identifying and diagnosing discrete problems in the process of service delivery that will lead to measurable improvements in program performance.

PRICOR staff now are refining and applying a systems analysis approach that allows program managers to accurately describe how key components of the PHC program actually operate and to identify the specific weak points and bottlenecks that impede effective delivery of PHC services at the peripheral level. The systems analysis relies on direct observations, key informant interviews, limited surveys, and other rapid assessment methods to provide decisionmakers with a comprehensive picture of program strengths and failures. By shifting the focus from input and outcome measures to process indicators, systems analysis provides concrete data that lead to tangible improvements, through immediate corrective action or short, problem-solving operations research studies.

The *PRICOR Country Report* series presents the efforts of PRICOR staff and investigators from collaborating institutions to apply, in some dozen countries, practical methodologies for observing and measuring how PHC service delivery activities are being carried out. This volume presents the results of an operations research study to train and then assess the field performance of community health volunteers in the management of acute respiratory infections (ARI). The study was developed and conducted in Bogota, Colombia by the Fundación Santa Fe de Bogotá, with PRICOR assistance.

This operations research intervention was initiated after a systems analysis conducted by the Fundación Santa Fe in 1987 showed serious deficiencies in health worker and community knowledge and practices with respect to ARI. The study's innovative training methodology and follow-up strategy will be of interest to all those who are involved in community level activities to address the problem of acute respiratory infections.

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OPERATIONS RESEARCH TO TRAIN VOLUNTEER HEALTH WORKERS IN HOME MANAGEMENT OF ACUTE RESPIRATORY INFECTIONS

I. PROBLEM DEFINITION

In Colombia, acute respiratory infections (ARI) represent the primary reason for visits to the doctor and the second highest cause of death among children 1 to 4 years of age. A community health assessment was performed in 1982 by staff from the Community Health Division of the Fundación Santa Fe de Bogotá (FSFB) covering the 10 low-income neighborhoods in its catchment area. This assessment indicated that the primary cause of morbidity in the population was acute respiratory infections. In 1987, during the systems analysis phase of the Fundación's PRICOR-funded¹ project, a household survey revealed ARI cases within the previous 15 days in 32% of the homes with children less than 5 years of age. In addition, respondents cited ARI as the main reason for visits to nearby health posts and health centers.

To the extent that ARI cases are managed correctly from the start, the proportion of patients who develop moderate or severe ARI can be decreased significantly. While guidelines of the Colombian National Program for ARI Management require that all cases of moderate or severe ARI be treated by medical personnel at a health facility, they also recognize the need to provide rapid treatment of mild cases of ARI, by family members and primary health care workers, who can also provide preventive education.

Since 1983, the Fundación has trained and supported community volunteers to serve as primary health promoters in their own neighborhoods. Given the magnitude of the ARI problem, the FSFB provides continuing education on ARI for these volunteer health workers. However, the problem diagnosis phase of the FSFB/PRICOR project identified a number of deficiencies in the volunteers' knowledge about ARI. This lack of knowledge has hampered their performance in assigned tasks related to the management and prevention of acute respiratory illnesses, and is also evidenced in the low level of ARI knowledge of mothers in the community. Specific examples of the problems found include:²

- Half of the volunteers had never received training in ARI management.
- Only 44% of the volunteers could identify 2 or more modes of transmission of ARI, the most common response being exposure to other sick persons.
- Only 51% could cite 3 or more preventive measures.
- Volunteers knew only three signs and symptoms of ARI: high fever, difficulty breathing, and cough.

1. The work upon which this report is based was funded by the Primary Health Care Operations Research (PRICOR) Project, through a subagreement from the Center for Human Services, under its Cooperative Agreement No. DPE-5920-00-A-5056-00 with the U. S. Agency for International Development.

2. For more detail, see the final report prepared for this phase of the project, entitled: "Operations Research in Child Survival." Final Report, PRICOR Project Phase I. Fundación Santa Fe de Bogotá, Bogotá, February, 1988.

- The ARI treatment measures known by volunteers were: vapor inhalation (67%), drugs (44%), abundant liquids (37%), bath in tepid water (17%), and eating fruits (11%).
- During observed home visits, volunteers showed a lack of initiative for diagnosing, treating and/or referring ARI cases, as appropriate, and for providing preventive education to mothers.
- Mothers did not know important signs of severe ARI, such as changes in respiration, chest retraction or earache. The only symptoms they recognized as ARI were: stuffy or runny nose (78%), fever (50%), cough (47%), general discomfort (27%) and sore throat (15%).
- Many family customs for treating ARI were counterproductive or ineffective, such as: use of medicines without prescription and/or mixing medications (88%); vapor inhalations (13%), or rubbing the child with Vicks Vaporub or alcohol (7%).
- Among the 36% of children that were taken to the doctor for ARI, only 16% went because of a volunteer referral.
- Mothers believed that the best way to prevent ARI was to avoid abrupt changes in temperature. They did not know other important preventive actions such as breastfeeding, avoiding exposure to contagion, and maintaining good nutritional practices.

Due to these deficiencies in volunteer knowledge about ARI, combined with the limited application of knowledge in the field, an operations research (OR) study was initiated to identify effective solutions. The specific objectives of the study were: to design and validate a strategy to train primary health care workers in ARI management and to develop mechanisms that would help them correctly apply their knowledge in their communities.

II. METHODOLOGY

A. Solution Development

A working technical group, composed of two researchers from the PRICOR project (a nurse and a nutritionist), an ARI specialist, and a trainer, was formed during the solution design phase of the study to define a detailed list of tasks, knowledge, and skills required for volunteer health workers to manage cases of ARI in the community. The group used the World Health Organization's recommendations for ARI management and the recently revised norms of the Ministry of Health (MOH) as points of reference. The MOH had modified its norms for ARI management to eliminate the use of vapor inhalations and cough syrups and to regulate the use of antibiotics for treatment.

The team defined specific ARI tasks for the volunteers along the lines of the three main activities for which the volunteers are responsible (prevention, treatment, and referral). The specific set of tasks identified by the technical group may be summarized as follows:

- PREVENTION:**
- o Conduct home visits
 - o Teach about risk factors
- MILD ARI:**
- o Examine children
 - o Classify cases according to the signs and symptoms
 - o Teach and demonstrate correct management procedures for: fever, stuffed nose, and feeding
 - o Teach warning signs for deterioration of the child's condition
 - o Conduct return visits to homes where children have ARI

MODERATE OR SEVERE

ARI:

- o Make immediate referral to the health center
- o Instruct mother about what to do if the child is referred
- o Conduct return visits to homes of children that were referred

In identifying a priority problem to address through operations research, the group decided that their greatest concern was the fact that volunteers were not applying their knowledge about ARI in the community. The solution selected to address this problem was to design a continuing education course on ARI management to provide refresher training for community volunteers and ensure that volunteers applied their knowledge in their communities.

The training course had three important characteristics. First, it focused on specific tasks and the skills needed to carry them out, thus giving the training a strong emphasis on application, rather than simply encouraging the accumulation of knowledge. Second, the training stressed the seriousness of ARI in the communities, in an effort to motivate the volunteers to assume a more active role in addressing this health problem. Finally, a post-course practicum of home visits observed by a nurse was included to allow the instructors to evaluate the effectiveness of the training and give health workers an opportunity to receive feedback on their performance.

After the course content was defined, a training manual, called the Manual for Trainers of Primary Health Care Workers³, was written to guide the volunteer training, as well as facilitate future replication of the course. The manual has four thematic modules: (1) Definition of ARI, seriousness of the problem, and the risk factors for ARI; (2) Signs, symptoms and classification of ARI; (3) Volunteer activities for the management of ARI; and (4) Communication skills for health education. Each module covers educational objectives, technical content, teaching methodology guidelines, resources needed, and steps for verifying student comprehension.

An innovative approach tested in the training was the preparation of "My ARI Notes" by the volunteers. The Notes had an outline format corresponding to the session plan for each day of training. Blank spaces were left for the volunteers to write in key information from each session. The idea to use these was born out of a concern that the volunteers would focus too much on the technical terminology and less on the steps for practical application. The Notes thus concentrated on the basic knowledge volunteers needed to fulfill their ARI tasks. At the completion of the course, the volunteers were given a folder in which to bind all of the Notes they filled out for use as a reference when conducting home visits.

B. Solution Validation

Before conducting the course, an evaluation scheme was designed to validate the effectiveness of the training (see Figure 1). Instruments were developed to assess the training process itself, volunteer knowledge levels before and after the course, and volunteer management of ARI during home visits following the training (see Annexes 1 and 2).

3. Copies of the ARI Trainers' Manual are available at cost from the División de Salud Comunitaria, Fundación Santa Fe de Bogotá, Calle 119 No. 9-33, Bogotá, Colombia.

EVALUATION MODEL

An active promotion campaign was carried out to encourage volunteer participation in the ARI course. This campaign included placing posters in the surrounding communities and distributing a course outline in advance. In addition, participants who completed the entire course were promised a certificate. Forty-seven active volunteers began the course, along with approximately 20 volunteer candidates and other interested individuals from the communities around the FSFB.

The course was held from January 25 to March 4, 1989, consisting of six weekly 3-hour sessions. Thirty-eight of the active volunteers completed the full 18-hour course.

The team nurse conducted follow-up field observation between March 15 and June 30, 1989. She accompanied volunteers on one to three different occasions as they visited homes in their communities. Volunteers were asked to select homes to visit with children under five and if possible, where a child had a respiratory illness. During the visits, the nurse filled out an observation checklist to assess the volunteers' competence in managing cases of ARI and educating mothers. Among the 38 active volunteers who completed the training course, 27 were observed on one home visit, 21 on two visits, and approximately half of the volunteers (17) on three visits.

III. RESULTS

A. Volunteer Knowledge of ARI

In the first session of the continuing education course, participants were asked to give their opinions about the causes and treatment of a cold and when to take a sick child to see a doctor. The questions were asked to determine volunteers' existing beliefs and practices before the course and to help the trainers orient the sessions. The results from this assessment are given below.

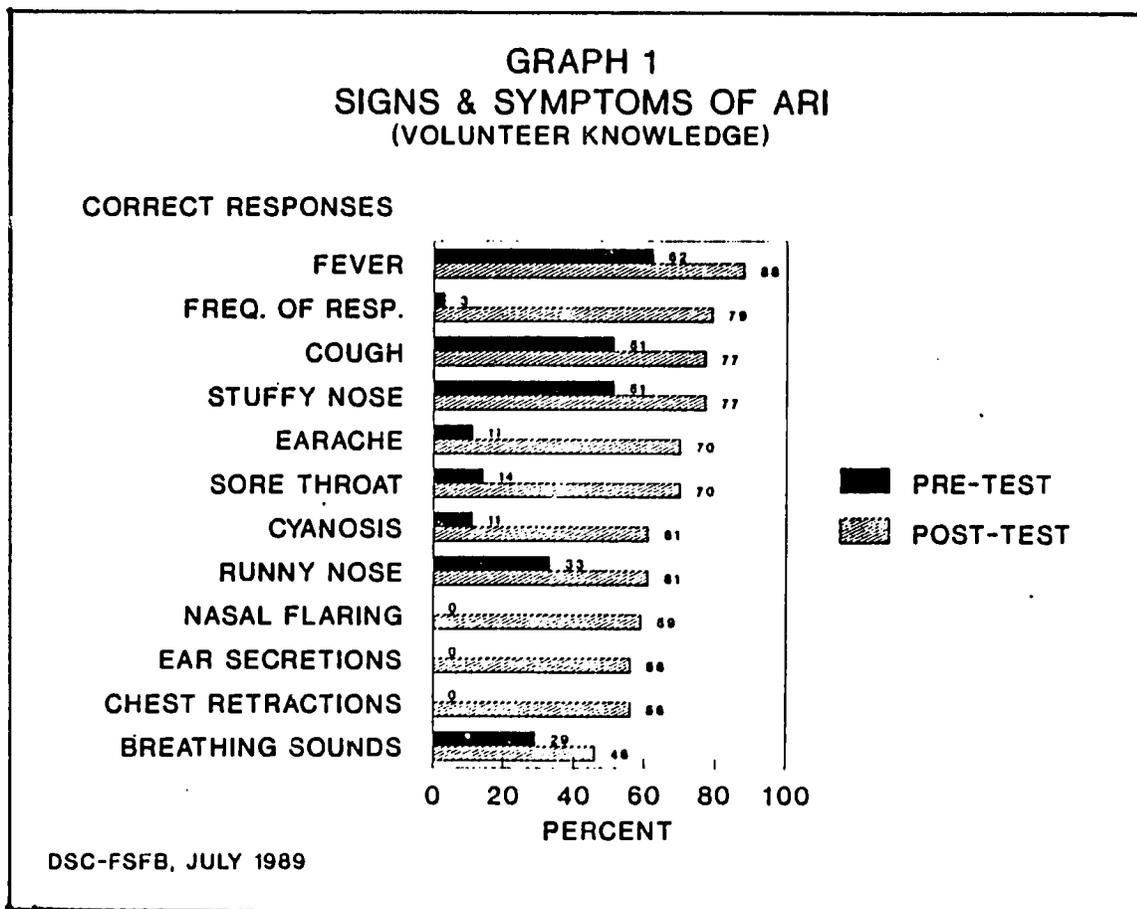
- Causes of a cold: When asked about what causes a cold (*gripa*), volunteers gave the following responses: a virus (44%); changes in climate or temperature (36%); "bad airs" (32%); exposure to contagion in the environment (28%); exposure to a contagious individual (20%); poor personal hygiene (20%); lack of immune defenses (12%); malnutrition or lack of vitamins (4%); from getting wet (4%); from getting cold (4%).
- Treatment for a cold: In treating a child with a cold, volunteers said that they usually took the following measures: give pills, like aspirin or acetaminophen (89%); give liquids (63%), especially herb tea with lemon or eucalyptus; warmly wrap the child (26%); give vapor inhalations (15%); and bathe child and cover with a white sheet or blanket.
- Seeking medical attention: In reference to this question, 69% of participants said a child should be taken to the doctor when he/she has a high fever or when the fever will not go down.

A pre-test was then given to determine volunteers' baseline knowledge levels before the course. At the end of the course, a similar post-test was given. A comparison of the results from these two tests indicates that, in general, the level of knowledge about ARI improved significantly (see Annex 3). The mean

score rose from 28 points (± 11.5) in the pre-test to 54.3 (± 17.3) in the post-test ($p < .005$). The results for each subject area are summarized in the following sections.

1. Signs, symptoms and classification of ARI:

In responding to the pre-test question about signs of ARI, the volunteers listed an average of 6 signs, most of which were for mild cases of ARI. During the course, the volunteers learned 12 signs for mild, moderate and severe ARI. On the post-test, volunteer responses increased, on average, to 10 correct responses and included signs for moderate or severe ARI. For example, in the post-test, volunteers named signs such as frequent respirations, earaches, ear secretions, cyanosis, chest retractions, and nasal flaring. Graph 1 illustrates the results for each of the signs and symptoms.



In the post-test, participants were asked read two case studies and then classify the illness as either acute respiratory illness, mild ARI or moderate/severe ARI, based on the symptoms described. For the first case, 64% of the volunteers made a correct classification of mild ARI. In the second case, 86% correctly identified the signs as moderate or severe ARI. An interesting trend appeared in these responses. The participants who misclassified the cases tended to "worsen" the classification; 34% of volunteers classified the first case of mild ARI as moderate/severe. In addition, some volunteers interpreted the term "acute" as being more serious than "severe".

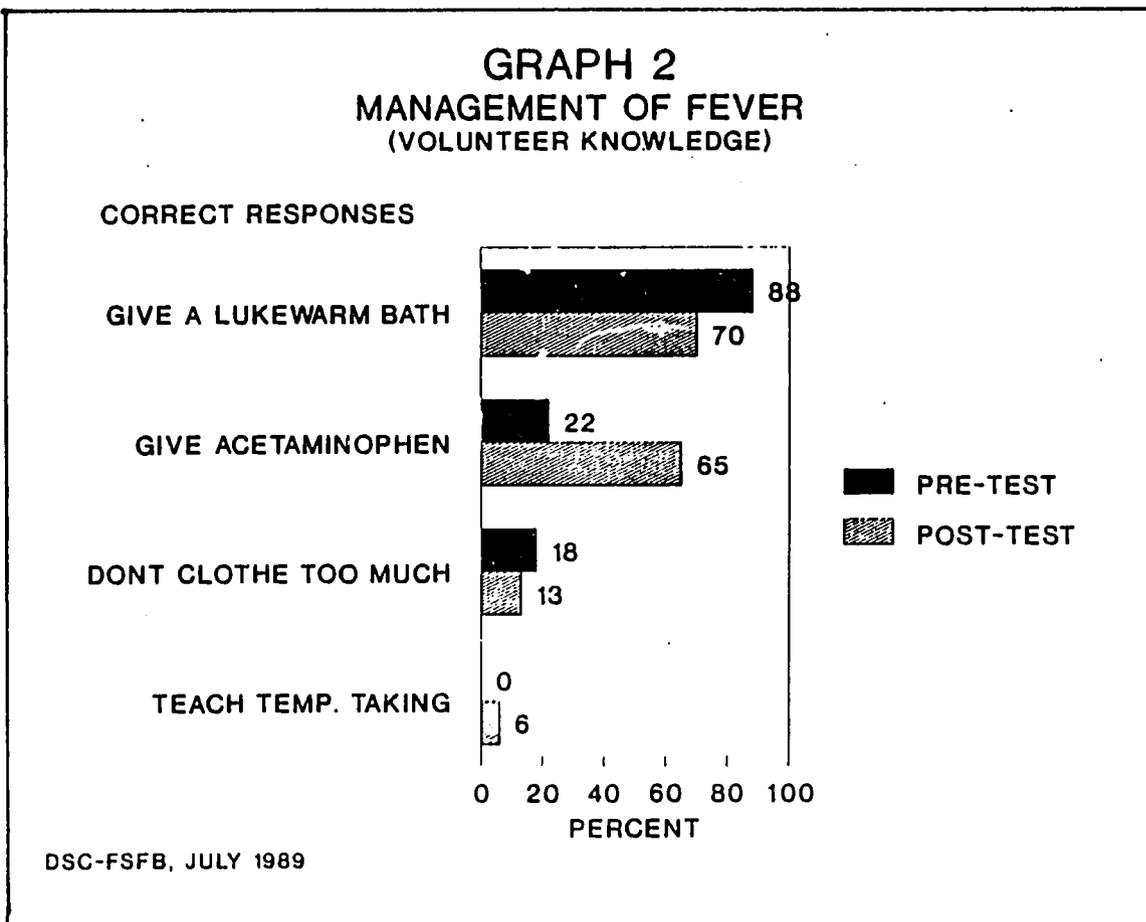
2. Mild respiratory infections

2.1 Fever

In both tests, less than half of the volunteers knew the axial temperature reading at which a child is considered to have a fever (37.5°C). In the pre-test, 27% responded correctly; the post-test scores increased to 43%. The change in scores was not statistically significant.

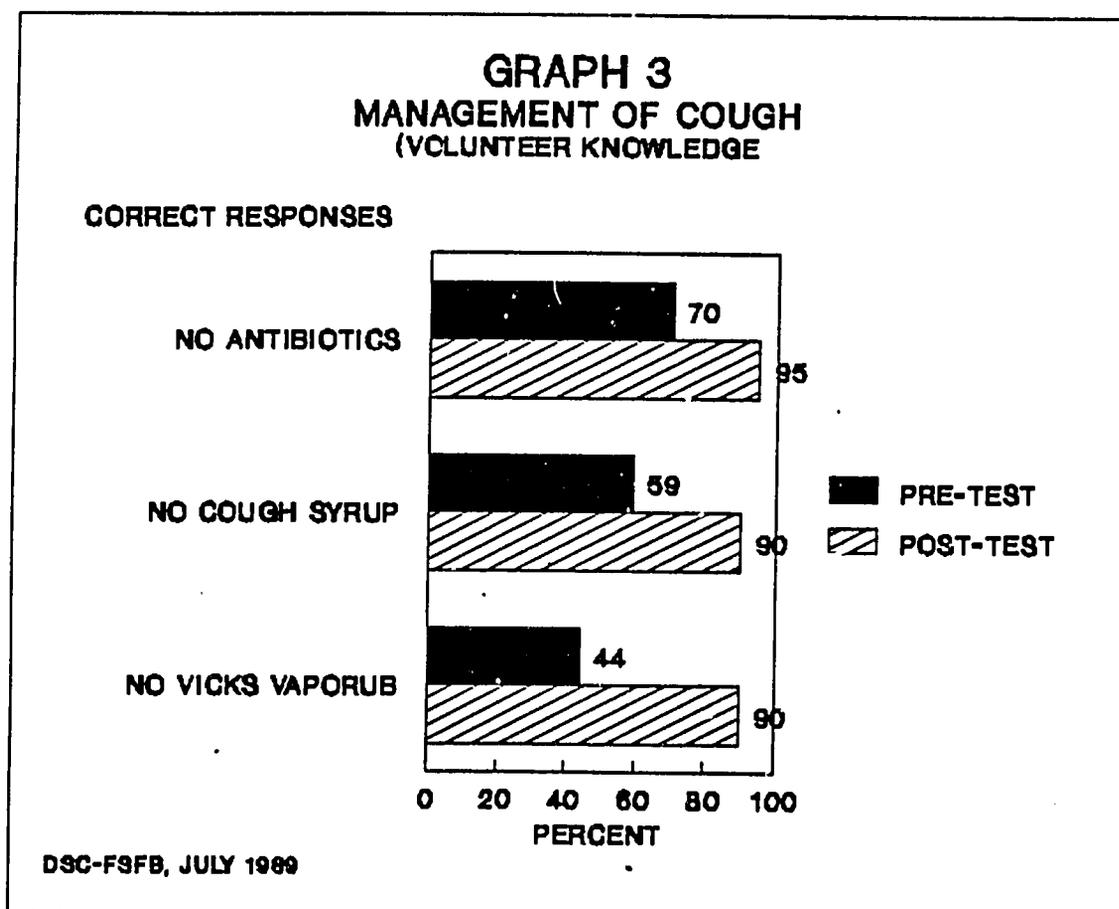
One possible explanation for the low scores on this item is that at the same time this definition of fever was given, the volunteers were taught that when a child had a fever of 38.5°C or above, steps should be taken to reduce the fever. Due to the apparent confusion over these two temperatures, the Trainers Manual was modified, leaving only the concept of managing a fever over 38.5°C .

Almost none of the scores for fever management tasks improved significantly. The only exception was "give acetaminophen", which increased as an answer given by 22% of volunteers in the pre-test to 65% in the post-test (see Graph 2). In the post-test scores for the case studies, 73% of the participants named the correct dosage of acetaminophen for a 10-month old child.



2.2 Cough

Graph 3 presents the pre- and post-test scores for items about managing a cough. A significant change in scores was noted for each of the items. At the time of the post-test, most participants knew that neither antibiotics or cough syrup should be given for a cough, and that products such as Vicks Vaporub should not be applied.



2.3 Feeding

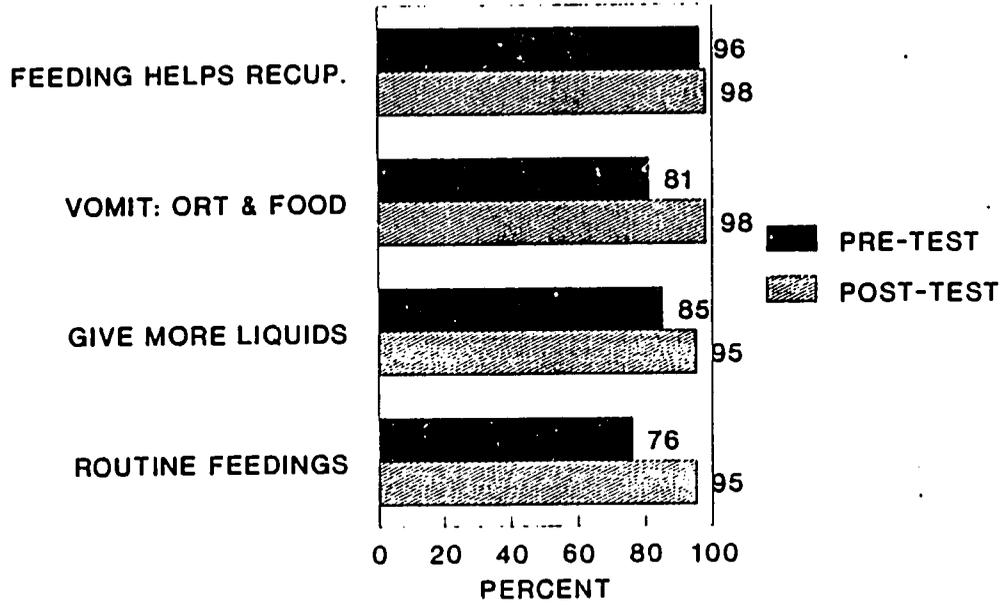
Volunteers generally knew about appropriate feeding practices before taking part in the course, as evidenced by their high pre-test scores. Nevertheless, their scores in each of the items improved significantly. Graph 4 presents these results.

3. Moderate or severe ARI

The volunteers knew that moderate and severe cases of ARI should be referred to the closest health center (85% in the pre-test and 100% in the post-test). Their learning with regard to specific tasks related to referral was notable. In the pre-test, for example, the volunteers knew only three of the six steps in referring ARI cases. As Graph 5 shows, volunteers gave the response "explain the seriousness of the illness to the mother" more often than any other.

GRAPH 4
NUTRITION FOR CHILDREN WITH ARI
 (VOLUNTEER KNOWLEDGE)

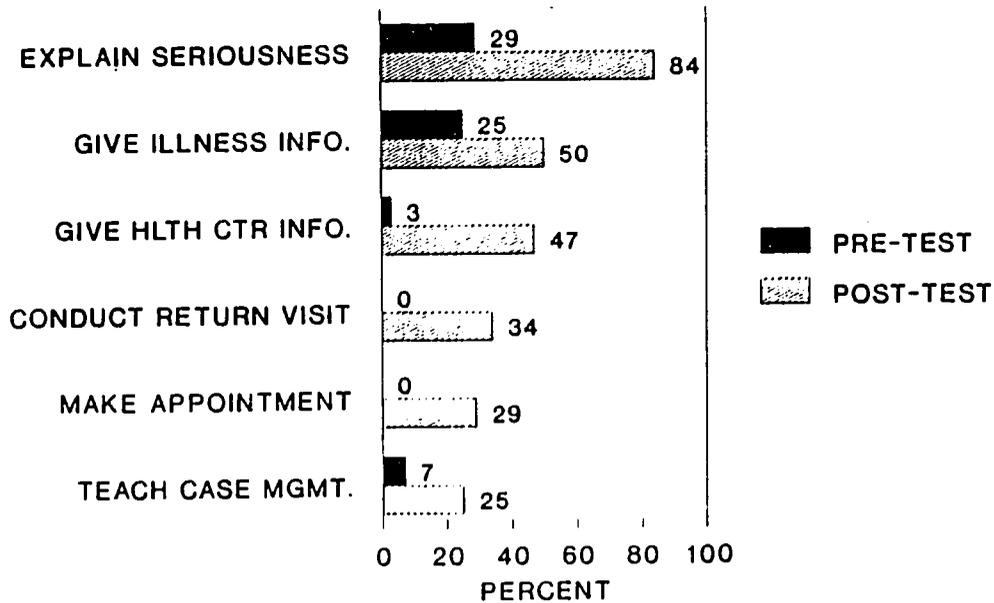
CORRECT RESPONSES



DSC-FSFB, JULY 1989

GRAPH 5
EDUCATION ABOUT REFERRAL
 (VOLUNTEER KNOWLEDGE)

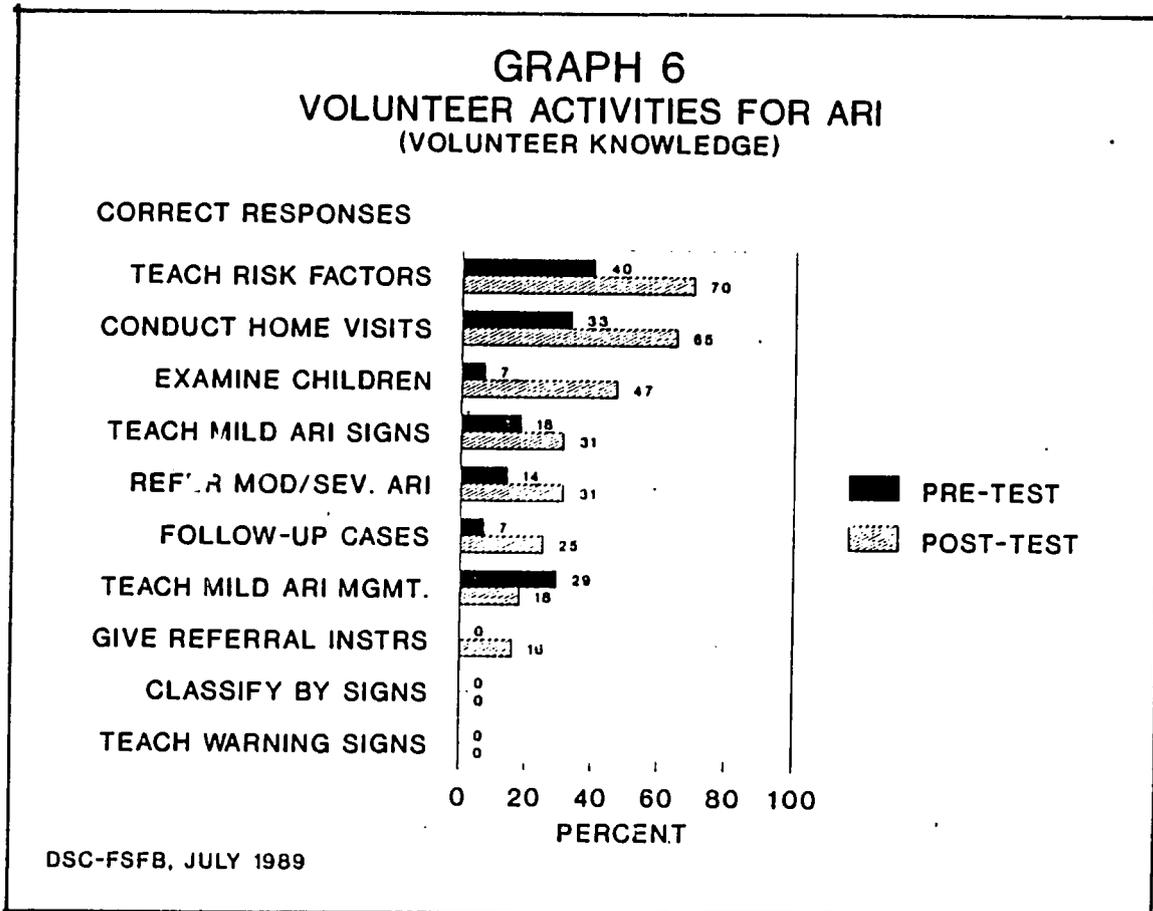
CORRECT RESPONSES



DSC-FSFB, JULY 1989

4. Activities to detect and manage cases of ARI

In designing the continuing education course, a set of 10 activities were identified which volunteers should carry out to detect and manage cases of ARI. These 10 activities were demonstrated in the course through sociodramas. At the end of the course, participants could name 8 of these 10 activities. Everyone omitted two of the tasks: "classifying cases by signs and symptoms" and "teach warning symptoms for moderate/severe ARI". The response participants gave most frequently was teaching about risk factors for ARI, followed by conducting home visits (see Graph 6). The increase in scores was significant for each of the items. Thus, the principal educational objective for the course was achieved.



B. Application of Knowledge in the Community

The following section describes the results from the follow-up field visits to verify volunteers' application of knowledge. As mentioned above, in this part of the study the nurse field supervisor accompanied volunteers who completed the entire course as they made home visits in their communities. One to three separate observations were made for 27 volunteers, using a checklist which covered all of the tasks that volunteers were taught to perform. Table 1 summarizes the results of the observations.

After the second visit, some volunteers asked how they had done and what they could do to improve their performance. At the end of the second visit, the field supervisor gave a series of recommendations to

TABLE 1

OBSERVATION OF HOME VISITS

	VISIT NUMBER		
	% of volunteers		
	1	2	3
	%	%	%
Diagnosis:			
*detected signs and symptoms	93	85	94
*checked frequency of respirations	30	66	88
*took temperature	52	76	82
*classified case correctly	74	76	100
*told mother diagnosis	63	61	100
*explained signs of mod/severe ARI	59	71	94
Cases of mod/severe ARI (N)	1	1	-
Referral:			
*referred child	0	0	-
*gave referral slip to mother	0	0	-
*explained seriousness to mother	0	0	-
*gave info. about where to take child	0	0	-
*gave info. about what to do according to case	0	0	-
*made appointment	0	0	-
Fever:			
*taught mother how to take temperature	81	90	100
*told mother to use acetaminophen	70	47	82
*told mother to give child lukewarm bath	74	85	94
*told mother not to apply alcohol	37	57	58
*told mother not to use antibiotics	44	76	82
*told mother not to clothe child too much	67	66	88
Cough:			
*told mother to give liquids	55	85	88
*told mother not to use cough syrup	44	76	94
*told mother not to give antibiotics	41	66	76
Stuffed nose:			
*taught mother how to clear nose	92	76	94
*demonstrated prep and app. of saline solution	7	33	82
*told mother not to use vapor inhalations	74	80	100
*told mother not to use vicks vaporub	70	80	94
Nutrition:			
*told mother to continue feeding	74	85	100
*told mother to increase liquids	74	80	100
Risk factors:			
*told mother about ARI risk factors	62	61	52
Communications skills:			
*acceptance of the visit	96	85	100
*good interaction with mother	96	85	100
*volunteer summarizes messages for mother	81	76	94
*establishes mutual agreement	74	80	76

all the volunteers for them to take into account during the third visit. This feedback stressed how to demonstrate the preparation and application of saline solution and to give more emphasis to teaching warning signs of a deterioration in the child's condition. The recommendations appeared to have had an influence, since performance scores improved in the last visit.

1. Preparation and initiation of the home visit

The field supervisor noted that during the first observed home visit, a large majority of the volunteers appeared nervous and insecure. They asked questions about what they would do during the home visit and what they should bring. This nervousness diminished with each consecutive visit.

For the first visits, almost all the volunteers brought their folders of "My ARI Notes", a thermometer, and alcohol and cotton. By the last visits, only a few volunteers carried their folders with them, but the number of volunteers who brought materials for demonstrating the preparation of saline solution increased.

At the outset of the home visit, the volunteers began by asking the mothers if they knew what an acute respiratory infection was, and if they knew the difference between a mild and moderate case. They told the mothers that they were going to talk with them about acute respiratory infections, and indicated that they would use the acronym "ARI" for this long phrase, so as to avoid confusion. However, their explanations of the concept of ARI were not very clear. In particular, there was a lot of confusion about the term "acute". Some thought it was the same as mild, others thought that it was the same as moderate, and most thought that "acute" was more severe than "severe ARI". Volunteers with a university education tended to have a more thorough understanding of ARI. On occasion, however, they used overly technical terminology to explain the illness to mothers.

2. Case diagnosis

Overall, volunteers' case diagnosis skills improved over the course of the three observed visits. During the home visits, volunteers asked mothers, "What has your child had?" or "How has your child been?". In most cases they examined the child for signs or symptoms of ARI.

Two appreciable changes were noted with respect to taking respiratory frequency and use of a thermometer to detect fever. In the first visit, few volunteers counted respirations (30%). By the third visit, however, 88% of volunteers were observed carrying out this task. In the first visit, 52% of the volunteers used a thermometer, and by the third visit, the proportion had increased to 82%.

During the 67 home visits observed, the volunteers encountered only 2 cases of moderate or severe ARI. Both cases were classified correctly, although the volunteers did not complete all of the diagnostic steps.

3. Management of mild ARI

In relation to management of fever, a large percentage of volunteers taught mothers how to take their child's temperature, particularly how to clean the thermometer. In addition, they told mothers about giving a lukewarm bath. The most common advice was to give acetaminophen. Among those who recommended medication, in most cases they were not sure of the dose; in others the volunteers forgot the dose, but consulted their notes. Two of the volunteers brought written notes about the dosage of acetaminophen and the preparation of saline solution for the child they were going to visit, so that they could leave this with the mother. The number of volunteers who cautioned mothers not to use antibiotics without a prescription rose from 44% during the first visit to 82% in the last visit.

Volunteers also demonstrated improvement in their counselling of mothers about managing a cough. Scores increased considerably over the three observed visits for telling mothers to increase liquids, avoid using cough syrup, and to refrain from giving antibiotics for cough without a prescription.

With regard to supportive therapies for stuffy or runny nose, volunteers consistently advised mothers how to clear their child's nose with saline solution and gave advice about what not to do (i.e., use vapor inhalations or apply Vicks Vaporub). However, only a few volunteers actually demonstrated how to prepare saline solution. By the third round of visits, the field supervisor's suggestions had affected volunteers' performance. The frequency of demonstrations for saline preparation and application increased dramatically, from 7% during the first visit, to 82% during the last visit. Some volunteers carried with them boiled water, salt and a dropper; others used the mother's kitchen to boil the water and prepare the solution during the visit.

Between the first and last two home visits, the number of volunteers who gave appropriate nutritional advice improved considerably. Volunteers recommended that mothers continue feeding the child with ARI. They also told mothers to increase the frequency of liquids. Only half the volunteers gave mothers information about risk factors for ARI. Most emphasis was placed on the importance of vaccination and breastfeeding.

4. Management of moderate/severe ARI

In the two visits where children were diagnosed with moderate or severe ARI, the volunteers did not refer the child to the nearest health center. The field supervisor reminded the volunteers to do this at the end of the visit. When the field supervisor reviewed the volunteers' referral slip books she discovered that none of the volunteers had made a referral during the three months of field observations for ARI or any other health problem. Moreover, the most recent referral date encountered was 1987. Some of the new volunteers had never even been given referral books.

5. Acceptance of the home visit and volunteers' communication skills

In general, the volunteers were well received by mothers during field visits. The interaction between the mothers and the volunteers was friendly and polite. On a few occasions volunteers were observed to be critical of mothers, rather than using a non-threatening approach to educating them.

In general, most volunteers tended to be disorganized in their discussions of different themes. For example, in talking with mothers about fever, they would jump to discussing cough and then return to talking about fever. The aspects of communication that were most frequently forgotten were summarizing the important points from the visit and establishing a commitment for mutual assistance in appropriately treating ARI.

C. Mothers' Interviews

The nurse field supervisor conducted interviews with 20 mothers in homes where there had been a child with mild ARI. These interviews, conducted 8 days after the volunteer's visit, were designed to examine what the mother had done regarding the recommendations made by the volunteer. The interviewed mothers said that the volunteers had told them to do the following:

- | | | |
|----|------------------------------|-----|
| 1. | Prepare saline solution | 75% |
| 2. | Give acetaminophen for fever | 75% |
| 3. | Give lukewarm bath for fever | 70% |
| 4. | Take the child's temperature | 30% |

5. Other⁴ 70%

Among the mothers who had received some of these recommendations, 53% indicated that they had prepared and applied saline solution; 43% had given acetaminophen; and 28% had given their child a lukewarm bath. None had taken their child's temperature because they did not have a thermometer. Although none of the children had been referred by a volunteer, 5 mothers had taken their child to see a doctor at the health center. There, the mothers received prescriptions for medications and vapor inhalations. Two of the 5 mothers did not do the vapor inhalations. Some women still applied their own home remedies, such as herb tea for cough, lemon juice in the evening, Vicks Vaporub on the chest, putting a red undershirt on the child and covering with newspaper.

Mothers were asked to give a demonstration of what they had learned from the volunteer. Ten (of 12) mothers prepared saline solution correctly, and 5 (of 7) applied a little amount in each nostril. Two women took their child's temperature, and one made a mistake in reading it. Only one mother knew to count the respiratory frequency, and she was unable to do so accurately.

The mothers interviewed knew the following warning signs of when ARI was becoming more serious, which the volunteers had taught them:

- | | | |
|----|---|-----|
| 1. | Persistent or high fever | 95% |
| 2. | "Purple fingernails" (cyanosis) | 60% |
| 3. | "The nose moves" (nasal flaring) | 30% |
| 4. | Strong cough | 30% |
| 5. | "Rapid respiration" | 8% |
| 6. | "Skin sinks between ribs" (retractions) | 8% |
| 7. | Others (doesn't accept fluids, doesn't eat, "breathing sounds bad") | 35% |

Upon completion of the home visits, volunteers from the Pañuelito and Campamentos neighborhoods, on their own initiative, gathered a group of 9 mothers who had been visited for a meeting to which the researchers were also invited. Mothers were asked to comment on and demonstrate what they had learned about management of ARI. The volunteers ended the meeting with a general review of actions to take for managing cases of ARI. The level of knowledge demonstrated by the mothers was excellent, and the volunteers, of course, were very proud.

IV. CONCLUSIONS AND RECOMMENDATIONS

The experience of this operations research study indicates that the time spent in advanced preparation for the course was well worth the investment. Taking the time to carefully define the educational objectives and teaching methodology, to prepare the materials and to develop the evaluation instruments produced a course that was well organized, yet flexible. The educational objectives were complemented by the methodology, and the extent to which they were accomplished was measurable.

Contrary to expectations, course attendance improved as the training sessions progressed. This may have been due to the use of effective methodologies (demonstrations, case studies, songs, sociodramas, video, stories based on real life, and group work); advance distribution of the course schedule; provision of written

4. Other responses: Don't take child out in the cold, wash the child's face, don't wrap the child too warmly, don't use Vicks Vaporub, look for a volunteer if the child becomes more ill, take the child to the doctor, give liquids, clean the thermometer, take the child out of the room before sweeping, dress the child warmly when he doesn't have a fever, and feed the child as usual.

material to support the course; and granting certificates to the participants. The development of structured course notes by the participants and the inclusion of a supervised practicum were considered by the trainers to be particularly valuable components of the ARI course.

In their evaluation of the course, the volunteers expressed their preference for trainers who used an open, pleasant, personal style in their presentations. At the end of the period of field observations, many volunteers commented that the opportunity for field practice after the course had been very helpful. They indicated that they felt more confident having someone from the FSFB with them during the first visits, for support and guidance, and that as a result, they were more motivated and secure in talking with mothers about ARI.

Based on the results from the pre-test and post-test, it can be concluded that the volunteers' knowledge about acute respiratory infections improved significantly. Comprehension of the information presented in the course appeared good, although some volunteers still had difficulty applying their knowledge during home visits. The volunteers who completed the practicum section of the course performed well with regard to transferring key messages during the home visits. Their performance improved over the course of the practicum, signaling the critical role that field observations and feedback by supervisors have in ensuring that knowledge is correctly applied.

The mothers visited demonstrated good retention of the ARI messages the volunteers had given, and about half had already applied the supportive measures shown to them by the volunteers. While these results do not indicate if mothers will consistently apply the information and skills taught by the volunteers, they do signal a substantial improvement over the level of ARI knowledge and practice that was found in these communities by the FSFB in the 1987 systems analysis.

Several recommendations emerged from the study for application in future FSFB training activities. First, a complete course plan should be prepared in advance of training activities. The training plan should detail educational objectives, methodology, materials, evaluation plan, schedule and requirements for trainers. While time-consuming, the preparation of such a plan greatly facilitates the training process and the achievement of course objectives. For short courses, 2 or 3 trainers are sufficient, but they should be selected based on their expertise in the subject area as well as their ability to work with groups.

A key component to the training's success was the inclusion of a period of supervised field work following the formal instruction. In the community field work, it is important to give health workers constructive feedback about their performance, especially concerning how they relate to members of the family and how they explain health concepts. The volunteers appreciated this feedback and responded well to suggestions for improvement.

A larger lesson that may be drawn from this study relates to the need for direct supervision of health worker performance following training. The fact that volunteers still had difficulty with certain key tasks in the home visits, despite the thorough and well designed training, demonstrates the importance of field supervision for attaining training objectives. The results of this study clearly show that health workers' performance can be significantly improved with such follow-up.

ANNEXES

- 1. Observation Instrument for Volunteer ARI Activities during Home Visit**
- 2. Instrument for Interviews with Mothers of Children with ARI**
- 3. Volunteer Knowledge Test Scores**

Observation Instrument for Volunteer ARI Activities during Home Visit

OBSERVACION EN TERRENO DE LAS ACTIVIDADES DE LA VOLUNTARIA EN IRA

FAMILIA _____ VOLUNTARIA _____
 DIRECCION _____ FECHA _____
 OBSERVADORA _____ VISITA: 1 2 3

DIAGNOSTICO:

- Detectó signos y síntomas
- Tomó frecuencia respiratoria
- Tomó temperatura
- Clasificó al niño correctamente
- Dijo a la madre el diagnóstico
- Dijo a la madre los signos de IRA mod/gr
- Diagnóstico del observador: _____

REMISION:

- Remitió al niño con IRA moderada o grave
- Le dió la boleta de remisión a la madre
- Explicó la gravedad de la cond. del niño
- Informó donde llevar al niño
- Dijo a la madre que hacer según el caso
- Fijó un compromiso de ayuda mutua

FIJURE:

- Enseñó a tomar la temperatura
- Dijo como bajar la temperatura:
 - Dolex
 - Bano agua tibia
- Dijo que no hacer:
 - No aplicar alcohol
 - No dar antibiotico
 - No arropar al nino

TOS:

- Dijo no dar jarabe
- Dijo no dar antibiótico

NARIZ TAPADA:

- Enseñó como destapar la nariz
- Demostró la preparación y aplicación de la solución salina
- Dijo que no hacer con la nariz tapada
 - No hacer vaporizaciones
 - No usar vick vaporub

NO APLICA	NO	SI	
		Bien	Mal

NO APLICA	NO	SI	
		Bien	Mal

ALIMENTACION:

- Dijo sobre continuar la alimentación
- Aumentó frecuencia de ingesta de líquidos

ACCIONES FACTIBLES SOBRE FACTORES QUE FAVORECEN PRESENCIA DE IRA:

- Dijo algo al respecto de fact. de riesgo

HABILIDADES DE COMUNICACION:

- Aceptación de la visita
- Trato de la voluntaria con la madre/flia
- La voluntaria hace resumen de los puntos importantes
- Establece compromiso de ayuda mutua

OBSERVACIONES:

Instrument for Interviews with Mothers of Children
with ARI

OBSERVACION Y ENTREVISTA DE LAS ACTIVIDADES
DE LA MADRE EN IRA POR PARTE DE LA OBSERVADORA

FAMILIA _____ VOLUNTARIA _____
DIRECCION _____ FECHA _____
OBSERVADORA _____

I. ENTREVISTA

1. Qué le dijo la voluntaria que hiciera con la gripa de su
hijo _____?
(nombre)

2. Qué hizo usted?

3. Qué no pudo hacer? Por qué?

4. Si el niño había sido remitido, preguntar a la madre:
Llevó el niño al médico?

SI NO

5. Lo atendieron?

SI

NO

6. Qué le dijeron?

7. Cuando su niño tiene gripa, cuándo lo tiene que llevar al médico?

II. VERIFICACION DEL APRENDIZAJE DE LA MADRE

De las actividades reportadas por las madres que se consideran prácticas adecuadas según la capacitación a las voluntarias de salud, pida a la madre que haga una demostración y/o una narrativa de lo que hizo.

Observación de la actividad	Bien	Mal	Por qué
DEMOSTRACION:			
1. _____			
2. _____			
3. _____			
4. _____			
5. _____			

NARRATIVAS:

Tema: _____

Recuerda Usted algunas frases que le dijo la voluntaria que le llamaron la atencion, como por ejemplo: "si su nino esta bien alimentado, en el momento que le de gripa, se recupera mas rapidamente? Cuales: _____

Observaciones del entrevistador: _____

ANNEX 3

Volunteer Knowledge Test Scores

TOPIC	Pre-test		Post-test		Significance
	\bar{x}	S.D.	\bar{x}	S.D.	P
Total	28	11.5	54.3	17.3	<.005
Signs, symptoms	2.6	1.7	8.4	3.2	<.005
Temperature for Fever	1.6	2.4	2.5	2.6	N.S.
Fever management	2.5	1.4	-3.4	2	N.S.
Cough management	3.5	2.5	5.8	0.6	<.005
Feeding	6.9	1.4	7.9	0.4	<.005
Referral	3.9	2.1	5	0	<.05
Education concerning referral	1.2	1.7	5.4	2.5	<.005
Volunteer activities	7.3	6.3	18	11.5	<.005

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