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**CHARACTERISTICS OF ADOPTERS OF
ORT IN HONDURAS**

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I. INTRODUCTION

This paper reports an analysis of the characteristics of adopters of an oral rehydration therapy promoted by the mass Media and Health Practices Project (MMHP) in Honduras. The MMHP was initiated and funded by the U.S. Agency for International Development and implemented between January 1980 and June 1983 by the Honduran Ministry of Public Health and the local USAID Mission.

A. The Mass Media and Health Practices Project

The purpose of the MMHP was to introduce the correct mixing and administration of an oral rehydration solution (CRS) and other practices related to the treatment and prevention of infant diarrhea. From a public health perspective, the question was how to get a significantly large number of mothers to adopt a new behavior, perform it repeatedly, accurately, and effectively, and ultimately to reduce mortality from diarrheal dehydration. The project and the evaluation were also designed to develop and test a methodology for improved public health communication applying insights from development communication and social marketing for specific behavioral objectives.

After extensive pre-program research, message design, and pretesting, the campaign intervention began in February 1981 and continued through March 1983. The campaign used radio, health workers, and printed materials to teach rural mothers and

grandmothers how to obtain, mix, and administer a packet of rehydration salts (called Litrosol), to seek help if diarrhea gets worse, to breastfeed young children instead of bottlefeed, and to follow recommended practices in food preparation and hygiene.

Throughout the two-year intervention, use of radio messages was emphasized to radio's ability to reach many mothers. But professional and paraprofessional health workers based in rural areas were also an important part of the campaign. Litrosol packets were distributed to mothers through rural health workers. When dispensing packets, health workers were instructed to give a short explanation of the Litrosol mixing and administration instructions on the packet.

B. Overview of Prior Findings

Earlier analyses of project results showed that access to the campaign messages was high: 84 percent had heard the radio spots, 41 percent had seen campaign posters, and 54 percent had seen a health worker within the past six months.

Awareness of and knowledge about Litrosol rose sharply early in the campaign, continued to rise more slowly later in the project, and leveled off by the end with more than 60 percent of mothers knowing how to correctly mix and administer the solution.

Actual use of the Litrosol also rose during the course of the campaign. Within six months of the start of the intervention, over one third of the mothers said they had used

Litrosol. By the end of the intervention, 62 percent said they had used Litrosol on at least one occasion.

While it was clear from earlier analyses that campaign activities were largely successful at initiating use of Litrosol, it was less clear what distinguished mothers who responded from mothers who did not, particularly in terms of household characteristics and mothers' other health behaviors related to the treatment of diarrheal disease. The present analysis takes a closer look at the relationship between characteristics of mothers and the use of Litrosol.

II. METHODS

A. The Sample

Mothers from a total of 750 households in 20 communities were interviewed at least once during the two year intervention. Interviews were conducted periodically: household characteristics were determined in a baseline enumeration survey, and there were five additional points at which information was gathered concerning infant morbidity and mothers' responses to episodes of child diarrhea. For the purposes of this analysis, subjects were mothers whose children had suffered episodes of diarrhea in the two weeks prior to each interview with a field worker.

B. Measurement Waves

Because the analysis was concerned with the health behaviors of mothers and because mothers often had more than one child

suffering from diarrhea at the time of an interview, an analysis strategy was adopted which focused on a mother's health behavior across children within a specified period. For example, at the time of the February 1982 measurement sweep, three of the mother's four children might have suffered bouts of diarrhea, two of whom were treated with Litrosol and one who was not; at the time of the next measurement sweep in June of that year, two of the four children might have had diarrhea, but neither was treated with Litrosol. Such a mother would be classified as a Litrosol user in February, but as a non-user in June.

Three measurement periods were constructed. The first, consisting of data from a single measure taken three months into the campaign in June 1981, was designated the Early Wave. The second, consisting of data from two measures taken in February and May 1983, respectively, was designated the Middle Wave. To do this, each mother's responses were aggregated across children and across the two measurement points, a strategy that increased the number of cases available for analysis. The third period consisted of two measures taken on December 1982 and May 1983. Because these points were taken at the end of the two year campaign, this period was designated the Late Wave. Unfortunately, there was significant attrition in the number of subjects available for analysis as the study developed making the final wave the smallest in sample size.

C. Independent Variables

1. Household Characteristics

Characteristics of households were measured in a baseline survey of the three counties in Honduras designated as experimental sites (Table 1). Measures included a general assessment of family living conditions, the maximum obtained level of education, number of family members living under the same roof, and location, of the household in a rural village or in the town which served as county seat. All of these variables were shown in previous analyses to be predictors of exposure and response to campaign activities.

The general assessment of family living conditions was made by interviewers as a validity check against other measures of socioeconomic status. Family living condition was coded as being either good or poor. It was found to be nearly as strong an indicator of socioeconomic status as a five-item index composed of measures of ownership of modern conveniences, household income, and household expenditures.

Household education level was defined as the highest level of education (years of schooling) attained by anyone living in the household.

2. Health Behaviors

Health behaviors included whether or not a mother took any of her children with diarrhea in the two weeks before an interview to a rural health clinic for treatment, and whether or not she took any of her children with diarrhea in the two weeks

before an interview to a village health worker for treatment, and whether or not she used any of several available alternative treatments (either traditional or "over the counter" remedies) to treat any episodes of child diarrhea occurring in the two weeks preceding an interview. Since these questions could potentially have been asked of mothers several times during each measurement period (that is, once for each sick child in the Early Wave, and twice for each sick child in the Middle or Late Waves), a mother was said to have performed the behavior if at any point in a period for any of her children she performed the behavior in question.

D. Dependent Variable

The dependent variable was whether or not a mother treated with Litrosol any episodes of child diarrhea during that period in question.

E. Analysis

The continuous family size and maximum household education variables were recoded as closely as possible into terciles representing small, medium, or large families and low, moderate, or high levels of attained education. These recoded variables were each used in turn to compute new variables which contrasted either high or low terciles against the other two-thirds of the subjects.

For example, maximum household education terciles were used to compute two new variables representing a low level of household schooling and a high level of household schooling. To compute the "low schooling" variable, mothers in households with a maximum attained level of education of two years were coded '1' and mothers in households with a maximum attained level of education greater than two years (that is, all others) were coded '0'. For the "high schooling" variable, mothers in households with a maximum attained level of education of six or more years were coded '1' and mothers in households with a maximum attained level of education less than six years (that is, all others) were coded '0'.

In a similar way, a "small family" variable was defined in terms of families with six or fewer people versus all others and a "large family" variable was defined in terms of families with 10 or more people versus all others.

Data were analyzed using Cross-tabulation and Probit (logistic regression) procedures from the Statistical Package for the Social Sciences (SPSSX, Version 2). Yates' corrected chi-square (for 2x2 tables) was used to evaluate bivariate relationships between dichotomous dependent and independent variables.

Logistic regression models were used to evaluate the effects of predictor variables on the dichotomous Litrosol use outcome variable. In each case, no logarithmic transformations were performed prior to fitting the regression models. The

significance level of regression coefficients was evaluated by dividing each coefficient by its standard error and locating the resultant figure in a table of t-test values.

III. RESULTS

The program was successful in getting mothers to use Litrosol to treat diarrhea in their children. Table 2 shows that 10.1% of mothers who reported that at least one of their preschool children had diarrhea in the last two weeks used Litrosol on at least one occasion. About a year later, 35.7% of mothers were Litrosol users, but this value declined to 30.2% at later stages in the program.

The relationship between the independent variables identified in Table 1 and Litrosol use was first explored in univariate analyses as shown in Table 3. Four variables were significantly associated with Litrosol use in at least one of the stages. In the early period, there were three factors associated with Litrosol use: less than 2 years of education in the household, 10 or more people in the household, and contact with the village health worker. In the middle period, residence in villages and contact with the village health worker were the variables which were significantly related to Litrosol use. Only contact with the village health worker was significant in the late measurement period.

Some of the predictors are correlated and their relative importance as predictors needs to be examined in multivariate analyses. Logistic regressions were run where the dependent variable is a dichotomous variable: 0 refers to a non-user and 1 to a user. The results of these analyses are shown in Table 4. Two values are presented: the logistic regression coefficient and the ratio of the coefficient to the standard error. The latter is equivalent to a t-test and is a measure of the strength of the association. With the sample sizes used in this paper, values of 1.6 are significant at the .05 level if a one-tailed test is applied and values of 2.0 or higher are significant if a two-tailed test is used. The results indicate that low household education, large family size, and contact with the village health worker are significant predictors of Litrosol use early in the campaign. Contact with the clinic is a strong predictor but it is not significant if a two-tailed test is used.

The results for the middle period are also shown in Table 4. The statistically significant predictors are residence in a village and contact with either the health clinic or the health worker. A strong predictor which is not significant using a two-tailed test is the general living condition of the home. There was a tendency for less advantaged households to be more likely to use Litrosol to treat diarrhea.

Contact with a clinic or a village health worker continued to be significant predictors in the late measurement period.

IV. DISCUSSION

The literature on diffusion of innovations has shown that in the majority of development efforts, those who have benefitted most from new information and other inputs are those who are already better off -- the wealthier, more educated, and more urbanized members of the audience. This has led to an increased gap between the higher and lower strata in a community and has become a major worry in the conception and design of development programs.

The study reported here suggests the opposite. Early in the program, Litrosol seems to have been adopted by less educated families in Honduras. Once the program was established, family size and education ceased to be important determinants of Litrosol use but place of residence became important. Mothers living in more rural villages were more likely to use Litrosol than mothers living in county seats. This is a surprising but optimistic finding for the poorly educated households in rural areas are precisely the group with the greatest need for effective measures to treat diarrhea in their children.

Litrosol use was strongly related to health seeking behavior. Contact with the village health worker was strongly associated with Litrosol use. This may represent the result of teaching and encouragement by the health care worker and/or the availability of packets. Whatever the reason, these findings emphasize the need for personnel and a means of distributing packets at the community level. Contact with the clinic was also related to Litrosol use but less strongly.

In conclusion, a third of mothers were reporting the use of Litrosol to treat diarrhea in their children a year after the program started. This is a remarkable achievement. The findings indicate that the early adopters were larger, less educated families. As the program matured, residence in rural villages became an important predictor of use. Throughout the program, contact with the village health worker and the clinic were important determinants of use.

The findings have to be interpreted with caution. Sample size attrition over time presents problems of design and statistical nature. It is not clear whether different types of mothers were being interviewed at different stages of the campaign and small sample sizes, particularly during the final measurement period, reduce statistical power substantially and thereby the ability to identify significant associations. Trends such as the apparent decline in Litrosol use from middle to late periods are not easily interpretable because of possible differences in sample representation.

TABLE 1

POTENTIAL PREDICTORS OF LITROSOL USE

HOUSE ASSESSMENT

Poor
Good

Assessed by field worker

HOUSEHOLD EDUCATION

2 years or less
3 to 5 years
6 or more years

Maximum education level found in household members

FAMILY SIZE

6 persons or less
7 - 9 persons
10 or more persons

Includes al adults and children

VILLAGE TYPE

Village
County Seat

Villages are rural and more isolated; County Seats are larger and more urban

CLINIC CONTACT

No
Yes

Whether mothers visited the clinic when their children had diarrhea

VILLAGE HEALTH WORKER CONTACT

No
Yes

Whether mothers visited the village health worker when their children had diarrhea

USE OF ALTERNATIVE TREATMENTS

No
Yes

Whether traditional folk remedies were used to treat diarrhea in children

TABLE 2

PERCENTAGE OF MOTHERS WHOSE CHILDREN HAD DIARRHEA IN THE TWO WEEKS PRIOR TO THE INTERVIEW WHO WERE LITROSOL USERS AT THREE STAGES OF THE MMHP PROGRAM IN HONDURAS

	<u>MOTHERS WITH SICK CHILDREN</u>	<u>% TREATING AT LEAST ONCE WITH LITROSOL DURING THOSE WAVES</u>
EARLY SURVEY	277	10.1
MIDDLE SURVEYS	263	35.7
LATE SURVEYS	162	30.2

TABLE 3

PROPORTION OF MOTHERS USING LITROSOL BY SELECTED CHARACTERISTICS AT THREE POINTS IN TIME

CHARACTERISTICS	EARLY		MIDDLE		LATE	
	N	%	N	%	N	%
<u>LOW EDUCATION</u>						
2 years or less	87	16.1	63	33.3	125	29.7
3 or more years	190	7.4	200	36.5	37	29.6
	p < .05		N.S.		N.S.	
<u>LARGE FAMILY</u>						
9 people or less	220	8.2	214	36.4	134	31.3
10 people or more	57	17.5	49	32.7	28	21.4
	p < .05		N.S.		N.S.	
<u>TYPE OF TOWN</u>						
Village	230	11.3	237	38.8	140	31.4
County Seat	47	4.3	26	7.7	22	18.3
	N.S.		p < .005		N.S.	
<u>CONTACT WITH VHW</u>						
No	236	7.6	229	28.8	142	25.5
Yes	41	24.4	34	82.4	20	60.0
	p < .003		p < .0001		p < .004	

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TABLE 4

ESTIMATED COEFFICIENTS FOR LOGISTIC MODELS OF THE DECISION TO USE LITROSOL AT VARIOUS STAGES

	<u>EARLY</u>		<u>MIDDLE</u>		<u>LATE</u>	
	<u>b</u>	<u>b/SE</u>	<u>b</u>	<u>b/SE</u>	<u>b</u>	<u>b/SE</u>
<u>INTERCEPT</u>	3.12	9.90	4.54	29.32	4.35	20.38
<u>HOUSE CONDITION</u> (1=poor, 0=good)	-0.18	-0.70	-0.31	-1.74	0.13	0.59
<u>MAXIMUM EDUCATION</u>						
< 2 years	0.66	2.43	-0.19	-1.01	0.002	0.01
3 to 5 years	-----	-----	-----	-----	-----	-----
> 6 years	0.22	0.71	0.10	0.53	0.16	0.69
<u>FAMILY SIZE</u>						
< 6	0.18	0.71	0.01	0.03	-0.15	-0.73
7 to 9	-----	-----	-----	-----	-----	-----
> 10	0.71	2.58	-0.06	-0.30	-0.25	-0.90
<u>TYPE OF TOWN</u> (1=County Seat, 0=Village)	-0.34	-0.83	-1.09	-2.72	-0.31	-0.96
<u>CLINIC CONTACT</u> * (1=yes, 0=no)	0.41	1.71	0.54	3.14	0.51	2.16
<u>VHW CONTACT</u> (1=yes, 0=no)	0.68	2.80	1.26	5.06	0.83	3.13
<u>ALTERNATIVE TREATMENT USE</u> (1=yes, 0=no)	0.04	0.18	0.12	0.80	0.10	0.56
<u>DEGREES OF FREEDOM</u>	267		253		152	

1 - tailed + value = 1.60 }
 2 - tailed + value = 2.00 } at p < .05 or better