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A BEHAVIOR ANALYSIS OF THE PROMOTION OF ORAL REHYDRATION THERAPY (ORT) IN GUATEMALA

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ABSTRACT

The present report presents the results and preliminary recommendations of a behavior analysis study of an oral rehydration therapy (ORT) promotion in four localities in San Marcos, Guatemala. In this study, we used behavioral observation techniques to look at one-to-one communication and health education efforts in health clinics as well as to evaluate the effectiveness of these health education efforts by observing mothers' behavioral skills in their own homes. Subsequently, we also observed *canalizacion* (outreach) strategies to see whether we could learn more from these health workers' activities, and conducted "behavioral focus group" research with teams of health workers to determine how best to promote effective health education activities to other health workers. Results of our study indicate that health workers already spent a substantial amount of time doing health education and primary prevention, and were fairly effective at doing so. Their communication, however, tended to be relatively unilateral and failed to involve some of the more progressive aspects of behavioral skills training.

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INTRODUCTION

Diarrheal disease is the leading cause of infant mortality in the world today. It is especially prevalent among malnourished children and, in turn, tends to aggravate malnourishment. In developing countries, approximately 30 percent of the mortality of children under the age of five can be directly attributed to diarrheal diseases. Oral rehydration therapy (ORT), a three-tiered approach which combines administration of a variation of a water-sugar-salt solution with continued feeding (including breast feeding) and necessary medical referrals, is perhaps the most effective approach to preventing mortality due to dehydration caused by diarrhea. The promotion of ORT throughout the world could save millions of lives per year [1].

Approaches to promoting oral rehydration have generally involved either nationwide electronic and print media campaigns [2], or a combination of primary care improvement and health education approaches [3]. For example, a recent study in southern Thailand documented the effectiveness of ORT promotion by village health workers, volunteers and opinion leaders [4]. While the results of this effort were very encouraging, the evaluation emphasized self-reports of knowledge, intentions and ORT use over actual observations of ORT-related behaviors.

Behavioral skills training and behavior modification procedures involving increasing incentives and decreasing disincentives for adaptive health behavior have recently become a major component of many developing country child survival programs [5]. Collectively labeled "behavior analysis," efforts to change behavior-consequence relationships have been used in conjunction with primary health care and education programs to enhance participation in and the impact of health promotion programs throughout the world [6].

To be maximally effective, behavior analysis strategies must be incorporated into planning as well as intervention phases of health promotion programs. Direct observation of health-related behaviors (of both the target audiences such as mothers as well as conveyors of health-related information such as health workers) can provide invaluable data during a program planning phase. Observational and interview techniques can be combined to determine what types of reinforcing and punishing consequences individuals are currently receiving for both adaptive and maladaptive health-related behaviors.

The present report provides an example of the use of behavior analysis for studying and planning oral rehydration promotion in four localities of the department of San Marcos, Guatemala. With an emphasis on face-to-face communication activities, this behavioral approach involved the use of direct behavioral observations of health promotion/education sessions, one-to-one clinical interactions, and the skills of mothers at mixing oral rehydration solution in their home. Also, informal observations of health worker outreach activities (in Spanish, *canalizacion*) as well as behavioral group research with

health worker teams complemented the direct more objective data derived from the behavioral observations. In the Guatemala system, these outreach activities "channel" needy individuals to sources of service or deliver services and supplies directly to them.

METHODS

Setting and Observers

Behavioral observations and interviews were carried out in one large "Health Center-Type A" (San Pedro or SP), two smaller "Health Centers-Type B" (San Lorenzo and San Rafael or SL and SR), and one Health Post (Esquipulas de Palo Gordo or EPG) in the Department of San Marcos in Western Guatemala. Additionally, observations of outreach activities were carried out in the catchment areas served by these health services. The observations and interviews were conducted by four trained observers, with assistance from three consultants. One observer was assigned to each clinic/community.

Procedure

First, observations were conducted of all mothers receiving treatment for their children who had diarrhea during the two days (July 20 and 21, 1988) of the observations. The emphasis of these observations was on how long they waited, with whom they interacted, and what type of treatment and education they received.

Second, homes in the communities were selected (by chance and convenience) to determine the level of skill *vis-a-vis* ORT in the community at large. Mothers interviewed in their homes fell into three categories: those who had received training the previous day, those who had been trained in ORT previously, and those who reported never having been trained. They were asked what ORT was for, whether and how they had used it, whether their neighbors used it (and if not, why not and how they could be convinced), and relevant follow-up questions. Subsequently, they were provided with an ORS packet and asked to demonstrate the correct mixing and use of the product. The observers noted in a binary format whether the mothers washed their hands first, attempted to measure a liter of water, used clean containers, poured the water into the container without problems, mixed all of the packet's contents into the container, tested the solution themselves, noted that the solution should be at room temperature, and indicated that they should begin with a new packet the next day.

Third, health education sessions in the clinics were observed to determine the quality of health education and promotion conducted by the health workers regarding the use of ORT on the part of mothers. "Quality" was operationalized

as to whether the training included the following steps, previously shown to be effective when promoting specific behavioral health skills [6]: instructions, two-way communication, a brief question and answer session, the use of modeling or demonstrating the behavioral skill, the use of role-play or practice on the part of the target audience (in this case, mothers), feedback to the mothers regarding how well their practice went, the use of verbal reinforcement, and other miscellaneous procedures conducive to good interpersonal communication and skills training with a complex behavior such as ORT. Similar to the observation of mothers in their homes, we observed the use of these techniques for describing each of the steps of ORT (handwashing, measurement of a liter of clean water, use of a clean container, total dissolution of the solution, testing the solution, administering the solution at room temperature, and remixing the solution with new ingredients the next day).

Fourth, although we had not previously planned to, we decided to accompany the health workers on their outreach activities. These outreach visits to mothers' homes (especially in more remote villages whose residents were less likely to visit the health centers) were primarily for the purpose of providing one of the three diphtheria-pertussis-tetanus (DPT) shots to children under one year of age. However, after preliminary discussions while introducing ourselves to each health worker team, we decided that this *canalización* approach also offered us substantial potential for further promotion of ORT. The purpose of this informal observation therefore was to determine the potential for ORT promotion through outreach.

Finally, "behavioral focus groups" were conducted to discuss with the health teams various reinforcers and punishers they encounter which promote or impede their work, and what strategies we might consider for dealing with these consequences on a nationwide basis. This behavioral focus group approach allows the informal qualitative development of health promotion ideas working both with individuals who already are engaging in a prescribed behavior as well as those who are not (e.g., by asking what motivates those in the former category and what serves as a disincentive for those in the latter). Conceptually, this approach is similar to the case-control methodology from the field of epidemiology.

RESULTS

Observations of Interactions with Mothers Attending Clinics

Mothers attending the health post (Esquipulas de Palo Gordo, or EPG, which was staffed by one auxiliary) waited between thirty minutes and four hours, with an average rate of one hour and forty minutes. Mothers in San Pedro (SP), the Type A health center, waited an average of fifty minutes, attended by four

auxiliaries, one nurse and two physicians, who were assisted by a secretary. Mothers in San Rafael (SR), one of the two Type B centers, waited an average of fifty-two minutes. Waiting time (and other variables related to clinical attention for diarrhea) was not recorded for San Lorenzo (SL).

SL and SP used numbers rather than names to call patients in for treatment. Measures and vital signs were taken in all clinics. However, the precision and completeness of this practice varied. For instance, some children were weighed with their shoes and clothes on, while other clinics used a subtraction method (weighing the mother on an adult scale with and without her child). Some clinics did not have a tape measure and therefore did not measure the length of the children. The average number of the six prescribed vital signs actually measured ranged from 1.2 (EPG) to 4.8 (SR), with physicians generally doing more complete measurement than other workers.

All staff observed played a role in communicating with the mothers. In one clinic (SR) this role was somewhat interchangeable among staff, depending on who was available. In the other clinics, the communication was specific to the specialty of the worker.

According to the norms currently being promulgated in Guatemala, mothers of children with diarrhea should be questioned regarding: a) when the illness began; b) quality, frequency, and consistency of discharges; c) color and quantity of urine; d) presence of convulsions; e) type and quantity of liquids and foods ingested during the illness; and f) whether the mother was given feedback on the severity of the illness. SL had no cases of diarrhea at the clinic during the two days of observation. None of the other three asked about convulsions, while the workers at SR failed to ask about feeding. At the health post, only onset, discharge, and intake questions were asked. Physicians were the most complete in their diagnostic interview.

As demonstrated by our observations, all of the health workers working one-to-one in this situation explained what they were doing and what they recommended to the mothers. Prescriptions for ORS (oral or written) were given to all of the cases in SR, three of the five cases in SP, and seven of eight in EPG. The above data are summarized in Table 1.

Observations of the Use of ORT in the Home

In SR, two mothers who had received training the previous day were followed-up. Their responses to the questions and role play were perfect except that they did not test the solution themselves. In SP, nine mothers who had received training at some time and one who had not were observed. Nearly all the mothers who had been trained (ranging in time from weeks to years previous to the observation) scored close to 100 percent in the knowledge and behavior tests, with the exception of mentioning "vomiting" as one of the problems treatable by ORS and the failure to test the solution or concern themselves with

Table 1. In-Clinic Observation Results

Variable	*Esquipulas Palo Gordo (N=8)*	*San Rafael (N=5)*	*San Pedro (N=5)*
Waiting Time	100 minutes	52 minutes	50 minutes
Number Vital Signs Measured (of six)	2	4.8	2.6
. . . by Worker			
Physician	n/a	5 (*N*=4)	2.6 (*N*=5)
Technician	1.3 (*N*=6)	n/a	n/a
Auxiliary	2.5 (*N*=2)	5 (*N*=1)	n/a
Number of Symptom Questions Asked (of seven)	3.5	3.8	4.2
. . . by Worker			
Physician	n/a	4.75	4.2
Technician	3.3	n/a	n/a
Auxiliary	4.0	1	n/a

whether it was at room temperature. The mother who had not been trained did not respond to the questions.

In EPG, two mothers trained the previous day, two trained prior to this, as well as two never trained, were observed in their homes. In the former two categories, nearly all knowledge and behavioral steps were correct except that most did not wash their hands, and while mentioning or demonstrating the boiling of water, they failed to boil it long enough for the desired effect. In contrast, those mothers who had not been trained answered nearly all of the questions wrong and were (not surprisingly) essentially unable to demonstrate ORS mixing. In SL, the observer located seven mothers who had previously been trained (either through outreach or in the clinic) but was unable to identify any who had not. Again, the mothers responded correctly to almost every test variable except that none taste-tested the solutions.

These data are summarized in Table 2.

Observations of Training

Health workers conducted ORT training upon request by the observers in SP, SL, and EPG. All three of these workers used didactic instructions to describe the mixing sequence. Only SL and EPG used two-way communication to ascertain audience understanding of the process, while only SL actually

Table 2. In-Home Observations of Mothers' Skills and Knowledge Regarding Oral Rehydration Therapy

Variable	*Trained in Health Care (N=17)*	*Trained in Health Post (N=8)*	*Trained in Home Visit (N=4)*	*Never Trained (N=3)*
Per Location, percent . . .				
San Pedro (*N*=10)	70	0	20	10
San Rafael (*N*=8)	84	0	16	0
Esquipulas de Palo Gordo (*N*=6)[a]	0	67	0	33
San Lorenzo (*N*=8)[b]	38	50	12	0
Percent errors in ORS mixing steps	16	27	16	100
Percent who stated that ORT treats . . .				
dehydration	41	0	75	0
diarrhea	53	100	25	0
vomiting	6	0	0	0
didn't know	0	0	0	100

[a]Does not include one case trained by missionaries.
[b]Does not include one case with missing data for this variable.

demonstrated the sequence and then asked mothers to practice it. All three of these health workers neglected to mention several steps promulgated by the Ministry.

Observations of Outreach

In SL and SR, we had the opportunity to observe outreach activities, accompanying workers who were primarily giving vaccinations and other preventive services to women who were unlikely to visit the clinic due to its distance from their homes. These workers were obviously well known and very well received by their clientele. Moreover, the women appeared more relaxed in their own homes than is typically the case in the clinics. They were able to interact with the health worker as a group of neighbors, and indeed helped the health worker locate mothers in the area who were potentially in need of services. They all kept their *carnets* (vaccination records) where they could find them and were very knowledgeable about preventive practices in general (including such things as disposal of garbage).

Summaries of Conversations with Groups of Health Workers

Finally, in-depth focus-group style conversations were held with the entire health teams of SL and SR. Our emphasis in these conversations was on how to best promote ORT through clinic services and outreach throughout the rest of the country. The following summarize the comments of these teams of health workers:

1. Health workers would do even more outreach if they could be assured that their expenses were going to be paid, and if they had sufficient material to use in their promotion efforts.
2. Natural reinforcers for outreach include identification with the community and knowledge that children in the community may not have to visit the clinic, thus ultimately saving work. School children can also be taught the value of this activity and even be requested to help out when possible. Perhaps community leaders should be reminded to reinforce the outreach efforts of the workers, and health clinic supervisors should remind the entire team of the ultimate savings in efforts this work may achieve.
3. *Collaboradores* (neighbors who volunteer to help coordinate prevention activities) are apparently very effective in facilitating outreach efforts. Perhaps each could be given print material (appropriate for illiterate people) for use between outreach visits.

CONCLUSIONS AND RECOMMENDATIONS

From Clinic Observations

These behavioral assessment procedures lead us to the following conclusions:

1. Personnel need to attend more closely to the current norms recently established by the Ministry of Health. The amount of information provided by the various workers was negatively correlated with their status in the system. This indicates that while physicians do a relatively good job of communicating these norms, they spend less time training or observing their staff in the use of the norms. Part of this recommendation, therefore, is that clinic staff conduct the necessary training and supervision for increased attention to these diagnostic guidelines.
2. At times, the lack of attention to the assessment of children's health and illness was a function of not having the appropriate equipment and instruments for measure. Clinics should be provided such equipment, or at least be encouraged to find alternatives. For example, clinic staff can improvise height measurement with marks on a flat table in the growth monitoring station.

3. Staff should continue to orient themselves to the needs of the clinic, for example, by doing more outreach when clinic activity is light. Within the limits of their roles and resources, supervisors should encourage a high level of community activity in villages in most need. One method to promote this extra-clinic work is to insure that field work gets at least as much supervisory attention as does in-clinic work, which is usually done in the presence of the supervisor. To do this, supervisors are advised to leave the clinic whenever possible to accompany staff on outreach activities. *This recommendation holds true for all levels of the health system.* Many health workers in remote areas report little or no contact with superiors who work at higher levels of the system. From our observations, it seems especially important that the supervisors from the district visit the centers and that the supervisors of the posts have more contact with them.
4. The level of vocabulary used in patient communication was too sophisticated to be easily understood by the mothers (if at all). Health workers should be challenged to use vocabulary common in the communities in which they work (e.g., "rats" instead of "rodents"). Graphic materials distributed to health workers and through them to mothers should contain commonly understood words rather than a vocabulary targeted to the workers' level of education. (We should note that the staff of SP were very adept at selecting appropriate vocabulary. Their approach to communication could be held up as a model for other staff who were less adept.)
5. These data are very limited in their generalizability in that we were in only a few clinics for a brief amount of time. Additional research may be needed to determine whether other clinics in other areas follow similar patterns.

From the Home Observations

1. Not surprisingly, many mothers used a baby bottle for the administration of ORS, as: a) this was more efficient, both in terms of proportion consumed and the freedom for the mother to perform other duties; and b) apparently some of the health workers were mentioning this as a viable option. The Ministry should decide whether this is a viable option and, if so, within what guidelines (e.g., only two ounces at a time). If this practice is not acceptable, it should be discouraged more directly.
2. Much confusion and inaccuracy attended the steps of "getting the solution to a room temperature" and "tasting before administering." Officials should decide if these are really necessary guidelines, or whether they are actually worth the trouble of overcoming the problems related to them. For example, mothers naturally think that the solution temperature should be equivalent to that of breast milk. Also, testing a solution seems to contradict the concept of "protecting it from contamination."

3. *Training and face-to-face communication are effective, and health workers are doing both effectively.* We were surprised at the level of knowledge and skill in the community, even among mothers who could not even remember when they had been trained in the use of ORT as so much time had elapsed.
4. Some innovative health workers were effectively using training as part of their health promotion activities in community outreach. Perhaps this practice could be institutionalized as part of their regular duties. For example, a new carnet could be designed which included a place to note "last time trained in ORT," just as we note when the children last received vaccinations. In this way, we would know when each mother needed a "booster promotion" and could record the number adequately trained in central files as well. At least in San Marcos, this system could work very well as nearly every mother observed in outreach could locate their carnets readily. In any case, training could be conducted efficiently for small groups of mothers/neighbors in the homes of "collaboradores."

From the Observations of Outreach

1. *Canalización* appears to be very effective and should be promoted throughout the country as it appears to have been in the department San Marcos. Those responsible (at all levels) are to be commended.
2. Whether or not the San Marcos experience is representative, we could use exemplary health teams as role models for promoting this activity to other areas of the country. For instance, the SF experience (in the village of Nance) would have been perfect for a videotape, slideshow, or *photonovela* which, in turn, could be used to train other teams in outreach.
3. Our brief observations were in villages which were situated on flat terrain with houses close together. Even in this favorable situation, the health workers were having substantial difficulty carrying their various instruments and materials. This effort could prove almost impossible in hilly terrain among more dispersed residents. Health workers are in severe and urgent need of some type of convenient carrying device such as a large backpack.
4. Such a device would especially be necessary if the outreach workers are to be expected to carry more print or other material (such as flip charts) for promoting ORT and other health-related behaviors. In the same vein, graphic material needs to be small and otherwise easy to manage for use in outreach.
5. *Canalización* is an invaluable activity. Individual health workers as well as entire health teams and even districts should be given feedback and reinforcement based on how much outreach they do as well as on local mortality and morbidity data, which is somewhat more distant from their experience.

SUMMARY

The formative study described above demonstrates how behavior analysis can be used to plan health promotion programs; in this case, the promotion of oral rehydration therapy in rural and semi-urban areas of Guatemala. Placing less emphasis on self-report and relatively more on direct behavioral observations, behaviorists, anthropologists, and other social scientists emphasize face-to-face communication and the quality of this communication, especially when used for behavioral skills training. The present study allowed us to determine that most centers were using at least minimal behavioral training, while mothers generally seemed to understand the messages imparted through the health promotion activity. Interestingly, mothers retained the appropriate behavioral skills over apparently long periods of time.

A second aspect of the use of behavior analysis in health promotion is in the identification of reinforcers and barriers which promote or impede the adoption of health behaviors. In this case, health workers were able to describe specific approaches that might be considered for promoting outreach and other ORT activities throughout the country. This procedure was indeed very informative, especially in that the health workers were placed in a role of teaching the investigators how to conduct health promotion. Again, by looking at people who had already adopted the prescribed behavior (in this case, extensive face-to-face communication with a given clientele), we were able to analyze their reinforcement retrospectively for having done so. Of course, only future studies could determine whether these efforts could be appropriately applied to "later adopters."

Finally, the data collected through more standard behavioral measurement procedures were greatly complemented by our informal observations of the *canalización* activities. Through the information gained in the in-clinic and home visit observations, we were able to place these outreach activities in a perspective which allowed us to estimate the potential for additional health promotion outreach efforts.

Behavior analysis offers an important complement to child survival health promotion activities or any other health-related effort which involves behavior change. Of course, the present study was only formative in nature and cannot be taken as solid scientific evidence for the existence or non-existence of various health practices. Future studies may include a more epidemiologically-flavored replication of this study with appropriate sampling methods, diagnostic procedures, and other reliability and validity assessments. Additionally, the ideas gleaned from this formative study could be applied to promoting increased supervisory visits and contacts with remote health post staff, and to changing the health carnet to include mothers' last training in a specific primary prevention/health promotion behavior (such as oral rehydration therapy). Through such efforts, long-term maintenance and institutionalization of health promotive practices can be documented and institutionalized.

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