

Perceptions regarding oral rehydration solutions for the management of diarrhea in Guatemalan children: implications for diarrheal management in the Americas

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ABSTRACT

Objective. To describe knowledge and perceptions regarding the use of oral rehydration solution (ORS) for the management of diarrheal diseases among formal and informal health care providers and community caregivers in the Guatemalan department of Santa Rosa, and to recommend strategies to increase ORS use for management of diarrhea in children.

Methods. From July to September 2008, in-depth, semi-structured interviews were conducted with formal health care providers; open-ended interviews were conducted with informal health care providers; and focus group discussions and pile sorting were carried out with community caregivers.

Results. The study participants attributed episodes of diarrhea in children to culturally recognized or folk ailments (empacho, cuajo, and varillas) that are primarily treated by traditional healers. There were knowledge deficits about 1) dehydration as a manifestation of diarrhea, and 2) management of dehydration, including the use of ORS and the need to continue feedings during diarrheal episodes. Caregivers perceived bottled/ready-made ORS products and the more expensive over-the-counter antidiarrheal medications as superior to ORS packets in the treatment of diarrhea.

Conclusions. In Guatemala, folk etiologies of disease differ from those of the biomedical establishment and influence the decisions made by caregivers when treating ill children, including those related to the use of ORS. Public health campaigns addressing the treatment and management of diarrheal diseases in Santa Rosa should recognize the ailments known as empacho, cuajo, and varillas and target them for ORS use by community caregivers as well as health care providers in both the formal and informal health sectors.

Key words

Diarrhea; rehydration solutions; qualitative research; Guatemala.

Acute diarrheal diseases are among the leading causes of mortality in children < 5 years old, particularly in devel-

oping countries (1, 2). The deaths occur mainly due to the severe dehydration and fluid loss that occurs during diarrheal episodes. Dehydration is preventable by increasing fluids and continuing feedings during diarrheal episodes, and administering oral rehydration solutions (ORS), which consist of a combination of sodium, carbohydrates, and water (3, 4).

Since the introduction of ORS in 1978 as a primary intervention to manage dehydration due to diarrhea, the estimated mortality rate for children with acute diarrhea has fallen from almost 5 million to 1.3 million deaths per year (5).

Despite progress in the management of diarrheal diseases and the global success of ORS, a recent study showed that

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many countries in Africa and Asia had no significant 1) reduction in mortality from these diseases or 2) improvement in the use of ORS for treatment of diarrhea (6). The low use of ORS in these countries may be attributed to several factors, including caregivers and health care workers not being well informed about the proper management of childhood diarrhea and deficiencies in the manufacturing and supply of ORS at the national level (7, 8). Some studies have suggested that community perceptions regarding diarrhea and ORS play a key role in determining choices for managing a diarrheal episode (9, 10).

Diarrhea is a major cause of death in Guatemala and is responsible for 18% of all deaths in children < 5 years old (11). A household survey conducted in 2006 in Santa Rosa, a rural lowland department in southeast Guatemala, reported that the use of ORS for the treatment of children with diarrhea was as low as 8% (12). This is particularly worrisome considering the recent cholera outbreaks in Haiti and the Americas, which highlight the potential threat of cholera in the region, although no cases of cholera have been reported from Guatemala since the late 1990s (13).

Globally, there is limited understanding of 1) the factors that affect ORS use and 2) how to encourage caregivers to use ORS for children with diarrhea. To help fill this gap, a qualitative assessment was conducted in Santa Rosa, where ORS use is low, to examine knowledge and perceptions about the use of ORS in the treatment of childhood diarrhea among caregivers and health care providers in the formal and informal health sectors.

MATERIALS AND METHODS

Study site

Santa Rosa, one of 22 departments in Guatemala, is located 80 km southeast of Guatemala City and includes 14 municipalities comprising both rural and semi-urban areas. It has a population of 308 522, about 3% of which is indigenous or Amerindian. Approximately 91% of its inhabitants are Spanish-speaking, and more than a quarter of the population has had no formal schooling.

Santa Rosa's municipalities roughly correspond to 14 health districts, each of which is supervised by a director

who oversees government medical and public health activities. Four levels of government health care are available in Santa Rosa: 1) the Cuilapa Regional Referral Hospital; 2) health centers (one in each health district); 3) health posts (56 in total); and 4) "convergence centers" (community outreach clinics that provide health care through nongovernmental organizations). Other sources of health care include private clinics, two small private hospitals, pharmacies, midwives, and traditional healers. Study sites with a high incidence of diarrheal diseases as reported from available diarrhea surveillance data were selected, and included the following villages: Tapalapa (in the municipality of Casillas); El Astillero (in Chiquimulilla); El Astillero (in Taxisco); San Nicolás (in Barberena); Potrerillos (in Pueblo Nuevo Viñas); and Jumaytepeque (in Nueva Santa Rosa).

Data collection

A phased approach was used for data collection, with information collected at earlier stages informing processes at later stages.

Formal health care sector. In the first phase of the study, semi-structured interviews were conducted with formal health care providers such as physicians and nurses. Participants were identified through the Guatemalan Ministry of Public Health and Welfare. Eight physicians participated in semi-structured interviews about health problems in their communities. A focus group discussion (FGD) was also conducted on a similar topic with seven nurses identified by the participating physicians. Participants were asked specifically about diarrhea, institutional and individual responses to diarrhea, and approaches for the successful implementation of health programs in the community.

Informal health care sector. Information provided by participants from the formal health care sector was used to identify participants from the informal health care sector, which included traditional healers and pharmacy staff. In Santa Rosa, pharmacies are operated by owners and family members who frequently do not have a license or degree in a pharmacy-related discipline and were therefore considered informal health care providers. Twelve semi-structured

interviews that included both closed and open-ended questions were conducted with pharmacy personnel. Open-ended interviews were also conducted with two traditional healers, one herbalist, and two midwives to collect information about 1) their experience with health problems in the community, including diarrhea, and 2) their knowledge and experience with ORS.

Community caregivers. Six FGDs were conducted with 5–10 women > 18 years old, from rural and urban communities, who were caring for children < 5 years old at the time of the study. The women were selected using convenience sampling among persons visiting relatives in Cuilapa Regional Referral Hospital. The FGDs included questions about 1) participants' experiences caring for ill children, particularly those with diarrhea, and 2) treatment-seeking behaviors for various illnesses. A correlation matrix (illness–age) was used to identify illnesses that may be perceived as affecting children of different ages. Ethno-anatomical sketches were used to help the participants identify ailments and their relation to different parts of the body. The discussion group facilitators probed about feeding practices and how they are affected by illness. Knowledge and practices regarding the use of ORS and home replacement fluids, and the need to continue feeding and breastfeeding during a diarrheal episode, were also explored. In addition to the FGD participants, 10 persons from the community with recent experience caring for a child with diarrhea were invited to participate in the study. For convenience, women or men visiting an ill child at the hospital were selected. With these 10 participants, the cognitive–symbolic dimensions of sickness and health, specifically in relation to diarrhea and the use of ORS, were explored using the pile-sorting technique. "Open" interviewing methodologies were used to allow for exploration of the more complex symbolic dimensions of the social constructs of health and disease. In addition to the pile-sorting exercise, life histories of sickness were collected. In the pile-sorting phase, participants were asked to arrange 20 flashcards depicting various diarrheal treatments in perceived logical order based on how they function (part of the body targeted by the treatment, symptoms addressed

by the treatment, or effectiveness of the treatment). Similarities across treatments were explored. The cards included photos or illustrations of previously identified medicines and other products/treatments commonly used to manage diarrhea in Santa Rosa. The order of each participant's stack of flashcards was then analyzed to determine perceptions of and preferences for various treatments.

Data management and analysis

All interviews and FGDs were tape-recorded and then transcribed and analyzed using NVivo version 7 (QSR International, Melbourne, Australia) and ANTHROPAC version 4.98 (Analytic Technologies, Lexington, Kentucky, USA). The NVivo software was used to code and capture themes from the data derived from the interviews and the FGDs. Consensus analysis and the pile-sorting functions in ANTHROPAC were used to conduct factor analysis to determine patterns of agreement and scoring, and to compute the correlations of the data collected in the pile-sorting exercise.

Study ethics and informed consent

There was no risk to the study participants, and the information collected was confidential. Verbal, informed consent was obtained from all participants. Only persons > 18 years old were allowed to participate. The protocol received approval from the institutional review board of the Universidad del Valle de Guatemala (Guatemala City, Guatemala). The protocol was also approved by the Guatemalan Ministry of Public Health and Welfare.

RESULTS

Formal health care sector

Physicians. The participating physicians reported managing around 70 diarrhea cases per month in children < 5 years old. The fluctuation in the number of cases was attributed to rainfall. The participants reported that 1) they prescribed ORS to every child with diarrhea but suspected many patients do not use it because of its "unpleasant flavor," and 2) ministry health centers and health posts have an appropriate supply of ORS but "sometimes do not have any salt packets."

In response to questions about clinical management, the participants said that feeding should continue during a diarrheal episode but "fatty foods" should be avoided and preference given to "bland" foods. Most agreed that breastfeeding should continue or be increased during diarrheal episodes. In addition to ORS, the participants said they recommended home fluid replacements made from "plantain water," "rice water," or "water with orange or lemon juice and salt."

Most participants viewed delays in seeking health care as a major barrier to adequate management of diarrheal episodes. Some said the delay was driven by perceptions among caregivers that diarrheal episodes are "normal occurrences." Participants also said that the use of traditional healers for diarrhea is a common practice. One of the physicians mentioned "stigma" and "social shame" associated with diarrhea (particularly being placed in a "rehydration room" for treatment, and even the use of ORS itself) as barriers to properly managing diarrhea.

Nurses. Participants said that the first line of care sought by caregivers of children with diarrhea is traditional healers, who use remedies made from herbs and roots, but if the ailments persist or worsen, caregivers may consider taking the patient to a health center or post. They also said that three culturally recognized or folk ailments known as *empacho*, *cuajo*, and *varillas*, which are treated primarily through traditional methods, are often associated with diarrhea, which often occurred before, during, or after the ailment. *Empacho* ("indigestion") was described as a condition caused by "eating food improperly"³ that is cured by drinking 1) a carbonated beverage such as lime water with aspirin effervescent tablets or 2) a caffeinated cola product with common over-the-counter antidiarrheal remedies such as Santamicina or Sulfatazol (sulfathiazole). The participants also mentioned *purgas* (laxatives) as treatments for *empacho*. *Cuajo* (literally translated as "rennet," the stomach enzyme that induces coagulation in milk) was believed to be the result of some type of physical irritation. "When children start walking, and fall, or they sit, and develop an irritation, they begin to

have diarrhea, and whenever it is *cuajo* the diarrhea is white." Treatment for *cuajo* was explained as follows: "[The caregivers] take [the children], suspend them upside down and rapidly and repeatedly tap the soles of their feet." The ailment known as *varillas* ("rods") was described as a diarrhea-related condition caused by improper positioning of babies during breastfeeding. In response to specific questions about ORS and diarrhea, the participants said they viewed ORS as the primary treatment, but children do not like to drink it, and parents do not emphasize its importance.

Informal health care sector

Pharmacists. Participating pharmacy owners and employees reported that the main diseases for which they dispense treatments included gastrointestinal and respiratory diseases, and that the ideal practice in response to questions about management of children with diarrhea was to refer the customer to a health center or health post, or to provide ORS and a medicine that would "attack" whatever was causing the diarrhea. Information provided to customers included instructions about oral rehydration, hygiene, and visiting a health provider. Participants said community practices that obstruct adequate treatment of children with diarrhea include beliefs about medicine, and "favored brands"; the use of home remedies; and the use of traditional healers and midwives instead of health care professionals. Although most participants associated ORS with the process of hydration, two admitted not knowing about ORS or its function in treating diarrhea.

Traditional healers. All participating traditional healers described four main ailments associated with diarrhea: *empacho*, *cuajo*, *varillas*, and *lombrices* (worms). *Empacho* and *lombrices* were described as conditions that can affect persons of any age, whereas *cuajo* and *varillas* were described as ailments affecting mainly infants.

The diarrhea-related ailment reported most frequently by participants was *empacho*, a condition attributed to eating too quickly, overeating, or eating after a prolonged period of fasting. According to participants, manifestations of *empacho* included *hijillos* (small nodules that occur under the skin, usually on the hands

³ As the nurses explained, *empacho* was previously understood as "intestinal infection."

or arms); nausea; vomiting; abdominal pain; headaches; fever; diarrhea; constipation; and bloating. The type of diarrhea that occurs during an episode of *empacho* was described as “fatty and foamy.” The main treatment for *empacho* is known as *sobada*, a massage performed on the abdominal area while the patient is in a supine position that consists of a series of circular, deep strokes. For people with severe illness, *empachos* are treated with *purgas* such as oils, milk of magnesia (magnesium hydroxide), sulfates, citrates, grape salts, or carbonated beverages. Those with very severe episodes of *empacho* may undergo colonic cleansing with water and herbs. In response to questions specifically about diarrhea, participants said the condition frequently occurs as a manifestation of *empacho* but should be treated with ORS when it occurs on its own.

Manifestations of the ailment known as *varillas* include small rods descending from the palate of the mouth behind the molars. Other manifestations of the condition include a noise (*tronido*, literally translated as “thunderclap”) made by the infant during breastfeeding; poor feeding; diarrhea; and fever. Participants said they attempt to treat *varillas* by manipulating the “rods” back to their original position using their index fingers to press on the gums in the posterior maxillary area of the mouth. This treatment was sometimes preceded by other treatments similar to the ones used for *empacho*.

Manifestations of *cuajo* (known elsewhere in Central America as *caída de la mollera* or “broken crown”) include a sunken fontanel, genital inflammation, diarrhea, and vomiting. *Hijillos*, previously described as a manifestation of *empacho*, can also occur in *cuajo*, in which case the nodules can usually be found in the groin area. Treatment for *cuajo* consists of holding the ill child face down from the ankles and lightly tapping the soles of the feet. This is usually repeated several times, particularly in those with severe illness.

Worms (*lombrices*) can also cause diarrhea. According to participants, worm infections increase during heavy rains and are exacerbated by consuming spicy or very heavy foods. *Lombrices* are treated with baths in garlic-infused water and are considered the least severe of the four diarrhea-related ailments described by traditional healers.

Community caregivers

Focus group discussions. Based on the results of the FGDs, community caregivers recognize that children are ill when they cry, and when they are not eating, breastfeeding, or playing as usual. Stomach diseases were most commonly associated with babies, children, and adolescents. According to these participants, when children are ill with a stomach disease they should be fed soft, bland food, which can be complemented with *atole* (a traditional cornstarch-based hot drink); their desire to breastfeed decreases; and they should not be “required” to breastfeed. They also said that while health centers or health posts are the first line of care for most diseases, for *empacho*, *cuajo*, and *varillas*, with or without diarrhea, they prefer the services of traditional healers, unless “there is no money,” in which case they visit a health center or health post, where services are free. To treat diarrhea, participants said they used aspirin effervescent tablets with lime, rice, or plantain water, or a solution of salt and sugar in boiled water. While most participants did not know the terms “oral rehydration solution” and “ORS,” they recognized the ORS packets provided by health centers and health posts, and understood that they are administered to treat diarrhea. There was no consensus among the participants on whether ORS packets were used to cure diarrhea or to manage dehydration.

When asked about ORS preparation, participants said the contents of the ORS packet should be dissolved in treated or boiled water and administered to patients “in small amounts” so that it can be better tolerated. The wide range of packaging and labeling for the various brands of ORS caused confusion among participants about how ORS should be prepared. They also reported that flavored ORS is considered more acceptable than unflavored ORS. Most participants said that bottled/ready-made ORS products were superior to ORS packets, based on the reasoning that a higher price should translate to better quality (bottled/ready-made solutions in Santa Rosa are 40 times more expensive than the packets). Participants also said that the bottled/ready-made ORS products were often administered like bottled medicines such as antibiotics or cough

syrups, which are given in small doses such as spoonfuls rather than larger volumes usually required for adequate hydration.

Pile sorting. In the pile-sorting exercise, the participants arranged the 20 flashcards depicting various diarrheal treatments, including the ORS formulations shown in Table 1, based on the instructions described above (in perceived logical order by 1) part of the body targeted by the treatment, 2) symptoms addressed by the treatment, or 3) effectiveness of the treatment). Most participants arranged their cards by stomach problem addressed by the treatment (which included the folk ailments *empacho*, *varillas*, and *cuajo*, as well as other commonly recognized gastrointestinal symptoms such as diarrhea, heartburn, and stomach ache). The participants were then asked to classify the cards in different groups based on effectiveness in treating diarrhea (“always effective,” “sometimes effective,” “rarely effective,” and “never effective for diarrhea”). According to most participants, the best treatments for diarrhea, in descending order, were *Sal de Andrews* (citric acid, magnesium sulfate, and sodium bicarbonate); bismuth subsalicylate; *agüitas* (infusions); and the ORS packets. None of the treatments were classified by participants as “not effective for diarrhea.”

The final step of the exercise consisted of choosing the flashcards that showed the best treatments for diarrhea. Of the 11 caregivers, five chose *Sal de Andrews* and bismuth subsalicylate, four chose the bottled/ready-made ORS products, and two chose the ORS packets.

TABLE 1. Brand name and type of oral rehydration solutions available in Santa Rosa, Guatemala, 2008

Brand name	Type	Flavor
Sales de Rehidratación Oral BP	Sachet	None
Suero vida oral UNICEF	Sachet	None
Suero Oral Ancalmo	Sachet	Multiple
Suero Oral Vitaminado Ancalmo	Sachet	None
Electro Dex	Sachet	None
Glucosoral	Sachet	None
Vida	Sachet	None
Pedialyte	Bottled	Multiple
Oralyte	Bottled	None
Levu	Bottled	None

DISCUSSION

This qualitative assessment demonstrated that in Santa Rosa, Guatemala, diarrhea is perceived to be largely a symptom of one of three culturally recognized/folk ailments: *empacho*, *cuajo*, and *varillas*. These findings are similar to other studies in Central America showing that folk etiologies of disease differ from those of the biomedical establishment and influence decisions made by caregivers when treating ill children (14–16). When diarrhea is perceived to be a manifestation of one of the folk ailments, traditional healers are the preferred source of treatment. In some cases, the treatments used for these ailments may worsen a diarrheal episode. In other cases, the diagnosed folk ailments may represent severe manifestations of diarrhea. In any case, the traditional methods rarely manage the underlying dehydration. Despite the perceptions revealed in the study, it has been well documented that in Guatemala, modern biomedical care plays a major role in the treatment of childhood diarrhea, suggesting that public health campaigns, particularly those conducted by the formal health care sector, should incorporate folk ailments as proxies for diarrhea and therefore targets for ORS use (17).

The discrepancy between medical versus cultural or folk conceptions and definitions of diarrhea pose considerable challenges to the implementation of prevention interventions and surveillance activities. Similar challenges have been reported in Africa, where perceptions and beliefs about childhood diarrhea were limiting the validity of community-based diarrhea surveillance (18). Another example of popular perceptions

of diarrhea creating a barrier to scaling up effective prevention interventions was documented in efforts to scale up household water treatment in developing countries (19, 20). The current study found that, similar to other countries with declining ORS use, in Guatemala, there is a wide variety of products marketed for oral rehydration, many of which are acquired through pharmacies (21). Wide availability of rehydration products with different instructions for use and formulations could lead to inappropriate product use or adverse consequences and pose a threat to appropriate management of diarrhea (22).

Limitations

The findings from this study are subject to several limitations. First, the study was not conducted during the rotavirus season reported for Guatemala (23). ORS is the primary treatment modality for rotavirus diarrhea, so the current findings might have been different if the study had been conducted during the rotavirus season, when health care worker and caregiver awareness of ORS as a treatment for diarrhea is higher. Second, the study area was limited to the department of Santa Rosa, so the findings can not be generalized to other populations. Despite this limitation, the findings from this study could be applicable to other, similar communities in Guatemala and throughout Central America.

Conclusions

Caregivers in Santa Rosa, Guatemala, perceived some episodes of diarrhea in children as manifestations of several

culturally recognized or folk ailments known as *empacho*, *cuajo*, and *varillas*. Therefore, public health campaigns to address treatment and management of diarrheal diseases in Santa Rosa should recognize these ailments and target them for ORS use by caregivers as well as health care providers in the formal and informal health sectors. Educational campaigns should 1) increase knowledge of dehydration as a severe consequence of diarrhea (regardless of whether it is perceived as the principal condition or as a manifestation of *empacho*, *cuajo*, or *varillas*); 2) promote the proper use of ORS and continued feedings throughout diarrheal episodes; and 3) describe the various brands of beneficial treatments available in the community, and how they should be prepared and administered. Particular attention should be given to the proper use of bottled/ready-made ORS products, which are considered superior to ORS packets within the community. These products are often administered like bottled medicines, such as cough syrup, resulting in dosing in small quantities rather than the administration of large volumes usually required to ensure adequate hydration.

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Conflicts of interest. None.

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RESUMEN

Ideas con respecto a las soluciones de rehidratación oral en el tratamiento de la diarrea de los niños guatemaltecos: repercusiones sobre el tratamiento de la diarrea en las Américas

Objetivo. Describir los conocimientos y las ideas que tienen las personas que prestan atención de salud en el sector convencional, el sector no convencional y los cuidadores de la comunidad con respecto al uso de las soluciones de rehidratación oral en el tratamiento de las enfermedades diarreicas, en el departamento guatemalteco de Santa Rosa y recomendar estrategias encaminadas a aumentar la utilización de estas soluciones en el tratamiento de la diarrea en los niños.

Métodos. De julio a septiembre del 2008 se llevaron a cabo entrevistas exhaustivas semiestructuradas a los profesionales de salud y entrevistas con preguntas abiertas a los proveedores no convencionales de atención sanitaria y se organizaron debates en grupos de opinión y ejercicios de ordenamiento de tarjetas con los cuidadores de la comunidad.

Resultados. Los participantes en el estudio atribuyeron la causa de los episodios de diarrea en los niños a dolencias culturalmente aceptadas o populares (*empacho, cuajo y varillas*), que tratan principalmente los curanderos. Se observaron deficiencias en los conocimientos acerca de 1) la deshidratación como una manifestación de la diarrea y 2) el tratamiento de la deshidratación, incluido el uso de las soluciones de rehidratación oral y la necesidad de continuar la alimentación durante los episodios diarreicos. Los cuidadores consideraron las soluciones de rehidratación embotelladas o preparadas y los medicamentos antidiarreicos de venta libre, que son más costosos, como mejores opciones para el tratamiento de la diarrea que las soluciones de rehidratación oral.

Conclusiones. En Guatemala, el concepto popular y el de las instituciones biomédicas sobre la causa de las enfermedades es diferente e influye sobre las decisiones que toman los cuidadores al tratar a los niños enfermos, por ejemplo, las relacionadas con el uso de soluciones de rehidratación oral. Las campañas de salud pública que abordan el tratamiento y el manejo de las enfermedades diarreicas en Santa Rosa deben incorporar las dolencias conocidas como *empacho, cuajo y varillas* y fomentar el uso de las soluciones de rehidratación oral en estos casos, por parte de los cuidadores de la comunidad, los profesionales de salud del sector convencional y los proveedores de atención del sector no convencional.

Palabras clave

Diarrea; soluciones para rehidratación; investigación cualitativa; Guatemala.