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MOTHERS' CONCEPTS OF CHILDHOOD DIARRHEA IN RURAL PAKISTAN: WHAT ORT PROGRAM PLANNERS SHOULD KNOW

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Abstract—Diarrhea is the leading cause of infant and child death in Pakistan. Appropriately, the development of oral rehydration therapy (ORT) programs has become a major priority of the Pakistan Ministry of Health and of international funding agencies. Paradoxically, however, there is virtually no published anthropological literature on diarrhea-related traditional health beliefs and practices among the rural and illiterate people who make up 90% of the nation's population. The study reported on here focuses on these matters and suggests important implications for the multimillion-dollar ORT programs currently being launched. Mothers' ethnomedical models of diarrheal disease and concepts of appropriate treatment are discussed, as are practical problems relating to the effective implementation of ORT in such a setting. The results underline the need for anthropological studies as an adjunct to health interventions involving behavioral modification.

Key words—diarrhea, ethnomedicine, health education, humoral theory, oral rehydration therapy, Pakistan

INTRODUCTION

Diarrheal disease is the leading cause of infant and child mortality in Pakistan, where it accounts for an estimated 300,000 deaths per year [1]. Appropriately, it is currently the focus of a massive nationwide oral rehydration therapy (ORT) campaign [2]. The gravity of childhood diarrhea in urban slums was documented in 1984–85 by the Department of Community Health Sciences at The Aga Khan University (AKU) in Karachi, the largest city in Pakistan. Health surveys conducted by the Department indicated that more than 1 child in 5 fails to survive to the age of 5 in Karachi shantytowns, and that 30–40% of these deaths are due to diarrhea [3]. The infant (first-year) mortality rate in one typical shantytown, Orangi, was found to be 110/1000 live births [4].

More recent studies carried out in rural Sind, the province in which Karachi is located, suggest that the death toll from diarrhea is even higher in the countryside. In July and August 1986, 2 closed-ended epidemiologic questionnaires were administered by AKU medical and nursing students in all 45 villages within a 7 km radius of the town of Vur, 100 km east of Karachi (Fig. 1). The first survey, covering the entire study area population (approx. 11,700 people living in 1055 households), yielded an infant mortality rate of 257/1000, more than double the official national figure [5]. In other words, more than one quarter of babies born alive died in the first year of life. The child mortality rate was 33/1000 per year from the ages of 2 to 5. The second epidemiologic survey, of 358 randomly-chosen women with children under the age of 5, produced comparable mortality figures and added the information that diarrhea accounted for about 40% of the 'under 5' deaths [3].

Although these surveys provided dramatic confirmation that diarrheal disease was a major health problem in Pakistan, they necessarily focused on broad sociodemographic data and general morbidity and mortality patterns. They did not and could not delve into the complex complementary area of traditional health beliefs and practices surrounding childhood diarrhea. Yet only a few studies touching on this area of inquiry have been carried out in Pakistan [e.g. 6–11], and those few are scattered and largely unpublished. Hence, recognizing the need for such information, one author (JDM) accompanied the epidemiological survey team to the field and simultaneously conducted an in-depth anthropological study of diarrhea using informants drawn from the same population in the same region of Sind. The purpose was to highlight culturally relevant matters that might be missed by the broader surveys but might have important implications for the formulation and implementation of ORT programs. This paper reports the major findings of the anthropological study.

METHOD

The authors undertook this study as the first phase of an ongoing effort to document clinically-significant maternal and child health beliefs and practices in Pakistan. Their subsequent research has focused on such beliefs and practices in Karachi slums (February–June 1987) and in rural Chitral in the North West Frontier Province (July 1987). For the present study, they designed an interview schedule following a review of literature on diarrheal disease in the Indo-Pakistan subcontinent [12–22] and intensive consultation with Pakistanis familiar with the culture of rural Sind. The questioning was carried out in the Sindhi language by a female AKU nursing student working in fairly close proximity to the larger epidemiologic survey team. One author (JDM) accompanied the interviewer to the village sites, and, where possible, was present during the interviews themselves (see discussion below).

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The interview schedule consisted of 21 closed- and open-ended questions followed by 6 'clinical vignettes' for informants to diagnose. The overall movement of the interview was from questions about prevalence and perceived seriousness of diarrhea in the community to more general inquiry about causes of diarrhea, the ways in which it was treated, including ORT, and the types of health practitioners who were consulted for diarrhea and for disease in general.

The clinical vignettes placed the informants in an active diagnostic role partly as a cross-check on their responses to prior questions and partly as a means of eliciting free, detailed, and undirected response. The use of such vignettes, one of which is reproduced in the 'Results' section below, has been described previously [23]. The method consists of presenting informants with a brief description of a sick person and asking them to state what the problem might be and its probable cause and proper treatment. All responses are recorded. If carefully constructed, these vignettes can be quite useful in bringing out emic concepts.

A total of 57 rural women with children under age 5 were interviewed in July and August 1986. Interviews were conducted in 35 of the 45 villages visited by the epidemiological survey team. Although random sampling procedures were not followed, an

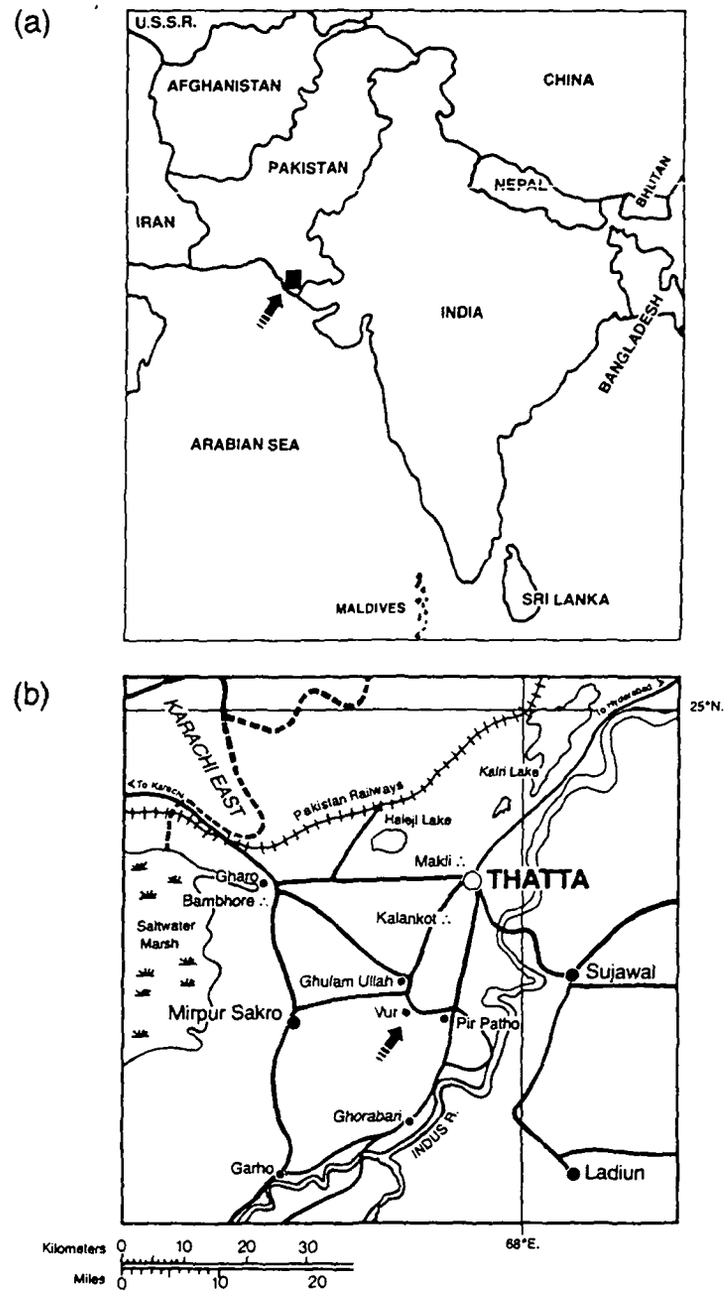

Fig. 1. (a) Area map and (b) detail map of the study site, with Vur indicated by a black arrow.

effort was made to select interview sites scattered over the entire region within a 7 km radius of Vur rather than focusing on the less remote, more easily reached locales. Within the villages, women who lived in widely separated houses were interviewed. The town of Vur itself was sampled to a lesser degree than its relatively large population (2000) would have warranted if strict proportionality had been followed. The reason for limiting the number of interviews in Vur was that AKU nursing students had conducted ORT lessons there and the town was therefore atypical of the rest of the study area.

THE SETTING

The study was carried out in a rather remote area of Sind bordering the Indus River, in a region dominated economically by large landowners. As remote as it is, one sometimes sees a television set or tape cassette player incongruously placed in a typical straw-roofed house with its dirt floor, unscreened windows, and animals wandering in and out. In 1 village, a very prosperous man was reported by his family to have an income of 8000 rupees per month, 5 times what the average unskilled worker earns in Pakistan. (Although 8000 rupees is currently equal to about $470 U.S., it is worth much more in terms of relative purchasing power.) This man had 2 wives and a television set complete with videocassette recorder. Yet he and his family had no latrine; they were using an open field as a toilet.

The landscape surrounding Vur is characterized by lush rice fields and irrigation canals punctuated by arid, unirrigated areas where people live. Cattle-breeding is important in the region, but the peasants are primarily tenant farmers: the major crops are rice in summer and okra (ladyfinger) in winter and early spring. Bananas and mangos are also grown. Most people live in crude huts made of sticks interwoven with rushes and plastered over with mud mixed with straw and cow dung. Clusters of huts form small villages, which are usually surrounded by a circular barrier of thorn bushes.

Electricity and indoor water connections are rare and basically limited to the town of Vur. Kerosene lamps are the major means of lighting, while scrub brush is used as cooking fuel. Wood is scarce. Some people have tubewells with hand pumps, but normally the irrigation canals, which have water buffalo roaming through them at will, supply water for all purposes—washing, drinking, and bathing. Enclosed sanitary facilities are very uncommon; the great majority of the people use the open fields.

Two hard-surfaced roads extending from Thatta, the district capital (25 km from Vur), south to Ghorabari run through the survey area, but many villages are located far from these roads, essentially in the middle of large rice fields. Some are virtually inaccessible at the time of year in which the survey was conducted (the rainy season), while others can be reached only by wading through knee-deep water. In this setting, bullock carts are the usual form of transport, although large landowners have 4-wheel-drive vehicles.

Officially-authorized allopathic health facilities in Vur itself include a government Rural Health Center (or 'Basic Health Unit') with 1 male doctor, an Aga Khan Health Services maternity center with 1 Lady Health Visitor (LHV), and 3 medical practitioners in private practice. (Lady Health Visitors are officially-licensed medical workers with secondary school diplomas and 2 years of clinical training in government schools of public health. The emphasis of the training is on maternal and child health.) There is another Aga Khan Health Services LHV in Mohammedabad, 1 km from Vur, and a third in Ghulam Ullah, 6 km from Vur; a Maternal and Child Health Center of the Population Welfare Division, with 2 LHVs, is also located in Ghulam Ullah. Finally, on the outskirts of Thatta there is a district hospital (known as Civil Hospital, Thatta) with several doctors in addition to LHVs and nurses. Practitioners of various types of nonallopathic therapies, traditional birth attendants, and religious leaders involved in healing are also scattered throughout the area.

A bus goes from Vur to Thatta twice a day, taking about 45 min to make the trip, but only about one third of the approx. 11,700 people in the study area live within a 30-min walk of Vur. The rest are at some distance, and some must walk for at least that long just to reach a dirt road loading to Vur, Ghulam Ullah, or Thatta. There is no bus service on such roads.

The people in the survey region all speak Sindhi and are virtually all Muslims. In terms of precise religious affiliation, about 10% are Shia followers of the Aga Khan (Ismailis), while just under 90% are Sunnis and a very small percentage are Hindus. The Ismailis are generally somewhat better off financially and better educated than the others and live in well-defined geographical areas, chiefly in the town of Vur itself. Ethnically, the majority of the tribes populating the villages originated in the province of Sind. A small number emigrated many years ago from Baluchistan and a still smaller number from Punjab. In the study area, the Baluch tribes were found to be the most conservative in relation to purdah (female seclusion) and in no case allowed male interviewers to enter the village clusters.

A few times, village women refused entry even to the female AKU interviewers, saying that with the men away they could not admit anyone. One family did agree to be interviewed with the men absent but threatened to retaliate if anything happened as a result of their answering the questions, while in another village, 2 women voiced fears that their children would be 'injected' or even killed. There seemed to be a general feeling that team members might be in league with tax collectors, present only to 'take more money' from them without doing anything in return. Perhaps for this reason, false names were sometimes given. On the other hand, interviewers were warmly welcomed in several villages, especially those populated by Ismailis, since the latter were already familiar with the outreach efforts of The Aga Khan Health Services organizations.

RESULTS

As stated above, all 57 informants were mothers of children under the age of 5. The mean age of these

Table 1. Distribution (%) of informants stating knowledge and use of ORS packets and a form of homemade sugar–salt solution (SSS) in rural Sind, Pakistan ($N = 57$)

	ORS packets	A form of homemade SSS
Had used	56	37
Has heard of but not used	12	0
Had not heard of	28	60
Missing data	4	4

mothers was 25. One women was Hindu, 3 were Ismailis, and the rest were Sunnis. In terms of ethnic origin, most were Sindhi, 5 traced their heritage to Baluchistan, and 1 belonged to a family that had emigrated from Punjab. Only 2 of the 57 women (4%) were judged to be literate. Virtually all were living as tenant farmers largely outside the cash economy, exchanging part of their crops for needed goods (and a few rupees) supplied by the landowners. If extra money was needed, a goat or water buffalo would be sold.

Despite the fact that the government has been actively promoting ORT since June 1983 [24], a significant number of respondents (28%) had never heard of using packets of oral rehydration salts (ORS) to treat diarrhea. An even larger number (60%) had never heard of using any type of homemade sugar–salt solution (SSS). Nevertheless, 32/57 women (56% of the sample) stated that they had used ORS packets, a much higher percentage than the 9% reported from a 1982 survey of women in rural Punjab [7]. (1982 was the year in which ORS production was initiated in Pakistan.) Further, another 7 women interviewed (12% of the sample) said that they had heard of the benefits of ORS packets, and 21 women (37%) claimed to have used some form of homemade SSS (Table 1)*. Thus it appeared that although many mothers were unaware of the existence of ORT, most had at least a superficial acquaintance with it.

Oral rehydration therapy, properly given, is believed to be effective in correcting dehydration in at least 80–90% of acute diarrhea cases. Only a tiny fraction of cases require intravenous therapy or antibiotics [27, 28]. The fact that the study area of Sind continues to experience extremely high death rates from diarrheal disease suggests that in addition to lack of awareness of ORT and/or insufficient access to ORS packets, other factors may be reducing the effectiveness of this potent therapeutic tool. One such factor is malnutrition, which, although not formally investigated in the present study, reportedly affects 84% of children in rural Sind [29] and was much in evidence. Other important factors undermining the efficiency of ORT were highlighted by the study results and are discussed below.

Incomplete understanding of oral rehydration therapy

To begin with, most of the 32 mothers stating that they had used ORS packets showed wholly inadequate understanding of how the solution should be prepared and administered. When questioned in detail, only 12 described anything approaching an effective form of utilization. The most common error was underuse. For example, 6 of the 32 mothers who had used the packets (19%) stated that the dose of ORS solution should be 1 or 2 teaspoonfuls at a time, 2 or 3 times a day. In other words, there appeared to be confusion with the manner in which over-the-counter 'tonics' or prescribed medicines such as liquid antibiotics or cough syrups are normally given†. Some mothers were administering larger quantities of fluid, but of these, most were giving much less in a 24-hr period than is officially recommended; and in general, the concept of replacing the amount of water lost via the loose stools seemed to be weak or lacking.

Inadequate understanding of ORT and consequent limited enthusiasm for the therapy were undoubtedly major factors underlying this usage pattern. In addition, even though the women said that ORS packets were either supplied free (at clinics) or could be purchased for about 3 rupees each (at shops), it is possible that the cost of the packets predisposed to underuse, given the cost and difficulty of transport and the general shortage of cash in this rural population. (3 rupees is currently equivalent to about 18 cents U.S.; in a study done in Bangladesh, 10% of 240 informants, most living in rural areas, said that ORS packets of comparable cost were prohibitively expensive for them [20, p. 363].)

The present study also exposed problems with preparation of the rehydration fluid. Several women described a preparation method that would have yielded a solution much too dilute or much too concentrated to be effective. For example, 1 mother said that she mixed half a packet of ORS in 1000 ml ('4 glasses') of water; 3 more said that they mixed 1

*This percentage is much higher than that found in other studies carried out in Pakistan (e.g. [25, 26]), most of which have found virtually no use of SSS, especially in rural areas. Perhaps the explanation of this discrepancy lies in varying understandings of what constitutes 'homemade SSS'. The present authors defined it broadly to include any solution containing sugar, salt, and water that was used to treat diarrhea. They did not require that informants understand its rehydrating function or administer it in an effective way. Preliminary analysis of data subsequently collected in Karachi slums suggests that there, well over half of 150 mothers interviewed had used a form of SSS.

†The authors' subsequent research in Karachi slums indicates that in those areas, women sometimes give ORS solution preventively (e.g. 1 or 2 teaspoons per day) to infants in the first year of life, whether the infants are ill or not. The underlying reasoning is that small babies are especially vulnerable and need extra protection against sickness. In the Philippines, it has been reported that ORS solution is not only used for high fever, burns, post-surgery, and hangovers, but as a general 'tonic' as well [30].

packet in 250 ml ('1 glass') of water. In these and other cases, it appeared that women had become confused because the packets came in 2 different sizes—one requiring 500 ml of water to be added, the other requiring 1000 ml (both sizes of packets were and are being distributed in government health facilities). Further, although some mothers said that they had received instructions for use from medical personnel, others from shopkeepers selling the packets, often their husbands had brought this information to them, thus introducing additional opportunities for distortion. Most women had radios, usually battery-operated, in their homes, but only one said that she had received mixing instructions via the radio.

Another somewhat disturbing finding was that 17 of the 32 mothers who had used the packets (53%) said that they gave sugar water in addition to the ORS solution. This could have had the effect of increasing the glucose—and decreasing the salt concentration—beyond the recommended limits. (In Karachi, extra sugar is sometimes added to the ORS solution itself to make it 'more palatable'.) If a child has watery diarrhea and fluids containing too little salt are given, the blood sodium can be lowered to a point endangering survival [31]. Too *much* salt is also very dangerous, of course.

Significantly, although 37% of all 57 informants said they had used a homemade solution containing sugar, salt, and water to treat childhood diarrhea (Table 1), most showed no knowledge of the proportions currently recommended for safe and effective use. Further, as with ORS solution made from packets, many mothers were administering tiny homeopathic quantities such as 1 or 2 teaspoons several times a day. Again, the concept of replacing diarrheal water losses was almost completely lacking. In effect, then, these mothers were giving a self-designed form of SSS in a hit-or-miss fashion. Mothers did have a generally positive view of the homemade solution as something that most of them had known about and used for years. However, as with the ORS packets, inaccurate preparation and administration of a potentially invaluable therapy undoubtedly undermined its efficacy. Such errors may have led to 1 mother's comment that she had given a sugar–salt solution once but had never done so again because 'it didn't work'.

In addition to highlighting these preparation and administration problems, results of the present study indicate that the decision to use or not use ORT is best understood in the context of the traditional model of diarrheal disease in this region of Pakistan. Several crucial aspects of this conceptual model are outlined below.

'Heat' as a cause of diarrhea

First, mothers' responses made it clear that in this area of rural Sind, most diarrheas are regarded as very closely linked to 'heat'. As used by these mothers, the term 'heat' did not normally refer to measurable temperatures but rather to a 'hot' quality believed to be inherent in certain foods or bodily states. This concept of 'heat' is derived from the ancient system of humoral medicine proposed by Hippocrates and Galen and transmitted to the Islamic world by Avicenna in his monumental *Canon of Medicine* (*ca* 1000 A.D.). (Similar ideas in the South Asian Ayurvedic tradition may have influenced Avicenna's thought, just as they have undoubtedly contributed to the strength and persistence of popular humoral notions in Pakistan. Ayurvedic works were available in Arabic from the 7th century A.D. on, and there are references in the *Canon* to the work of Indian physicians [32, p. ix].)

In both the Greek and the Ayurvedic systems, balance is believed to be vitally important to health, and restoration of balance is characteristic of most therapies. Such a restoration is typically achieved through the use of foods and medicines classified as hot, cold, wet, or dry. In Pakistan, most Western allopathic medicines such as antibiotics, and even vitamins, are classified as 'hot' (*garam*), while many foods and herbs traditionally used to treat diarrhea are viewed as 'cooling' or 'cold' (*tanda*)*.

Table 2 summarizes the results of the present study with regard to mothers' perceptions of the causes of child diarrhea. It will be seen that heat-related concepts predominate. (96% of informants mentioned at least one such concept.) Studies carried out by other investigators in various parts of India [12, 13, 19] and in Sri Lanka [35] all produced a similar finding: the most common view of diarrheal disease was that it was a 'hot' illness caused by excessive heat in the body. In North India, Bentley [22] found that diarrhea was most commonly attributed to 'hot weather' (66% of approx. 200 respondents); 'hot food' and 'hot breastmilk' were also perceived as important causes. In a Punjabi village in Pakistan, heat was the factor most prominently mentioned as a cause of diarrhea [8, p. 90]. Finally, the present authors' own research in Karachi and the North West Frontier Province suggests that the concept of diarrhea as a 'hot' disease is widespread in these areas as well†.

*Notions of hot and cold are pervasive in Pakistan, to the extent that not only foods and medicines but also individual temperaments [33] and even whole ethnic groups are linked with one or the other quality: Pathan tribesmen from the North West Frontier Province of Pakistan are reportedly viewed as relatively 'hot', for example [34]. The authors' research in Karachi slums suggests, however, that hot–cold classifications of foods are both less extensive and less consistent in that urban, multi-ethnic setting than they are in the study area of rural Sind.

†It should be mentioned that one very important type of diarrhea in Pakistan is classified as 'cold' rather than 'hot'. Typically, this diarrhea is thought to be contracted by an infant when his mother goes out in the cold morning air and then breastfeeds; the diarrhea is worse if the mother is exposed to water (as in washing clothes) and cold air at the same time. The resultant loose stools are greenish in color, but the diagnosis is not made as much by color (other causes produce greenish stools) as by the antecedent conditions, especially the ambient temperature. Thus the authors encountered no mention of this 'cold' diarrhea in rural Sind in July and August of 1986, when the present study was carried out, but recorded several cases in their subsequent research in Karachi beginning in February 1987. Interestingly, the fact that the diarrhea was thought to be caused by cold did not deter Karachi mothers from using rehydration fluid to treat it, even though sugar water is thought of as 'cooling'.

Table 2. Distribution (%) of informants mentioning various folk models of child diarrhea in rural Sind, Pakistan ($N = 57$)

Perceived cause of diarrhea			% Mentioning
I.	Problems affecting mother's breastmilk		
	A.	'Heat'	
		1. Mother eats 'hot' foods	39
		2. Mother works in hot sun	12
		3. Mother has fever	5
		4. Mother becomes pregnant and milk 'sours'*	4
		5. Mother takes hot bath	2
		6. Mother drinks hot water	2
		7. Mother takes 'hot' medications	2
	B.	Mother eats spoiled or unclean food	7
	C.	Mother eats food that does not agree with infant	4
	D.	Mother does not eat on time	2
II.	Problems affecting child		
	A.	'Heat'	
		1. Child has fever	46
		2. Child eats 'hot' foods	39
		3. Child has 'fallen fontanel' (*sutt*)*	12
		4. Child has 'evil eye disease' (*nazar*)*	7
		5. Child's teeth are erupting*	5
		6. Child is exposed to hot weather	5
	B.	Child eats spoiled or unclean food	19
	C.	Child eats food that does not agree with him	9
	D.	Child has intestinal worms 'from eating dirt'	7
	E.	Child is ill, disease unspecified	5
	F.	Child drinks 'too much' fresh or tinned milk	4

*See text for discussion.

In Table 2, the supposed souring of breastmilk caused by a new pregnancy is classified as heat-related because pregnancy itself is considered a 'hot' condition in the humoral schema [36, 37]. The concept is that certain 'hot' conditions or 'hot' foods affect the mother's breastmilk and by this means cause diarrhea in the nursing infant. Similarly, 'fallen fontanel', 'evil eye disease', and teething are classified as heat-related because they are conceived of as conditions accompanied by an excess of body heat, sometimes manifested as fever. Fallen fontanel, evil eye, and teething are discussed in more detail below.

Table 3 lists the foods specifically mentioned by women interviewed in the present study as being 'hot' and therefore potential causes of diarrheal illness. It follows that substances perceived as cooling the intestines would be regarded as effective anti-diarrheal remedies, and indeed, these rural mothers repeatedly stated that 'cooling' agents such as yoghurt (curd: Urdu *dahi*, Sindhi *khatto kheer*), lime juice mixed with water, and rice water should be given, along with small quantities of various herbal infusions seen as aiding digestion. The cooling herbs most frequently mentioned were white cuminseed (white *zeera*), cardamom (*ilaichi*), and fennel (*saunf*). Infusions made from ground pomegranate peel or seed (*anarr*) or ground mint leaves (*podina*) also had a few advocates. Such remedies were described as being prepared with boiling water but administered only after the water had cooled. For older children, commercially-prepared 'husk' (chaff of plantain seed, called *ispaghol*) was said to be very widely used, either in 'tea' form or mixed with yoghurt.

Of particular relevance to ORT acceptance is the fact that 72% of the 57 women interviewed stated that they had used sugar water for childhood diar-

Table 3. Distribution (%) of informants mentioning various 'hot' foods as causing diarrhea in rural Sind, Pakistan ($N = 57$)

Food perceived as 'hot'	% Mentioning
Fish (Urdu *machli*, Sindhi *machee*)	37
Potato (Urdu *alu*, Sindhi *batata*)	33
Most types of *dal* (a lentil)*	30
Spices (*masala*)	28
Beef (Urdu *baraa gosht*, Sindhi *wadoh gosht*)	18
Dried fish preserved with salt (Urdu *namkeen machli*, Sindhi *khari machee* or *sukhi machee*)	16
Mango (Urdu *aam*, sindhi *aamb*)	14
Okra (ladyfinger: Urdu *bhindi*, Sindhi *bhinda*)	9
Leafy green vegetables such as spinach (Urdu *saag*, Sindhi *bhajee*)	7
Fats and fried foods in general	7
Tea made with tea leaves (Urdu *chai*, Sindhi *chanh*)	5
Chickpea (Urdu *chana*, Sindhi *chanaa*), especially when roasted	4
Dates (*khajoor*)	4
Egg (Urdu *anda*, Sindhi *baida*)	2
Chicken (Urdu *moorghi*, Sindhi *kookkar*)	2

*One type of *dal*, a small yellowish bean (Urdu *moong dal*, Sindhi *mungk dal*), was classified as 'cool' and therefore not a potential cause of diarrhea.

rhea and that it was beneficial because of its 'cooling' effect on the body. This sugar water was prepared either with table sugar or with packets of glucose powder (marketed in Pakistan as *Glaxose-D*). In addition, these and other mothers often added sugar to the lime water and various herbal preparations mentioned above, and yoghurt was sometimes sugared as well. This finding is significant because it has been reported that in South India, sugar is viewed as humorally hot and therefore sugar–salt solution ('sugar water') may be considered inappropriate for treating a 'hot' disease such as diarrhea [12, p. 355]. However, the evidence from the present study suggests that provided the amount of sugar used is not perceived as excessive, mothers in this area of Pakistan will not reject rehydration fluid out of hand simply because of its sugar content*.

With reference to its salt content, an initially rather worrisome finding was that 9/57 women, or 16% of the sample, said that 'salty fish' (fish dried and preserved with salt) was a 'hot' food that often caused diarrhea. Follow-up questioning suggested, however, that it was the concentrated 'fishiness" of the dried fish, rather than the salt as such, that was viewed as generating excessive heat. (In Pakistan, as in India, fish is widely believed to be very hot in the humoral sense.) Nevertheless, 5/57 mothers (9%) did state that salt 'worsens' or 'causes' diarrhea, and one woman volunteered that it was 'hot'. Further study of the prevalence of this concept in other parts of Pakistan would seem warranted†.

Diarrhea as an illness requiring folk treatment

Another finding with important implications for ORT programs was that certain diarrheas were classified as signs of folk illnesses requiring traditional folk treatment rather than fluid replacement or other biomedical therapy. Two such illnesses will be focused on here: *sutt* ('fallen fontanel') and *nazar* ('evil eye disease', literally 'sight' or 'vision')‡. The significance, of course, is that if serious symptoms are attributed to a folk disease, health can be compromised while traditional therapies are pursued.

By way of illustration, in the present study, informants were presented with the following clinical vignette to diagnose: A child frequently falls to the ground and lies there jerking with his eyes rolled back. What could be wrong and what can be done?

Seventy-five percent of the mothers recognized the disease and added further details: the infant shivers, especially while sleeping; when he wakes up, he cries a great deal and has anorexia; later, his eyes roll up and he drools and has convulsions; his hands and feet twist and turn outward; finally, he clenches his fists and teeth and turns black; death usually results.

Significantly, none of the mothers recognizing this disease connected it with the fever and infectious diarrhea that may be causally related to such convulsions. Rather, all said that the disease was caused by ghosts (*jinns*) having come to 'put their shadow' (*saya*) on the infant§. Fright was viewed as a prominent component. It followed that the proper treatment should be spiritual rather than biomedical, involving such therapies as visiting the tombs of holy men (*pirs*) or reading the Quran and 'blowing the words' toward the child, a procedure known as *dam*. Overall, only 33% of the women presented with the vignette recommended taking the infant to a doctor, since the latter would have been inconsistent with their conceptual model of the cause. Clearly, ideas about etiology must be reckoned with if clinical interventions such as biomedical treatment of febrile convulsions are to succeed in such a setting.

The diseases known as *sutt* and *nazar* provide even more dramatic evidence that potentially serious diarrheas may be treated almost exclusively with traditional remedies. It is interesting that these diseases were not named in reply to the survey question 'What causes diarrhea?' but instead were diagnosed in response to clinical vignettes that did not particularly emphasize diarrhea as a sign. For example, the vignette overwhelmingly judged to depict *nazar* described a situation in which a person simply felt 'tired and ill' the day after a hungry person had watched him eat; diarrhea was not even mentioned as being a

*This question of 'excessive' sugar is an important and rather complex issue that merits further study. In their subsequent research, the authors observed that both in Karachi and in rural Chitral, mothers tended to use less sugar in homemade SSS than the amount recommended in official recipes. When asked why, they said that too much sugar was 'bad for diarrhea' because it caused intestinal worms (as well as tiny worms in the teeth thought to be responsible for dental caries). These intestinal worms in turn produced an increase in diarrhea. In Karachi, the authors found that many local doctors practicing in the slums shared the belief that too much sugar causes intestinal worms. Taylor reports that near Bombay, too much sweet food is thought to cause roundworms [38], and a similar belief has been documented in the Indian state of Gujarat [39].

†The authors' research in Karachi indicates that there, salt is considered to exacerbate diarrhea only when combined with foods such as fish that are already classed as humorally hot. Although some mothers mentioned that their children refused to drink ORS solution because it tasted 'too salty', none avoided offering it simply to prevent ingestion of salt. In contrast, several mothers interviewed by the authors in rural Chitral said that they omitted salt from the SSS formula recommended by local LHVs because salt was 'bad for diarrhea'; 1 of these women volunteered that it 'caused weakness' and another stated that it was 'hot'.

‡Details about *nazar* in India are given in [40]; in addition, Maloney's comprehensive work on evil eye beliefs worldwide [41] includes chapters on India and the Middle East. *Sutt* and *nazar* are virtually identical to the Hispanic folk diseases known as *mollera caida* ('fallen fontanel') and *mal de ojo* ('evil eye disease'), respectively. For a discussion of these latter diseases, see [42]. In Honduras, *mollera caida* and *mal de ojo* are reportedly also regarded as important causes of diarrhea, especially when the diarrhea is very severe and/or long-lasting [43].

§A discussion of belief in possession by *jinns* and other spirits in a Punjabi village can be found in Ref. [8, pp. 125–128]. *Jinns* are reportedly thought to be afraid of 3 things: shoe leather, iron, and the smoke of red chili peppers. Conceptualized as being composed of smokeless fire, they are regarded as very hot, and their presence in the body is thought to cause 'hot' conditions. See also [36, pp. 110–111]. *Jinns* are described in the Quran (e.g. in Sûrah CXIV, An-Nâs); belief in their existence is unquestioned by most Pakistanis.

feature of the illness. Yet as they were elaborating on their diagnoses of *sutt* and *nazar*, mothers stated that diarrhea was often present in these diseases.

A similar 'interview phenomenon' has been described in anthropological diarrhea studies in Honduras, where virtually no one named the folk illness known as *empacho* as a cause of diarrhea, yet it later became clear that prolonged diarrhea was being attributed to precisely this illness [43, pp. 257 and 259]. One explanation is that such folk diseases are often the attributions of last resort, not immediately thought of as causes when diarrhea first occurs but diagnosed in intractable cases—the very cases that are likely to prove fatal. In addition, of course, respondents are frequently reluctant to initiate discussion of nonbiomedical disease models in interview situations.

In the present study, the folk disease that emerged as most immediately relevant to the question of ORT acceptance was *sutt*, because it affects infants and diarrhea is often a very prominent feature. *Sutt* is basically an illness in which poor sucking ability is thought to be caused by sunken or 'fallen' fontanel. The 'soft spot' on the baby's head is perceived as having become depressed, usually because the baby has supposedly been jounced too vigorously or has fallen from a height, or the nipple has been pulled out too rapidly from his mouth, causing the palate and then the fontanel to fall. (The palate and fontanel are thought to be connected to each other; in Urdu, the same word, *talu*, is used for both.) Although the alleged depression of the fontanel may not be visible to the naked eye, people make the diagnosis when they perceive that the baby is fretful, feverish, and 'too weak to suck'.

Since the fontanel is viewed as an exit point for body heat, people fear that if it remains depressed, not only will the baby be unable to suck but heat will be trapped inside the head and the brain will become dangerously overheated [44]. Hence, the treatment of *sutt* involves trying to raise the fontanel by various means such as applying sticky, 'cool', astringent substances—e.g. egg white mixed with turmeric (*haldi*)—to the top of the infant's head and/or pushing up on the palate with a finger. Sometimes the finger is coated with alum (Urdu *phitkari*, Sindhi *phitki*), which is regarded as humorally cold and dry. Traditional birth attendants (*dais*) or experienced female relatives are the healers of choice for such therapies. Almost 90% of the mothers interviewed knew of *sutt*, which most physicians would probably equate with severe dehydration, yet no one mentioned loss of body water as an associated problem or spoke of giving ORT for diarrhea accompanying this disease. A similar failure to connect depressed fontanel with dehydration has been documented in South India [12], in Zimbabwe [45], and in Swaziland [46].

Another folk illness relevant to ORT acceptance is *nazar* ('evil eye disease'), which was diagnosed in response to a clinical vignette by 96% of the mothers interviewed in the present study. The perceived etiology of this condition is exposure to strong or envious glances, and attractive infants are the most frequent victims, although adults can also be affected. *Nazar* is classified as a 'hot' disease. It can be caused by a well-intended but overly affectionate glance as well as by an ill-intended one. Symptoms typically include fretfulness, fever, anorexia, and sometimes convulsions, but may also involve diarrhea, especially if fever is present. (Evil eye as a cause of diarrhea has also been reported in India [17].)

Mothers interviewed in the present study said that measures to prevent *nazar* include drawing black spots on the infant's body with lampblack (*kajal*) to make it appear unattractive or even hiding the infant from possibly envious visitors such as childless women. Other common preventive practices are tying knotted black threads, pieces of black shoe leather, or amulets containing a piece of paper with words from the Quran written on it (known as a *taveez*; see Fig. 2) around the baby's neck. These amulets are frequently fashioned of black cloth, for black is thought to repel harmful influences.

The diagnosis of *nazar* is often made by passing an object such as a rice loaf tied with thread around the victim's head, then placing the loaf in the cooking fire and observing what happens; if the thread does not burn as it 'naturally' would, the presence of *nazar* is confirmed. Alum thrown onto a griddle used for breadmaking (*tava*) supposedly takes on the shape of the person or animal—often a hungry, envious dog—that has caused the disease. It is also believed that if any illness is treated with Western allopathic medicine and fails to be cured, the underlying reason may be that the victim has *nazar*.

For *nazar*, 3/57 informants said that a common form of treatment is the 'egg cure'—an unbroken egg is rotated around the victim's head and then thrown into the cooking fire. Alum, salt, or 7 red chili peppers are often used instead of the egg. The chili peppers are rotated 7 times clockwise around the head and then thrown into the fire; if they do not produce a strong smell while burning as they 'naturally' would, this confirms the *nazar* diagnosis while curing the illness*. If these forms of treatment are ineffective, one can take a shoe and hit it 7 times on the ground where the person causing the disease was sitting, or collect sand from his feet without his knowledge and throw it into the fire. (These latter procedures apppear to be based on contagious magic.) Only 1 mother mentioned taking the child to a doctor if symptoms were not relieved by such measures. Yet it seems clear that *nazar* could represent any number of potentially serious diseases characterized by fever and diarrhea, including a bacterial or protozoan diarrheal infection and dysentery.

Use of traditional healers to treat diarrhea

The epidemiologic survey team working in Vur asked 358 mothers whether they or any family mem-

*Divination and cure of evil eye by passing an egg over the body and then breaking it is common in Latin America, but the authors are not aware that egg cures of evil eye have been documented elsewhere. Thus the present study would appear to be the first one reporting egg cures in South Asia. By contrast, chili peppers are reportedly regarded as potent talismans against evil eye in Italy and are used to diagnose the condition in Guatemala; they are widely used in India for both divination and cure. See [41] for details.

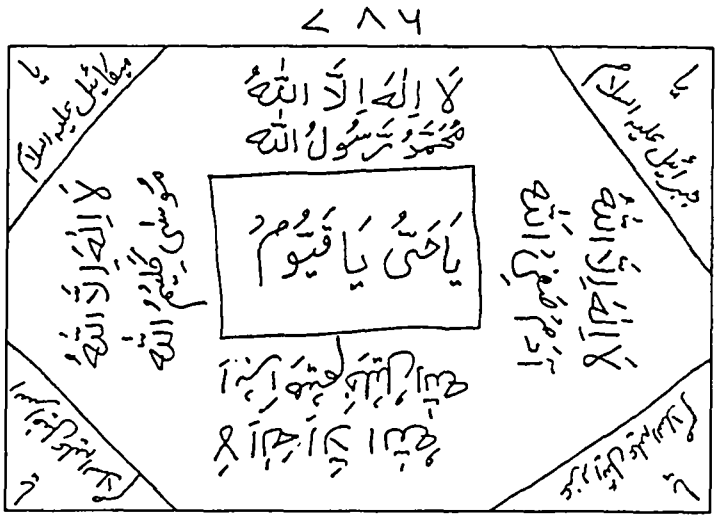

Fig. 2. A Pakistani *taveez* to protect against 'evil eye disease' (*nazar*) or *jinns*. At the top is the Urdu number '786', which in the science of numerology represents the opening verse of the Quran, "In the name of Allah, the Beneficent, the Merciful." At the corners are the names of several archangels, and in the center the words read, "O living and permanent [One]." The surrounding sentences mention the Prophet Muhammad, Adam, Abraham, and Moses but affirm that "There is no one but one Allah." Such a *taveez* could be either folded and worn in a metal or cloth holder, or placed in the home for protection. (Source: Pir Mumtaz Ahmed, Karachi. Translation courtesy of Kausar S. Khan).

ber had consulted a traditional healer during the 30 days preceding the survey. Only 4 mothers said yes. For diarrhea, only 2 said that they had consulted such a healer, a *hakim* [3]. [The traditional healers inquired about included homeopaths, *dais* (untrained midwives), *hakims*, and *pirs**.] Yet by contrast the anthropological study reported on here indicated that such healers were frequently consulted for diarrhea, especially for chronic cases or those attributed to *sutt*. Further, the mothers interviewed for the anthropological study said that when the cause of the diarrhea was viewed as supernatural, as in *nazar*, Muslim religious leaders (known as *molvis*) were also frequently approached; they supplied *taveez* for cure as well as prevention.

Table 4 summarizes these mothers' responses with regard to their own use of 'doctors' and traditional healers as health care providers in cases of childhood diarrhea. It should be emphasized that the word 'doctor' as used in this population can refer to anyone from a highly-trained physician to a homeopath to a pharmacist to a quack with fraudulent credentials. It is used as a term of respect even when people know that the person in question is not a physician. As Table 4 shows, 84% of mothers said that their children had been taken to 'doctors' for treatment of diarrhea; of these women, all stated that a non-electrolyte drug had been prescribed.

Results of the present study indicated that *dais* were consulted only for those diarrheas attributed to *sutt*; therapy consisted of body massage, pushing the palate up, and/or application of various sticky, astringent substances to the fontanel as described above. *Hakims* supplied herbs for stomach upsets associated with diarrhea, usually assuring the patient that these herbs were 'cool' and therefore much more appropriate for diarrhea than the 'hot' medicines prescribed by Western allopathic doctors. For *nazar*, living *pirs* or shrine attendants might give sand or

*Homeopaths adhere to a system of medical care introduced in Germany by Dr S. C. F. Hahnemann in the late 1700s, typically administering tiny quantities of substances on the principle that 'like is cured by like'. *Hakims* are practitioners of *hikmat*, a form of therapy based on the humoral theory of Hippocrates and also referred to as Unani (literally 'Ionian', i.e. Greek) medicine. Pakistani *hakims* use allopathy for diagnosis but rely mainly on herbs for treatment, emphasizing the digestive system. *Pirs* are holy men; treatment is given by living *pirs* or by attendants at a shrine surrounding a *pir*'s tomb.

Table 4. Distribution (%) of informants stating use of 'doctors' and traditional healers for childhood diarrhea in rural Sind, Pakistan ($N = 57$)

	'Doctors'	*Dais*	*Hakims*	*Pirs*	*Molvis*
Had used for diarrhea not attributed to *sutt** or *nazar**	84	0	46	0	0
Had used for diarrhea attributed to *sutt**	0	26	0	0	0
Had used for diarrhea attributed to *nazar**	0	0	2	19	21

*See text for discussion.

water from the area surrounding the *pir*'s tomb (substances then ingested by the child and/or rubbed on his body), or threads or *taveez* to be worn. As noted above, the role of *molvis* was limited to supplying *taveez**.

Twenty-three percent of the mothers having consulted *hakims* for childhood diarrhea and 36% of those having consulted *pirs* said that they would visit such healers "mainly if the doctor's medicines [including ORS] didn't work". One woman's comment perhaps reflected a pragmatic distinction between symptomatic relief and definitive cure: "We go to doctors for diseases, but we go to the *pir* to make the child well." Only 11 of the 57 women said that they had 'never' gone to a *pir's* tomb and only 8 said that they had 'never' gone to a *hakim*, and even these few did not necessarily disbelieve in such healers' powers. For example, 1 mother gave as a reason for not consulting a specific *pir* the distance to the *pir's* tomb and the associated cost of travel (300 rupees, or $18 U.S.).

In the case of childhood diarrhea, then, the present study uncovered a high usage rate of traditional healers that was not at all apparent from the results of the epidemiologic survey. Because the 2 studies were done concurrently in the same population, a comparison of the results provides some useful perspectives on the relative strengths and weaknesses of the 2 research methods, namely closed-ended epidemiologic surveys and structured but largely open-ended anthropological interviews.

Diarrhea as a 'natural' condition not classified as illness

Another aspect of folk etiology and treatment documented by the present study is that certain diarrheas are regarded as 'natural'—a more or less expected part of growing up. The mothers indicated that these diarrheas should simply be tolerated or managed by avoidance of the underlying cause (as outlined in Table 2) rather than treated with therapies such as ORT. They stated that so-called 'teething diarrhea', for example, was not normally regarded as cause for concern (see [35] for a comparable finding in Sri Lanka). On the contrary, they said that it was actually harmful to try to stop that kind of diarrhea because if one did so, the trapped heat might cause soreness in the eyes. It might even rise to the brain and create fever, and fever was considered to be a much more alarming symptom than the diarrhea itself. The important thing, they said, was that the excessive heat present during teething must be expelled from the body.

Similarly, when infant diarrhea was viewed as caused by a breastfeeding mother having eaten 'hot' foods, the usual treatment was simply to discontinue the food; when it was thought to be caused by her having become overheated in the sun, the treatment was to 'cool off' before nursing; when it was seen as caused by her having become pregnant, the remedy was to stop breastfeeding; and so on. In other words, in all of these cases the infant diarrhea was not conceptualized as a life-threatening 'disease' requiring heroic measures but as a relatively mild condition, a natural consequence of certain fairly common life events.

In the present study, 19 of 57 women (33%) went so far as to say that diarrhea *per se* was "never serious enough to need treatment" (see [11] for a similar finding in Karachi), even though 2 of these 19 women had themselves lost children to diarrheal disease. There appeared to be a certain logic underlying this response. First, many people had observed that most diarrheas are self-limiting. Those who said that diarrhea was 'never' serious were basically overstating this (accurate) perception.

In addition, further probing made it clear that because diarrhea was so common in the area, many mothers did not identify it as an 'illness' unless it was accompanied by other symptoms such as fever and severe vomiting. If a child with these symptoms died, the fever and vomiting then overshadowed the diarrhea as the perceived cause of death. In other words, in the minds of the mothers the death was from fever and the diarrhea was of peripheral interest only, an unimportant coincidence. (In fact, the 2 infants referred to above had fever as well as diarrhea before they died and were initially said to have died from 'fever'. Only when specifically questioned did their mothers state that diarrhea had been present.)

Finally, the term used for 'diarrhea' in the interview schedule (the Urdu and Sindhi word *daast*) may have caused some mothers to understate the seriousness of the disease. In the region of Sind in which the study was done, different terms are used for different types of diarrheal illness. Some of the more serious diseases involving diarrhea are not usually referred to as *daast*. Dysentery, for example, is called *paichish* in Sindhi, while cholera is called *hehza* in both Sindhi and Urdu. Mothers' responses may have been influenced by this linguistic distinction.

Although the classification of certain diarrheas as 'nonillnesses' can obviously have negative consequences, there was one salutary associated finding: the great majority of mothers said that except in cases where pregnancy was involved, breastfeeding should be continued as usual during diarrheal episodes. This tallies with results reported from Punjabi villages in Pakistan [7], from Karachi [11], from North India [22], and from Bangladesh [20, 21]. Only 7% of the 57 women interviewed in the present study said that breastfeeding should be stopped, although 19% felt that cow's milk (or buffalo's milk) should not be given because it was 'heavy' (*baari*) and thus harder to digest than breastmilk. Overall, 95% of the women stated that fluids of some type should continue to be given to a child with diarrhea; no mention of withholding fluids was encountered. Again, however, it must be noted that the word used for 'diarrhea', *daast*, may have influenced this response, in that it excludes certain very serious diseases such as dysentery and cholera.

*These therapeutic procedures are viewed as inherently 'cooling' in the humoral sense and therefore appropriate for a 'hot' condition such as *nazar*. *Pirs* cool people by dispensing blessedness, and prayer is a cooling activity. See [42] for a detailed discussion of such practices in terms of the indigenous concepts on which they are based.

DISCUSSION

The anthropological study reported on here produced findings that have significant implications for ORT programs not just in rural Pakistan but elsewhere as well. First of all, despite the fact that the use of ORS has been promoted in Pakistan since June 1983 and packets are available free of charge through government health outlets [24, p. 41], a large percentage of the mothers interviewed had no knowledge of either ORS or homemade sugar–salt solution. Even among those women who had used the packets, a majority did not know how the solution should be prepared and administered. Knowledge of homemade SSS was similarly scanty and vague; and on the whole, it was clear that ORT was not being used with anything approaching maximum effectiveness. As stated above, the most frequent error was administration of rehydration fluid in inappropriately small quantities, presumably because of incomplete understanding of the principle of water replacement, but serious mistakes in *preparing* the fluid were also encountered.

This finding is hardly surprising in such a remote area, since such problems have been reported even in the Bangladesh Rural Advancement Program, where training conditions are extremely favorable and the initial success rate was quite high [47]. Nevertheless, it underlines once again the need for education and re-education of mothers and for fuller understanding of the obstacles these mothers face in attempting to administer ORT. In particular, the confusion caused by the varying amounts of water called for by the different types of ORS packets emerged as a serious problem that should be addressed so that a standard measure is known to all. Further, as has been suggested elsewhere [48], this standard measure should suit the size of an easily available container. Health planners should also spell out how much of an error a person can make on the water measurement (30%? 50%?) without compromising the safety or efficacy of the ORS solution.

With reference to preparation of homemade rehydration fluid, here again there is an obvious need for consensus—in this case, consensus as to the amounts of sugar and salt that should be added to a given amount of water. The official WHO recommendation is for 15 to 35 g of sugar and 2.0 to 4.5 g of salt per liter of water [49]. This means that the ratio of sugar to salt should be 7 or 8 to 1. However, even while stating that 8 parts of sugar should be used per 1 part of salt, the official Government of Pakistan growth chart, approved by the Pakistan Pediatric Association, goes on to say that 4 tablespoons of sugar and 1 teaspoon of salt should be added to 1 liter of water—a 12 to 1 ratio. (If the words 'tablespoon' and 'teaspoon' are to be interpreted as referring loosely to a 'large' spoon and a spoon used for tea, respectively, this creates other measurement problems since there is so much variation in spoon size within these two broad categories.) The present authors have encountered at least four different 'recipes' for sugar–salt solution at health care facilities in the Karachi area alone, and sometimes contradictory measurements are recommended even within the same institution. If there is this amount of disagreement among health workers themselves, it is to be expected that illiterate mothers in a rural area would be uncertain about what amounts of sugar and salt to use. A standard recommendation is needed, as well as some kind of resolution of the variable spoon size problem.

Another point made clear by the present study is that in the minds of the women interviewed, the primary disease was not diarrhea but 'heat', the latter caused mainly by humorally hot foods or exposure to hot weather. Logically, then, ORT programs aimed at this population could profitably stress the cooling effects of ORS or homemade sugar–salt solution, especially since sugar water is already widely regarded as humorally cool. In addition, acceptance might be enhanced if a herb or fruit juice classified as cool or temperate were recommended as an additive to the basic solution. (Some of the commercially-sold ORS powders currently available in Pakistan are already citrus-flavored; citrus fruits are generally regarded as humorally cold.) Hot–cold beliefs about diarrhea should be sampled in various parts of the country to insure that in each region, rehydration therapy is being presented in a culturally appropriate way.

The manner in which certain hot–cold beliefs can 'interfere' with an agency's programs is illustrated by the following incident. On their own initiative, the authors showed a drawing developed and distributed by an international agency in the Pakistani province of Baluchistan (Fig. 3) to 15 Baluch women living in Karachi slums. The message that the drawing sought to convey was that the foods pictured should be given to a child with diarrhea, but the authors suspected that some of these foods would be considered inappropriate. This suspicion was confirmed. Initially, the women found it very difficult to recognize several of

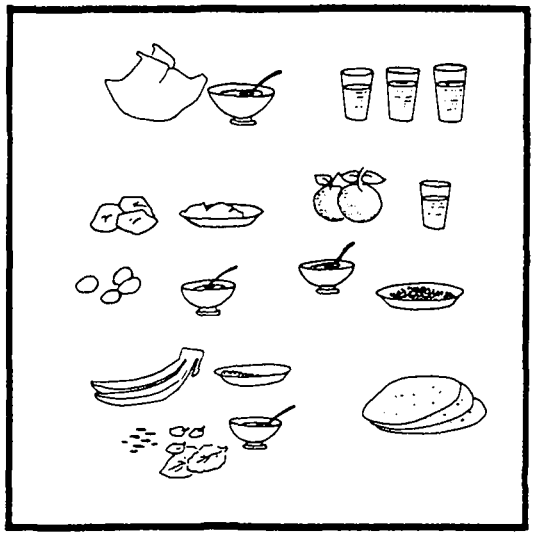

Fig. 3. A segment of an educational poster produced by an international agency in Pakistan picturing foods to be given to a child with diarrhea. The chicken, eggs, and (to a lesser extent) potatoes, being widely recognized as humorally hot, were bewildering to most women who viewed it in Karachi, since diarrhea is primarily thought of as a 'hot' disease requiring 'cool' forms of treatment. See text for discussion.

the foods, especially the chicken, but even after the intended message was explained to them, most of the women were completely mystified by the inclusion of chicken and eggs. They said that these were 'hot' foods that should not normally be eaten during diarrhea. Some also saw potatoes as humorally hot; others said that they merely produced intestinal gas; but in either case, most said that potatoes should be avoided also. (The other foods were pronounced either cooling and hence 'very good' for diarrhea—e.g. bananas and oranges—or 'acceptable if nothing else is available'—e.g. the flat bread sketched in the lower right corner.) It is possible, of course, that reaction to this picture would have been different in other parts of Pakistan, but the researchers who field-tested it in Baluchistan itself noted that there also, chicken, eggs, and potatoes were widely regarded as 'hot' and therefore inappropriate for diarrhea. Comprehension of the message might have been better if the drawing had depicted only foods commonly given to children during diarrheal episodes.

Health educators might capitalize on the widely-shared idea that diarrhea is a 'hot' disease to discourage the inappropriate use of antidiarrheal drugs and antibiotics, which is a major problem in Pakistan as elsewhere in the developing world [24, p. 60]. In the present study, it was found that such drugs were prescribed for all of the children who were taken to 'doctors' for diarrhea. Although enthusiasm for these medications is generally high, since they are often perceived as 'stopping the diarrhea', some Pakistani mothers already hesitate to use them because they are classed as humorally hot. Frequently a child will be given a 'cool' substance such as buttermilk (*lassi*) or yoghurt to counteract the effect of the drugs. Health workers could make use of these beliefs to encourage mothers not to abandon rehydration fluid, with its 'cooling' properties, for the 'hot' medicines (e.g. antibiotics and antispasmodics) available in pharmacies even without prescription. Although such social marketing strategies are often resisted by the medical community, one Karachi physician was overheard winning over a patient to ORT with just this argument [50].

Since the concept of hot–cold imbalance is so prominent in the humoral medicine schema, and it is thought so important to get the undesirable heat out of the body, health education programs in some parts of rural Pakistan have built on this concept by suggesting that rehydration fluid helps to 'wash out' the impurities that have caused the diarrheal illness. In other words, the undiminished or even increased amount of stool accompanying the therapy has been presented as evidence of a beneficial cleansing. Again, this way of explaining things is certainly open to criticism as incorrect, not scientifically defensible, and perhaps even unethical. Nevertheless, it has reportedly allayed anxieties and furthered acceptance of ORT [10, p. 3]. In Karachi, physicians sometimes use a similar argument to convince patients to allow them to draw blood; the latter is widely feared as causing permanent weakness, but is accepted if presented as part of a plan to remove impurities associated with disease [51]. The authors do not endorse distortion of the truth, and certainly do not wish to encourage the use of purgatives for diarrhea. However, it may be that if one thinks along these lines, some culturally appropriate but still truthful explanation of the undiminished stool volume associated with ORT will eventually be formulated.

Another implication of the present study is that since at least two folk illnesses—*sutt* and *nazar*—were repeatedly characterized as having diarrhea as one of their components, it might be advisable to allude to these illnesses in ORT education programs. (*Nazar* is widely known by that name throughout Pakistan, but fallen fontanel disease is apparently referred to by different names in different areas: Pushtu-speaking Pathans interviewed by the authors in Karachi called it *jabaish*, for example.) The fact that fallen fontanel and *nazar* are frequently treated by traditional midwives and spiritual healers, respectively, and that diarrheal disease is commonly brought to *hakims* as well, should also be known to those planning ORT interventions. While it might not be possible to incorporate all types of traditional Pakistani healers into ORT programs, the authors have found that Karachi *dais* are both willing to share their own knowledge of traditional rehydration methods and eager to understand how to use ORS packets and homemade sugar–salt solution more effectively. Since these untrained midwives attend almost all births in many of the poorer areas of Pakistan, they are the traditional practitioners who have most contact with mothers of young children and thus could be appropriate allies for ORT program planners.

Finally, the finding that some types of diarrhea, such as teething diarrhea, were not classified as 'illness' suggests that much more data are needed about the folk taxonomy of diarrheal disease in Pakistan, along the lines of the information provided by Chowdhury and Vaughan for Bangladesh [52] and Nichter for Sri Lanka [35]. It seems likely that potentially dangerous concepts will be uncovered. In Bangladesh, for example, it has been reported that diarrhea associated with measles, which is a very serious complication of the disease, was considered normal or even beneficial by the majority of the mothers studied and so was not treated with ORS solution [16]. The present authors have documented a parallel belief among Karachi slumdwellers. This important matter should be studied in other areas of Pakistan.

Remarkably little is known about how illiterate Pakistani women perceive health messages about the circumstances under which ORT should be used, but reportedly, one Urdu word for 'diarrhea', *julab*, had to be discarded because it also means 'purgative' in literary Urdu. People listening to health messages or viewing posters urging treatment of *julab* did not understand why they should use ORS solution to treat a purgative [53]. Research in other South Asian countries also indicates that confusion may occur because of inappropriate terminology. Nichter reports, for example, that in Sri Lanka, ORS packets used a word for 'diarrhea' that meant only *adult* diarrhea. People were bewildered because they believed that children could not catch diarrheal illness from adults, nor adults from children [35]. Similarly, in Bangladesh a health message promoting homemade sugar–salt solution (SSS) for *all* diarrheas was

understood by the people to mean that SSS should be used primarily for *severe* diarrhea (cholera), and a large-scale study showed that it was largely reserved for such cases [52]. In short, much clarification is needed regarding not only the folk etiology and treatment of diarrheal illness in Pakistan, but also the precise nature of what the subsuming term *daast* ('diarrhea'), as used by health planners, actually means to illiterate women in various parts of the country.

As mentioned above, the Pakistan Ministry of Health has recently authorized a massive effort to establish ORT use nationwide. More than 18 million packets of ORS are being produced annually by Pakistan's pharmaceutical industry, and health workers have begun delivering at least 2 packets to every family in the country with children under 5 years of age. Reportedly, more than half of the eligible homes in the populous Punjab province had already been reached by November 1986 [2]. However, it seems clear that merely distributing ORS packets without instructing mothers about preparation and use is likely to be ineffectual at best and possibly even dangerous. The government health planners intend to follow up by supplying each home with an explanatory leaflet and a 1-liter measuring container, perhaps a plastic cup, but items of this nature are easily damaged or lost. Even as such interventions proceed, it is essential to continue collecting information on how mothers are already treating diarrhea and dehydration, what type of instructional material would be best understood and best preserved under adverse living conditions (moisture, dirt, crowding, etc.), and what durable measuring containers are already available in the home.

In the survey area of Sind, for example, water for ORS solution is frequently measured in metal drinking glasses, and such glasses are reportedly used for this purpose in many other areas of Pakistan as well [25]. Although the glasses are not uniform in size, if they are found in every or nearly every home they could serve as a backup for the government's plastic cups. They could be calibrated by means of a simple scratch with a sharp instrument, and mothers themselves could be trained to do this. The authors' experience in rural Sind, Karachi, and rural Chitral indicates that most mothers are very eager to learn how to measure water and other ORT ingredients accurately, but that the best and most lasting learning occurs when they have a sense of ownership, i.e. when they are actively involved in a 'hands on' process involving their own measuring containers in their own homes.

The results of the present study suggest that governmental and nongovernmental ORT initiatives in rural Sind will be most effective if they are based on a realistic assessment of traditional health beliefs, existing health practices, and the practical constraints faced by poor people in the region. Further in-depth probes of such matters should be carried out by trained observers in other parts of Pakistan, so that local interventions can be adapted accordingly. After all, the success of such interventions depends as much on the mothers' willingness to provide enthusiastic administration of the therapy as on their inherent ability to do so. To be motivated, they must feel that their voices are being heard and their views understood. In short, when one is dealing with an entity as complex and resistant to eradication as childhood diarrhea, it is essential to be familiar with what is already in place before attempting to introduce something new.

To date, there is little reason to think that large-scale surveys carried out in relative haste by uninterested observers can succeed in eliciting this type of information. In the present study, for example, it was found that mothers were using traditional healers to a far greater extent than the concurrent epidemiologic survey indicated. A rich body of shared indigenous understandings made recourse to such healers both logical and likely, but, naturally enough, none of these understandings were communicated to the epidemiological survey team. Further, the anthropological study revealed that while a majority of rural mothers were familiar with the general concept of ORT, most were not using the therapy in an informed or effective manner, and—perhaps as a result—they were not very enthusiastic about its benefits. Such findings call into question some of the reassuring statistics produced by large surveys.

For example, a study carried out in Pakistan in 1984 reported that 50% of diarrhea episodes occurring within the preceding 2 weeks had been treated with ORS [24, p. 41], yet there was no evidence that the rehydration fluid had been accurately prepared or correctly given. Similarly, a nationwide survey of about 5000 Pakistani households commissioned by the Pakistan Ministry of Health and conducted by an advertising firm in 1987 found that 90% of those interviewed knew that a 1-liter packet of ORS should be mixed with 1 liter of water [54, p. 33], but interviewers did not ask detailed questions about the preparation and administration process. They also did not measure the household containers into which water was poured to see whether the correct quantity of water was really being used. The present authors' research in Karachi and Chitral, as well as in rural Sind, indicates that when one probes, one finds serious problems in all of these areas of potential confusion. Thus it seems certain that the current WHO estimate that ORT is being used 'effectively' in 80% of diarrhea cases treated with such therapy worldwide [55] is much too optimistic, at least for Pakistan.

In the ongoing effort to combat mortality from childhood diarrhea, the focus must be on what is really being done in the home and why. Firsthand observation, such as Bentley's monitoring of feeding practices during diarrheal episodes in North India [22], is especially crucial although very time-consuming. Preparation of rehydration fluid in the home should be checked and rechecked for accuracy. Relatives and neighbors of children who die from diarrheal disease should be interviewed, since they can often provide valuable insights on what went wrong. Health care providers in rural and slum areas, including folk practitioners and others who are not trained allopathic physicians, should also be consulted to find out how they see the problem of childhood diarrhea, and where possible they should be persuaded to advocate the use of ORT.

Diarrhea researchers worldwide must not lose sight of these basic and simple matters. As noted above

and as many observers have pointed out in other connections (e.g. [56]), large closed-ended surveys are very unlikely to produce sufficient information on such topics. Depending, as they do, on questions formulated *a priori*, and tending to emphasize elegant but rigid statistical analysis of data, they miss the human doubts, errors, concerns, and practical constraints that hamper the effectiveness of health interventions. Thus, although such surveys can delineate problems and help measure progress, it is improbable that lasting solutions will be found in the absence of the complementary process of anthropologically-oriented inquiry.

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