

BELIEFS ABOUT CHILDREN'S ILLNESS

ANNE PEBLEY*, ELENA HURTADO† AND NOREEN GOLDMAN‡

**Population Center, RAND, PO Box 2138, 1700 Main Street, Santa Monica, CA 90407-2138, USA, †Instituto de Nutrición de Centro América y Panamá (INCAP), Guatemala City, Guatemala and ‡Office of Population Research, Princeton University, 21 Prospect Avenue, Princeton NJ 08540, USA*

Summary. Beliefs about child illness were investigated using semi-structured interviews with mothers and providers in four rural Guatemalan communities. The two most common forms of child illness in Guatemala – diarrhoea and respiratory disease – were focused upon. These illnesses are particularly difficult to prevent and treat, especially with the rudimentary health services available in rural areas of developing countries. Comparisons with other ethnographic studies in Guatemala suggest that some traditional models of illness causation identified in these earlier investigations are relatively unimportant in the communities studied here. This finding, in conjunction with frequent responses related to hygiene and water, suggests that traditional explanations may be co-existing with biomedical views of illness causation to a greater degree today than in the past.

Introduction

This paper examines women's beliefs about the causes of childhood illness in rural Guatemala. It focuses on the two major causes of child morbidity in developing countries – diarrhoea and acute respiratory infection (ARI) – and uses reports from a qualitative survey to compare mothers' beliefs with biomedical and public health perspectives and with the results of earlier anthropological fieldwork. One of the goals of this study was to determine the degree to which differences between mothers' and biomedical beliefs constitute a barrier to implementation of biomedically prescribed prevention and treatment measures, and to identify aspects of popular belief systems that might be incorporated into public health programmes. In addition, an assessment is made of whether ethnic differences in health beliefs play an important role in observed ethnic differences in the use of biomedical health care. A comparison of the health beliefs reported in this study with the results of earlier anthropological fieldwork should highlight any recent changes in health beliefs in rural Guatemala.

Guatemala, one of the poorest countries in Latin America, has been highly socially stratified historically and has a very unequal distribution of income. Roughly half of the population is indigenous – i.e. descendants of Maya and other pre-conquest groups, who have maintained a separate identity during the past 500 years – while the

other half, referred to as *ladinos*, speak Spanish, wear European clothing, identify with the national Guatemalan culture, and are of both indigenous and European origins. Ethnicity and social class are intertwined, with the indigenous population being generally quite poor while *ladinos* are members of all social classes. Treatment for illness is available from biomedical providers (both through the publicly financed health care system and through private doctors), from traditional practitioners (midwives, curers, massage specialists, herbalists, spiritual healers, etc.), and from popular practitioners who often dispense modern drugs and give injections without biomedical training (see Pebley, Goldman & Rodríguez 1996; Cosminsky & Scrimshaw, 1980). Use of biomedical health care is relatively low among both *ladino* and indigenous populations, although it is consistently lower in indigenous families (Pebley *et al.*, 1996; Warren *et al.*, 1987).

In the first section below, the biomedical perspectives on the causes of diarrhoea and ARI in developing countries are summarized. In the second section, the findings of anthropological research on health beliefs are summarized. The third section is a discussion of the study communities and methods. The fourth section presents the results.

Biomedical perspective on diarrhoea and acute respiratory infection

Diarrhoea and ARI are two of the leading causes of morbidity and mortality among children, accounting for as much as half of all childhood deaths in the developing world (UNICEF, 1990; Boerma & Van Ginneken, 1992). From the biomedical perspective, both illnesses are syndromes, rather than specific diseases, and each can be caused by a wide variety of infectious agents (Gordon, Béhar & Scrimshaw, 1964a; Chen, 1983).

Diarrhoea

Acute diarrhoea is characterized by a high frequency of loose or watery stools often accompanied by vomiting or fever (Benenson, 1995). In public health contexts, the term 'diarrhoea' also includes dysentery, which is associated with blood in the stools rather than with looseness or frequency (Martines, Phillips & Feachem, 1993). Children who die from diarrhoeal infections principally succumb to serious dehydration which can be a consequence of diarrhoea. At least 25 pathogenic causes of diarrhoea – including bacteria, viruses and protozoa – have been identified, many during the last two decades (Martines *et al.*, 1993). Diarrhoea can also be a symptom in infections outside the intestinal tract, such as measles, malaria and respiratory infections. Non-infectious conditions can also cause diarrhoea, but are likely to play a minor role relative to infectious diarrhoea among children in poor countries (Rohde, 1986).

All of the pathogenic agents responsible for diarrhoea can be transmitted through faecal–oral pathways, the most common route of transmission for infectious diarrhoea. Studies in developing countries suggest that much of the transmission occurs through direct hand-to-mouth contact or through the ingestion of contaminated food and water, via a variety of mechanisms that include improper disposal of human faeces and nappies, the presence of animal faeces, flies, unwashed hands, unclean utensils, inadequate cooking of foods and delays in food consumption (Black *et al.*, 1983; Chen, 1983; Gordon *et al.*, 1964b). These modes of transmission help to explain the especially

high rates of diarrhoea among children of weaning age, since the replacement of breast milk by weaning foods opens up several new avenues of contamination (Gordon *et al.*, 1964b; Black *et al.*, 1983).

Acute respiratory infection

Acute respiratory infection (ARI) is subdivided into upper and lower respiratory infections. Symptoms of upper respiratory infection (URI) include runny nose, nasal discharge, sore throat, cough and earache. Lower respiratory infection (LRI) is a more dangerous syndrome that includes such symptoms as wheezing, rapid respiration, crepitation (a rattling sound), retraction (in-drawing of the chest upon inhalation), cyanosis (purplish discolouration of the skin) and stridor (harsh vibrating sound), as well as such conditions as laryngitis (croup), tracheobronchitis, bronchiolitis and pneumonia (Stansfield & Shepard, 1993; Selwyn, 1990). URI and LRI symptoms can also include fever and cough, and in the case of LRI, vomiting. URI can lead to LRI, but LRI can also develop without the preceding symptoms of URI.

The most common route of transmission of pathogens is through direct person-to-person contact, typically through either inhalation of droplets released through sneezing or coughing, or through contact with hands or articles contaminated with discharge from the nose or throat of an infected person. The vast majority of respiratory infections are due to viruses, with bacteria being responsible for some forms of pneumonia and other respiratory tract infections. Several vaccine-preventable illnesses, such as measles, pertussis and diphtheria, can also produce respiratory symptoms and lead to LRI (Stansfield & Shepard, 1993). By definition, all causes of ARI are infectious, although other respiratory conditions such as allergies and asthma may mimic symptoms of ARI. While most acute respiratory infections are URI (usually coughs and colds), the vast majority of deaths from ARI are the result of pneumonia (Bulla & Hitze, 1978; Campbell, 1995; Stansfield & Shepard, 1993).

Causes of diarrhoea and acute respiratory infection

While one biomedical view of causation focuses on the actions of pathogens within the human body, an alternative approach, which is more likely to reflect parents' ideas about causation, considers factors related to prevention and control of these diseases. In Mosley's (1980, 1985) framework, illness is the consequence of exposure to pathogens, but resistance and susceptibility can affect whether such exposure results in illness. Resistance includes natural and acquired immunity or partial immunity. Factors which may increase susceptibility include malnutrition, previous or concurrent illness, and physical or environmental stress.

A review of the public health literature on prevention of diarrhoea in developing countries (Black *et al.*, 1983; World Health Organization, 1989; Martinez *et al.*, 1993; Feachem & Koblinsky, 1984; Feacham, 1984; Esrey, Feacham & Hughes, 1985; Rohde, 1986) and in Guatemala (Torun, 1983; Bartlett *et al.*, 1992; Cruz *et al.*, 1994) suggests six types of infection. The first four are aimed at reducing exposure to pathogens: (1) safe disposal of human waste; (2) improved water supplies both at the source and in the home; (3) better childbearing practices, such as improved personal hygiene, childcare and feeding practices; and (4) improved household hygiene, including proper

storage and use of water, proper preparation and storage of food, dishwashing, exclusion of animals from the house, better garbage disposal, and handwashing before preparing food. The remaining two measures are related to improving resistance to infection: (1) improved nutrition, and (2) immunization against measles.

In the case of ARI, a review of the literature from developing countries (Stansfield & Shepard, 1993; Selwyn, 1990; Phelan, Olinsky & Robertson, 1994; Borrero *et al.*, 1990; Cerqueiro *et al.*, 1990; Tupasi *et al.*, 1990) and from Guatemala (Cruz *et al.*, 1990) suggest seven types of prevention. The goal of the first two is reduced exposure to pathogens: (1) better childrearing practices, such as improved personal hygiene and better feeding practices; and (2) less crowded housing. The other five are aimed at increasing resistance and reducing susceptibility: (1) reduction in cigarette smoking and other sources of air pollution in the household; (2) improved nutrition; (3) reduction of the frequency of low birth weight babies; (4) full immunization against measles, pertussis and diphtheria; and (5) reduction of some childcare practices, such as swaddling and other practices which restrict the ability to breathe.

Anthropological research in Guatemala

There is a long history of research by anthropologists on health beliefs in Guatemala (e.g. Adams, 1952; Logan, 1973; Cosminsky & Scrimshaw, 1980; Cosminsky, 1987; Tedlock, 1992). Here the results of studies carried out in rural Guatemalan communities in the 1980s which focus explicitly on health beliefs about children's illnesses are reviewed (Scrimshaw & Hurtado, 1988; Vielman & Hurtado, 1986; Hurtado & Esquivel, 1986; Villatoro & Hurtado, 1985; Burleigh, Dardano & Cruz, 1990). Most of these studies relied on qualitative interview methods, including individual interviews and focus groups, rather than on traditional lengthy ethnographic fieldwork.

Diarrhoea

Previous research suggests that diarrhoea, generally known as *asientos* in Guatemala, is a well recognized illness, although it is sometimes reported as a symptom of other illnesses. Two beliefs about the causes of illness underlie the explanatory models of diarrhoea in Guatemala. The first is that an imbalance of hot and cold can cause illness, a belief which is common in Latin America, Asia and, historically, in Europe (Weiss, 1988). Hot and cold qualities apply to foods, as well as to activities and emotional and physical states and do not necessarily refer to temperature. For example, in Guatemala, beef and sugar are often considered hot, as is pregnancy and the experience of some types of emotions such as anger, while drinking cold water, touching the cold ground and eating 'cold' foods are mechanisms through which excessive cold can enter the body. The second belief concerns the function of worms (*lombrices*) in the digestive system. Under normal circumstances worms are believed to live in a sack in the abdomen and aid in digestion, but a serious and potentially fatal condition can arise when the worms are disturbed, leave their sack and travel throughout the body.

Research by Hurtado and her colleagues (Hurtado & Esquivel, 1986; Vielman & Hurtado, 1986; Villatoro & Hurtado, 1985) in several rural Guatemalan ladino, indigenous and mixed communities is summarized in the taxonomy of causes and

Table 1. Taxonomy of diarrhoea causation

Cause	Associated symptoms
I. Mother's condition is hot because of: a. physical activity b. eating 'hot' foods c. pregnancy d. hot emotions (anger, sadness, fright)	Watery diarrhoea, frequent stools
II. Food eaten by child: a. bad food b. too much food c. did not eat on time d. excessive 'hot' or 'cold' food	Watery diarrhoea, frequent stools, flatulence, feeling of fullness
III. Tooth eruption	Watery diarrhoea, frequent stools
IV. Fallen stomach	Watery diarrhoea, frequent stools, green stools with mucus
V. Fallen fontanelle	Watery diarrhoea, frequent stools, vomiting, green stools
VI. Evil eye	Watery diarrhoea, frequent stools, fever
VII. Attack of stomach worms (<i>lombrices</i>)	Watery diarrhoea, frequent stools, worms sometimes observed in stools
VIII. Cold enters stomach (through feet or head)	Watery diarrhoea, frequent stools, white stools
IX. Dysentery (from neglect of, or failure to cure, other types of diarrhoea)	Watery diarrhoea, frequent stools, blood in stools, uncontrollable bowel movements, stools are red or black

Source: Adapted from Hurtado & Esquivel (1986) and Scrimshaw & Hurtado (1988).

symptoms shown in Table 1. The first panel of causes (I) are related to transmission of excess 'hot' from mother to child, usually through breast milk. As panel II shows, children can become ill for reasons related to their own food intake as well. For example, children can become ill from not eating food on time or eating too much food, causes which are related to a syndrome known as *empacho*, a form of gastrointestinal upset in Latin America frequently thought to result from food becoming stuck in the stomach or intestinal tract (Kendall, Foote & Martorell, 1984; Weller *et al.*, 1993).

Diarrhoea may also be related to teething or to one of several folk illnesses – fallen fontanelle, fallen stomach or evil eye. Increased incidence of diarrhoea during teething is commonly reported throughout the world (Weiss, 1988), and is part of a group of causes of diarrhoea associated with children's developmental stages (e.g. crawling, walking). From a biomedical perspective, fontanelles (soft places in a young child's head where the skull has not fully fused) become depressed during serious dehydration, whereas from a rural Guatemalan perspective, they 'fall' because a child was dropped, not held properly, or the breast was withdrawn suddenly. Similarly, fallen stomach is often thought to result from children jumping around or being bounced around when carried. Children are thought to become sick from the evil eye as a result of attention

from pregnant or menstruating women, adults who feel jealous of the child or his/her parents, or adults who are hot after a day of working in the field.

As noted above, stomach worms which have been disrupted and have left their sack are thought to be a common cause of diarrhoea. Another cause results from cold or chills which enter children through uncovered feet and heads, chill the stomach, and lead to diarrhoea either directly or indirectly by arousing the worms (Vielman & Hurtado, 1986; Burleigh *et al.*, 1990). The final item listed in Table 1 is not a cause, but a type of diarrhoea, commonly recognized as a more serious ailment: dysentery. Dysentery is believed to result from neglect or ineffective treatment of other types of diarrhoea (Scrimshaw & Hurtado, 1988).

Burleigh *et al.* (1990) conducted focus groups in a highland indigenous community in Guatemala, with a focus on distinguishing *types* of diarrhoea and their causes. They organized their results into a taxonomy centred around six 'causal chains' related to the colour and other characteristics of diarrhoea. The first two types of diarrhoea are caused either by excessive hot or excessive cold, in which the hot-cold imbalance causes worms to be aroused and leave their sack, resulting in vomiting and dehydration. In the third type, worms are aroused by 'the irregular preparation of food, serving schedule or the amount consumed rather than the humoral quality of the food' (Burleigh *et al.*, 1990, p. 424).

The fourth type of diarrhoea is caused by the *ingestion* of worms, which generally happens when children eat unwashed food (especially fruit) or when 'children eat food with dirty hands, inhale dust carrying worms, ingest 'microbes', or drink from bottles which have not been protected from flies' (Burleigh *et al.*, 1990, p. 425). The ingestion of worms does not affect the worms in the stomach, although some of the symptoms appear to be similar to other worm-related diarrhoea. The last two types of diarrhoea are the same as two of the causes listed in Table 1: diarrhoea due to the evil eye and to teething.

Whereas Burleigh *et al.*'s findings are largely connected to the action of worms, the taxonomy shown in Table 1 and most other studies of diarrhoea in Guatemala focus on a broader range of causes and give greater emphasis to hot-cold imbalances. Research elsewhere in Central America shows similar explanatory models of diarrhoea as described in Table 1, although with some variations (Scrimshaw & Hurtado, 1988; Gorter *et al.*, 1995; Kendall, Foote & Martorell, 1983). One notable difference is that the taxonomies presented by Scrimshaw & Hurtado (1988) for Costa Rica and Nicaragua include poor hygienic habits as a type or cause of diarrhoea and, in a separate study, Gorter *et al.* (1995) note that mothers report lack of hygiene in Nicaragua as a potential cause of several different types of diarrhoea. Studies of children's diarrhoea in Lima, Peru (Escobar, Salazar & Chuy, 1983) and in the highlands of Ecuador (McKee, 1987) also report dirtiness (in both cases, the ingestion of dirt) as a perceived cause of diarrhoea among mothers of young children. In contrast, poor hygiene is not included in Hurtado and Esquivel's taxonomy for Guatemala and is mentioned solely as a means of ingesting worms among Burleigh *et al.*'s respondents.

Acute respiratory infection

In contrast to diarrhoea, acute respiratory infection (ARI) is not a well-defined illness nor has it received extensive attention from medical anthropologists in

Guatemala. In Hurtado and Esquivel's 1986 study of a mixed ladino/indigenous community, they list six different types of respiratory illness commonly reported by respondents: common cold (*catarro*), pulmonary cold (*catarro pulmonar*), flu (*grippe*), common cough (*tos*), pulmonary cough (*tos pulmonar*) and whooping cough (*tos ferina*). Fever or 'temperature' can either be a symptom associated with these illnesses or a separate illness. Colds were by far the most commonly reported respiratory illness. The most frequently reported causes of respiratory illness are related to sudden changes in body temperature, either through being exposed to cold temperature when the body is hot or sudden changes in the weather. Hurtado & Esquivel (1986) report that these changes generally are thought to occur because of *descuido* (carelessness or lack of adequate care of children), or *desmando* (violation of the rules, such as not taking a bath when hot).

The causes of respiratory illness described by Hurtado & Esquivel (1986) are remarkably similar to those described in other parts of the world: the Philippines (Nichter & Nichter, 1994), Pakistan (Mull & Mull, 1994; Kundi *et al.*, 1993), Indonesia (Kresno *et al.*, 1994) and Nigeria (Iyun & Tomson, 1996). Causes reported by mothers in each of these countries focus predominantly on exposure to cold, chilling of the body, and sudden changes in climate. This belief system is common in the US and Europe as well, and is even enshrined in the English word 'cold' commonly used to describe minor upper respiratory illnesses.

Study communities and methods

This study was carried out during May and June of 1994, at the beginning of the rainy season, in four rural communities located within three departments of Guatemala: Chimaltenango, Totonicapán and Jalapa. The communities were chosen because they were relatively small (between 500 and 2500 inhabitants) and varied in ethnicity and language group. Two communities, one predominantly ladino and the other indigenous (Kaqchikel), were chosen in the department of Chimaltenango which is in the western highlands though relatively near to Guatemala City. These two communities are in close proximity to one another, but are quite distinct. One community was chosen in each of the other two departments. Totonicapán is a relatively poor indigenous (predominantly K'iche) department in the western highlands, while Jalapa is a predominantly ladino department in eastern Guatemala. To distinguish between the communities, the first letter of their respective department is used (i.e. T for the community in Totonicapán and J for the community in Jalapa), except in the case of the two communities in Chimaltenango where the indigenous one is referred to as CI and the ladino one as CL.

The most important occupation in all four communities is agriculture, although the agricultural systems vary. For example, most residents in the Totonicapán community farm their own (generally small) plot of land while families in the Jalapa community either rent land to farm or sharecrop. The availability of electricity, water and latrines varies across the four communities. The Totonicapán community is the only one of the four without bus transport and is therefore more isolated than the others. It is also the only one without a health post.

Respondents were chosen by quota sampling, with the objective of incorporating all sections of the community. In each community, trained ethnographic interviewers

interviewed at least 20 women with children aged 5 or under; a total of 87 mothers were interviewed. The interviews were conducted in Spanish, K'iche or Kaqchikel depending on the preference of the respondent. Interviewers in the indigenous communities were from the same indigenous ethnic group and geographic area, while ladino interviewers carried out the fieldwork in the ladino communities. The fieldwork was organized and supervised by an experienced Guatemalan medical anthropologist (Hurtado) who has been involved in developing rapid assessment procedures for use by anthropologists to assess community health care and nutrition.

Interviews were recorded in two ways: (1) tape recording and (2) abbreviated field notes. The tape recordings were translated into Spanish (for those in indigenous languages) and transcribed into WordPerfect computer files. The fieldwork also included focus groups, interviews with health care providers, and interviews with community informants. However, the results presented in this paper are based exclusively on the interviews with mothers.

As shown in the Appendix, the interview outline included two sets of open-ended questions on child illness. In the first, women were asked to describe the symptoms of the most recent illness (experienced by a child under 5), its duration and treatment, and their perception of the cause. The second set of questions concerned general health beliefs related to diarrhoea and respiratory illness. Women were first asked about why children (in their community) get diarrhoea, what the symptoms are, and how diarrhoea should be treated. In the case of respiratory illness, women were first asked to mention the types of respiratory illness that were common among children in the community. Interviewers then arbitrarily selected one of these and inquired about causes, symptoms and treatment for that illness. Respondents were probed repeatedly and encouraged to elaborate and clarify their answers.

The analysis presented in this paper is based on the Spanish language transcripts of the interviews. The analysis focuses on the symptoms respondents associated with diarrhoea and respiratory illnesses and their beliefs about the causes of these illnesses; separate analyses were carried out for each community. The analytic method relied on many careful readings of the transcripts, the development and refining of schemes for classifying symptoms and causes, independent coding of individual cases according to these classification schemes by two researchers and a comparison of the results of this coding with an independent analysis of cases, and of field notes, carried out by a third researcher. The goal was to attempt to minimize the effects of researcher bias in classifying responses.

The results are presented in three sections. The first describes women's responses to the general questions about the symptoms and causes of diarrhoea. The second section presents comparable responses for respiratory illness. In the third section women's experiences during the most recent time their child was sick are described.

Results

Symptoms and causes of diarrhoea

Symptoms. In order to determine the extent to which respondents appear to be talking about the same illness when referring to diarrhoea, as well as to compare beliefs reported in this study with those in the biomedical and anthropological literature, the analysis was begun by examining the reported symptoms associated with diarrhoea.

Table 2. Symptoms of diarrhoea

Broad categories of symptoms	Indigenous communities		Ladino communities		All communities combined n = 87
	CI n = 20	T n = 26	J n = 21	CL n = 20	
Stool characteristics	9	13	7	11	40
Characteristics of elimination/defaecation	6	8	9	9	32
Stomach symptoms	3	7	4	7	21
Dehydration	13	10	14	14	51
Other physical symptoms	4	5	3	2	14
Behavioural symptoms	15	11	7	10	43
Don't know/not asked	2	2	0	0	4

Numbers do not sum to the total within each community since respondents could give more than one response.

The categorization of symptoms (as well as of causes) presented here is derived solely from women's responses, rather than from a set of categories developed *a priori*.

Alongside the symptoms of diarrhoea, shown in Table 2, the frequencies with which the symptoms were reported in the transcripts are presented. Since these counts are based on qualitative reports, they are intended only as a rough guide. In addition, because of small sample sizes, relatively large differences among categories typically involve only several respondents.

The first category, stool characteristics, includes the colour and consistency of the stool as well as whether it contains mucus. By a fair margin, the most common answer in this category in all communities was that diarrhoea is associated with watery stools. Women are less likely to mention the colour of diarrhoea, but many – particularly women in the indigenous communities – did mention that diarrhoea is associated with green, yellow or white stools.

The majority of responses in the second category refer to the fact that children defaecate more frequently when they have diarrhoea. The primary symptom mentioned in the third category, stomach symptoms, is stomachache (*'dolor del estómago'*). Only three women mentioned stomach rumblings (*'ruido'*), which is reported in earlier work to be associated with noise made by the stomach worms as they move through the body.

The fourth category is labelled *dehydration* because, from the biomedical perspective, symptoms in this group (dry mouth or thirst, thinness, sunken eyes, paleness or whiteness of the skin, wane or disfigured face, and fallen fontanelles) are clear signs of dehydration (World Health Organization, 1989). This category contains the highest frequency of reported symptoms, suggesting that women in these villages frequently see symptoms of dehydration in children with diarrhoea. This is not to say, however, that the respondents believe that these particular symptoms are signs of dehydration. Indeed, only three women mentioned dehydration or dryness *per se*. Rather, what is important from a health education perspective is that women notice

these symptoms and commonly associate them with diarrhoeal illness. The most commonly reported symptom related to dehydration is sunken eyes in the two ladino communities, paleness in community CI, and thinness in community T.

Relatively few women reported other physical symptoms, such as nausea, vomiting and fever. However, behavioural symptoms were mentioned frequently. The most common behavioural symptoms were anorexia (the child does not eat or does not want to eat) and that the child becomes sad, looks bad or ill, does not act normal, or is not happy. Women in CI also commonly reported that children cry or scream. Overall, reported symptoms tended to be similar across the four communities.

In general the symptoms of diarrhoea reported by women in this study are consistent with the biomedical perspective. The symptoms are also quite similar to those in previous anthropological research, although there are some exceptions. Women interviewed in this study did not mention excretion of worms, in contrast to Burleigh *et al.*'s study, nor did they mention flatulence or feelings of fullness, as in Hurtado & Esquivel's (1986) taxonomy. In addition, less emphasis was found on the colour of diarrhoea than in Burleigh *et al.*, although this difference may result from the use of specific questions concerning colour in Burleigh *et al.*'s study.

Causes. Most causal explanations offered by respondents can be divided into two major groups: (1) an interrelated set of causes involving cold (either as temperature or as a quality), stomach worms, and/or eating and (2) causes related to dirtiness or lack of hygiene. Some women offered both types of explanations. It is important to note that alternative explanations are not contradictory, since women often believe that there are several different types of diarrhoea with different causes. The first set of causes are presented in Fig. 1, as a set of five causal paths, which are not mutually exclusive. The numbers after each causal path represent the counts of women in each community who described the particular pathway, permitting multiple counts per women. Thus, for path A, the numbers of respondents giving this answer are as follows: 11 in CI, 7 in T, 2 in J and 8 in CL, for a total of 28 women in all four communities. The numbers (not shown) of respondents giving any of these five explanations related to cold, stomach worms and eating is 16 in CI, 10 in T, 14 in J and 17 in CL, yielding an overall total of 57 out of 87 or about two-thirds of respondents in the four communities.

These five causes are presented as an interrelated group because the analysis suggests that cold, eating certain things or in certain ways, and the actions of stomach worms are often linked in women's responses about the causes of diarrhoea. Because of variation in the amount of detail individual women provided about their beliefs, some responses (e.g. cold weather causes diarrhoea) may be simplified versions of more complex beliefs (e.g. cold weather causes diarrhoea *because* it arouses stomach worms or *because* it chills the stomach).

The first set of causal explanations in Fig. 1, given by 28 women, is related to becoming chilled or wet and/or to cold and rainy weather. A common response in this group is that cold and wet themselves cause diarrhoea. Children can also get cold by taking a bath or playing in water. Some women specify that cold and wet weather cause diarrhoea by chilling (or sometimes swelling) the stomach. For example:

'... it's raining right now and they walk around without shoes and without a sweater. They get (catch) cold in their stomach, for this reason they get diarrhoea ...' CL-17.

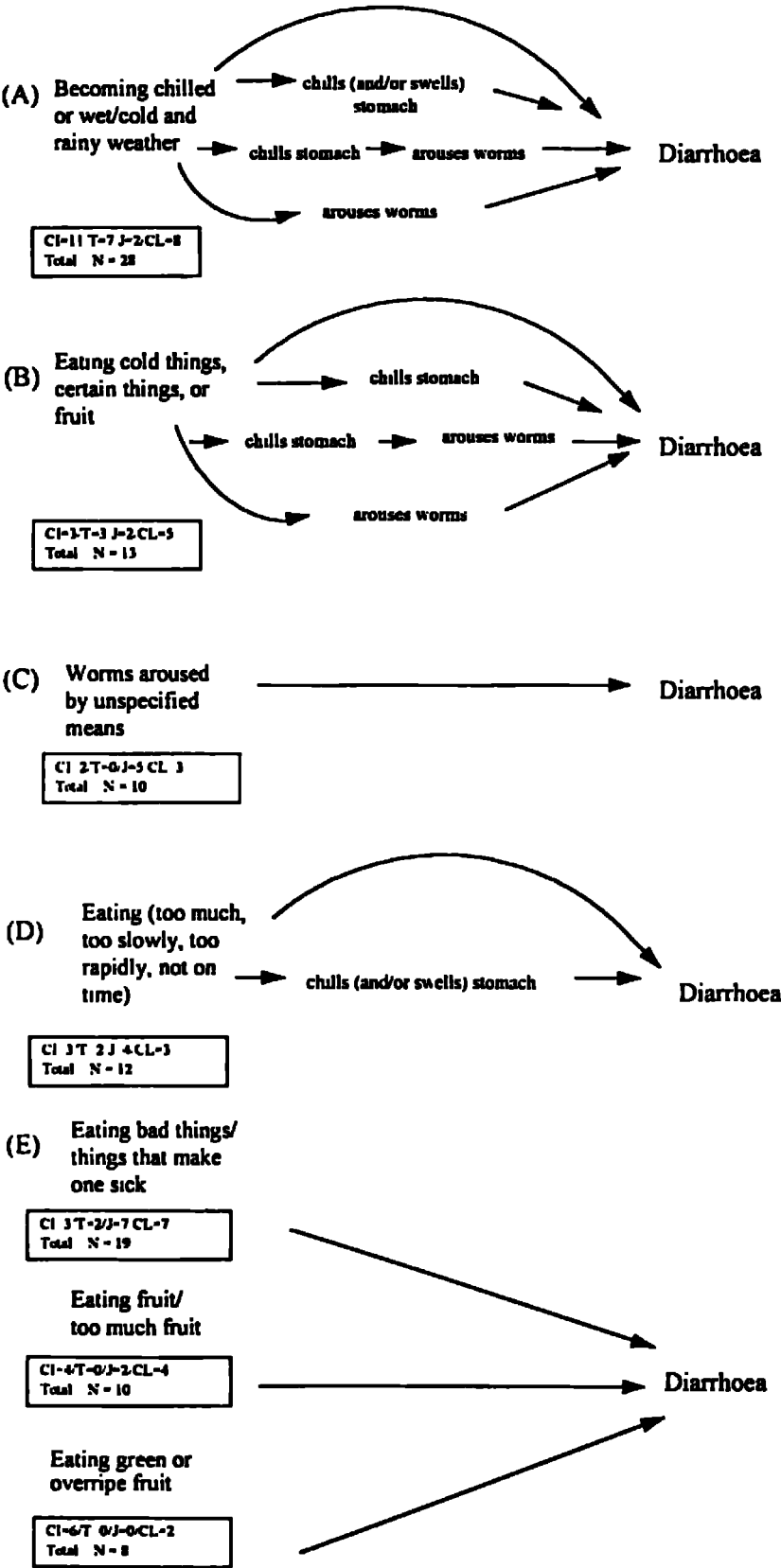


Fig. 1. Causes of diarrhoea related to cold, stomach worms and eating.

Other women describe more complicated mechanisms through which cold and/or wetness arouses stomach worms, in some cases by first chilling the stomach.

Path B shows that 13 women described a second set of causal pathways. In this case, the process starts with eating cold, or 'certain' (unspecified) foods or eating fruits, especially mangos which are considered cold by the respondents who mentioned them (although, as noted by Rosenthal (1987) there is considerable range across villages in the classification of foods as hot or cold). As in the case of path A, eating these foods can cause diarrhoea directly, or by chilling the stomach, by chilling the stomach and arousing the stomach worms, or simply by arousing stomach worms. For example,

'... when they eat something cold ... like when there is fruit, they eat a lot and it makes them sick, it gives them diarrhoea ...' CL-11.

'... they eat cold things and the stomach worms don't like that. So [the worms] get aroused. That's when they give them stomachaches and diarrhoea ...' CI-19.

As previous anthropological research has shown, children are also believed to get sick because of hot-cold imbalances in their mothers caused by eating too many cold things.

A total of 10 women, shown in path C, expressed the belief that worms cause diarrhoea without stating how the worms become aroused. Another set of explanations, shown in path D, relates to the pace or amount of eating. Children who eat too much, not at the right pace or are not fed on time, can either get diarrhoea for this reason or through the mechanism of chilling or swelling the stomach. This cause appears to be similar to the descriptions of *empacho* in other work (Hurtado & Esquivel, 1986; Kendall *et al.*, 1984; Scrimshaw & Hurtado, 1988), although only two women (in community J) mentioned *empacho* in this part of the interview.

The final set of causes in Fig. 1 relate to eating things that make one sick, either in general or more specifically, fruit. Although responses in these categories did not make any reference to cold or hot-cold imbalance, some of them may implicitly refer to these ideas.

To the extent that respondents in the interviews associate diarrhoea with hot-cold imbalances, it is almost always associated with excess cold rather than both hot and cold. The emphasis on cold and wet conditions may have been exaggerated because the interviews were taking place in the rainy season when conditions are generally cold and wet.

Differences among communities in the frequency of reporting these causes related to cold, worms and food are small, except in the case of community T. Although respondents here are about as likely to say that cold and wet (path A) and eating cold things (path B) cause diarrhoea, they are less likely to give the other explanations in Fig. 1.

The second broad group of causes, shown in Table 3, is related to dirtiness or lack of hygiene. As indicated in the top row, a total of 52 or over half of respondents gave an answer related to dirtiness, about the same proportion that gave explanations related to cold, food or worms. Examples of explanations related to lack of hygiene include:

'It's because of the dirtiness, because of not washing one's hands and not bathing, because of not washing clothes, that's why they get sick.' T-2.

'They get diarrhoea I think maybe when children are not taken care of, they go out in

Table 3. Causes of diarrhoea related to dirtiness or lack of hygiene

Causes of diarrhoea related to dirtiness	Indigenous communities		Ladino communities		All communities combined n=87
	CI n=20	T n=26	J n=21	CL n=20	
Number of women giving any response related to dirtiness or hygiene	14	18	10	10	52
Eat/put dirty things/dirt in mouth	7	12	7	0	26
Touch/play with dirt/sand/dirty things	4	3	0	0	7
Not washing hand/dirty hands/not bathing or washing/not washing clothes	8	12	2	3	25
Dirty water/unboiled water	1	3	1	2	7
Eat badly cooked food/food not properly prepared	6	5	1	4	16
Flies on food/food not protected from flies	4	3	0	2	9

Numbers do not sum to the total within each community since respondents could give more than one response.

the dirt, maybe they eat the dirt, since we don't watch how the children are crawling around ...' CI-4.

The most common types of lack of cleanliness that women cited are children putting dirty things in their mouths or eating dirty things (including dirt, sand, garbage, discarded fruit, anything on the floor), and children not washing or being washed adequately. Unlike respondents in Burleigh *et al.*'s (1990) analysis, only one respondent mentioned children eating fruit with worms (*gusanos* in this case, rather than *lombrices* which is used to describe stomach worms).

Dirtiness-related causes, especially eating dirty things or putting them in one's mouth, touching and playing with dirty things, and not washing adequately are more frequently cited in the indigenous than in the ladino communities. *A priori* ladino respondents might be expected to be more likely to give dirtiness-related explanations because they are more likely to have had some education, to know about the germ theory of disease, and to be cognizant of public health messages, as well as to hold less traditional views about illness causation. The authors speculate that there are at least two reasons for the higher frequency of dirtiness-related responses in the indigenous communities. First, given the greater poverty of the indigenous population, children may be more exposed to dirty conditions in indigenous communities, even though all four of the study communities are relatively poor. For example, households in indigenous communities are more likely to have dirt floors and are less likely to have houses built from good materials or to have running water. A second factor may have been the activities of the water programme in the indigenous communities, particularly in community T. The water programme is a national programme through which local

communities organize committees of community leaders, with outside help, to identify and develop a clean local source of water.

Several respondents offered a variety of other causal explanations for diarrhoea. Surprisingly few mentioned folk remedies often cited in the literature such as evil eye (mentioned by one woman), *empacho* (two women) and fallen fontanelle (one woman). Although only three women mentioned diarrhoea associated with teething, several women mentioned forms of diarrhoea associated with other developmental stages, such as when children begin to walk, crawl or talk. A few women gave explanations related to microbes or infection (five women) and parasites and amoebas (four women), but it is hard to know whether they were referring to biomedical pathogens of diarrhoeal disease. For example, in studies of diarrhoea in Peru and Ecuador, the use of the term *infection* did not appear to indicate knowledge of germ theory or modern principles of hygiene (Escobar *et al.*, 1983; McKee, 1987).

About 20 women in the four communities explicitly or implicitly responded that children get diarrhoea because parents do not take adequate care of them (*'por descuido'*). Several mothers specifically said that their own lack of adequate care for children made the children sick. When the interviewer probed, most went on to define lack of care. For example:

'I think sometimes that for one thing, its lack of care on the part of the mother by not giving [children] things that are washed, not washing their hands before they eat something.' CL-8.

One woman suggested that the problem is that mothers are busy and don't have enough time to walk around after their crawling or walking toddlers and keep them from picking up things and putting them into their mouths.

These results on the causes of diarrhoea also provide some clues into how indigenous and ladino women view one another, although no questions were asked about ethnic differences or differences among communities. The two communities CI and CL are located about 20 km apart along the same road and have strong economic ties because of proximity. In response to the question on why children get diarrhoea, an indigenous respondent in CI observed:

'If we took care of our children like the ladinos, like them, and they have servants to take care of the children so that they don't pick up dirt and so that they don't grab other dirty things. And with us being poor there isn't money to pay servants to take care of our children so that they don't pick up dirt and so that they don't grab dirty things . . . Its because of that that children become sick . . .' CI-7.

No ladino in CL made any explicit contrast between the ethnic groups or communities. However, one woman, on being prompted about whether there were other reasons children got diarrhoea in CL, said:

'One cannot say that its because of dirtiness because things around here are more neat and clean than in other places where you see garbage dumps and everything. By contrast, around here you don't see garbage dumps anywhere.' CL-15.

However, it should be noted that this respondent did not say explicitly to what other places she was referring, and may have been talking in general terms.

Table 4. Respiratory illnesses mentioned by respondents as common among children in the community

Respiratory illnesses mentioned by respondents	Indigenous communities		Ladino communities		All communities combined <i>n</i> = 87
	CI <i>n</i> = 20	T <i>n</i> = 26	J <i>n</i> = 21	CL <i>n</i> = 20	
Bronchitis (<i>bronquitis/enfermedad de bronquios</i>)	3	0	8	11	22
Cough (<i>tos</i>)	13	20	6	6	45
Cold/pulmonary cold (<i>catarro/catarro pulmonar</i>)	1	3	4	8	16
Flu (<i>gripe</i>)	1	11	6	1	19
Broncopneumonia (<i>bronconeumonia</i>)	0	0	4	7	11
Pneumonia (<i>pulmonial/pulmón/neumonia</i>)	0	5	8	1	14
Fever/temperature (<i>fiebre/calentura</i>)	8	17	0	1	26
Other illnesses	4	5	8	10	27
Don't know/no response	3	2	2	0	7

Numbers do not sum to the total within each community since respondents could give more than one response.

To summarize, respondents interviewed in this study gave many of the same causes for diarrhoea described in the anthropological literature, in particular those causes related to cold, worms and eating. Other folk illnesses, such as the evil eye and *empacho*, were only rarely mentioned. In contrast to earlier anthropological work in Guatemala, many respondents, especially women in indigenous communities, said that dirtiness is a cause of diarrhoea. As many medical anthropologists have noted in the past, the cluster of explanations related to cold, worms and eating reflects underlying beliefs about physiology which are sharply different from those of the biomedical perspective. Dirtiness as a cause, however, is much closer to the biomedical notion of the transmission of pathogens through faecal–oral contamination, even though the specific mechanisms by which women believe dirtiness causes diarrhoea may be quite different.

Symptoms and causes of respiratory illness

Types of respiratory illnesses and symptoms. Because the term 'respiratory illness' includes a wide range of ailments and would not be easily understood by most women in this study, this section of the interview was begun by asking respondents to describe the types of illnesses of the chest or lungs that are common in their communities. The reference to chest or lungs was chosen because of the study's interest in lower respiratory illness. Responses are shown in Table 4. A few women in each community could not think of (or would not report) any illness of the chest or lungs, even after prompting.

By far the most common respiratory illness reported was cough (mentioned by 45 women) followed by fever/temperature (26 women) and bronchitis (22 women). Table 4 shows two important differences between the indigenous and ladino communities. First, highly medicalized terms like bronchitis and broncopneumonia were used almost exclusively by women in the ladino communities. This probably occurred because ladinos generally have more contact with physicians and are more likely to have heard a doctor or someone else use one of these terms. Language may also have been a barrier to use of these Spanish terms in indigenous languages, although technical words in Spanish are frequently used by people speaking K'iche and Kaqchikel. The second difference by ethnicity is that indigenous respondents are considerably more likely to use the words cough and fever/temperature than ladinos.⁸ Flu and pneumonia are mentioned more often in communities T and J, although there is no apparent reason for these ailments to be more prevalent in these two communities.

After asking the respondent to list chest and lung illnesses that occur in the community, the interviewer arbitrarily selected one of the illnesses listed by the respondent and asked about symptoms and causes. As a result, different respondents reported on the symptoms and causes of different illnesses and the numbers of women reporting on several of the illnesses are quite small (as shown in the first row of Table 5). Symptoms reported for bronchitis, cough, cold, flu, broncopneumonia, and pneumonia are summarized, recognizing that some interpretations are based on the very small counts of respondents who were asked about particular illnesses. As might be expected, in the case of the illness 'cough', the most commonly reported symptom is coughing. Other symptoms include sore throat, mucus or phlegm, fever or temperature, headache, getting red (from fever), crying and anorexia (the child does not eat or does not want to eat). Less commonly reported symptoms are sneezing, noise in the chest (*hervor de pecho*), headache, lethargy, teary eyes, nausea, chest pains and inability to sleep. Symptoms reported for colds and the flu appear to be similar. The symptoms for bronchitis and broncopneumonia include more chest-related symptoms such as difficulty breathing and noise in the chest, although symptoms like cough and fever are the most commonly reported for these illnesses as well. Symptoms reported for pneumonia are more likely to include chest and lung symptoms, as well as apathy. Some women mentioned the fact that other respiratory illnesses could lead to pneumonia and that pneumonia was dangerous. In general, symptoms reported for respiratory illnesses appear to be quite similar to those described in the public health literature for ARIs.

Causes. Because women in the four communities listed different respiratory illnesses, it is difficult to compare causes among the communities. For this reason, responses aggregated across the four communities are presented in Table 5. The largest group of causes are related to cold and wet. Children get cold, wet or chilled in several ways: being bathed in cold water, getting soaked by the rain and not changing their clothes, being 'hit' by the cold air, playing in water, not wearing sufficient clothing, and having their clothes changed outside (in the cold). Many of these causes are interrelated as shown by the following response:

'... because of lack of care, for not taking care of them, sometimes changing them in the [cold] air and they are very delicate [weak], quickly the air enters into the *bronquios* and the illnesses begin. [Interviewer: what is it that you change in the [cold] air?] their

Table 5. Major causes of selected respiratory illnesses mentioned by respondents

Causes	Selected respiratory illnesses					
	Bronchitis	Cough	Cold	Flu	Broncopneumonia	Pneumonia
Number of respondents	15	26	7	9	3	4
Cold/chill/rain/wet (including bathing)	14	17	7	4	2	3
Eat cold foods/drink cold water	3	3	0	0	0	0
Because of the air/ being hit by the air	4	4	0	0	0	1
Not adequately dressed	6	1	1	1	1	2
Change of climate	0	1	1	2	0	0
Effects of the sun	1	10	1	3	0	0
Heat	1	1	2	1	0	0
Dust	1	2	1	0	0	0
Dirtiness or contamination of the air	1	0	0	1	0	0

Numbers do not sum to the total within each illness since respondents could give more than one response.

underwear. [Interviewer: Anything else that you think causes bronchitis?] . . . when they already have a cold and one washes, one touches cold water, and this makes them sick.' CL-8.

As Hurtado & Esquivel (1986) found in their research, some of the respondents in this study said that respiratory illnesses could be caused either by excessive cold or excessive heat, or by a change between hot and cold. For example:

'The worst is because of the weather, also sometimes beause there is a lot of heat, sometimes because it is very cold, or because of the change in climate I think, it's this more than anything. A lot of heat or a lot of cold yes, and they also are chilled this way . . . Sometimes when one bathes them like this in the air, sometimes there are mothers . . . I always bathe him in warm air, but there are mothers who bathe them with pure cold water and maybe the children already have this illness, then they get sick a little later on.' J-5.

Excessive heat, particularly in the form of playing under the sun, was also given as a cause, especially in the case of cough; several respondents noted that not wearing a cap, and consequent burning by the sun, was a cause of the flu or cough. A few respondents mentioned that cold can also be introduced into the body by eating foods with cold qualities or by drinking cold water.

Respondents also offered a variety of other explanations not included in Table 5. In general only one or two respondents mentioned each one. Some of these responses refer to the child being born sick or having weak lungs, the mother having weak blood, the lungs not being adequately taken care of, the child not being strong, and illness as

Table 6. Types of illness experienced by youngest child during last illness episode

Type of symptoms	Indigenous communities		Ladino communities		All communities combined
	CI	T	J	CL	
Number of illnesses*	23	28	21	22	94
Respiratory	5	9	10	9	33
Gastrointestinal (GI)	3	10	7	7	27
Respiratory and GI	11	5	1	3	20
Temperature/fever	1	0	0	0	1
Respiratory + GI + eye infection	0	0	0	1	1
Respiratory + skin problem	0	1	0	0	1
Respiratory + eye infection	0	2	1	0	3
GI + other symptoms†	3	1	0	0	4
Eye infection	0	0	1	0	1
Other‡	0	0	1	2	3

*If mothers reported on the most recent illness of two children, the symptoms of both children are included in this table.

†One case of GI + *susto* (a folk illness referring to shock or fright that disengages a person's spirit); two cases of GI + skin in CI; one case of GI + swelling in T.

‡One case of object lodged in the ear in J; one case of *corazón* (heart) – perhaps nerves or *susto* – and one case of stomach worms and scraped nose in CL.

a punishment of God. Three women mentioned 'contagion' as a cause of cough. One woman mentioned microbes while describing the causes of pneumonia.

In contrast to the results for diarrhoea, no one gave causes of respiratory illnesses related to dirtiness, although a few respondents mentioned that inhaling dust was a cause. The primary focus of the causal explanations, cold and chilling or changes from hot to cold, are quite similar to those of previous anthropological research in Guatemala. However, the respondents in this study appeared to emphasize chills and colds more than changes from hot to cold. On the other hand, the causes given by these respondents are quite different from those discussed in the biomedical and public health literatures. Although explanatory theories related to cold and chilling might be seen as related to susceptibility to illness in the Mosley framework described above, the public health literature to date discounts the role of cold and chilling as predisposing factors related to respiratory infection (Douglas, Lindgram & Cough, 1968; Stansfield & Shepard, 1993).

Most recent illness

To determine whether respondents harbour different beliefs about their own experiences with illness as compared with (diarrhoeal or respiratory) illness in general, responses to a set of questions earlier in the interview about the most recent illness experienced by one of the respondent's children under age 5 were examined. Based on the symptoms described by the mother, illnesses were classified as respiratory, gastrointestinal, both, or other illnesses (Table 6). Respiratory symptoms included any

symptom involving the nose, throat, chest or ear infections as well as illnesses which included cough, cold, flu and other respiratory classifications reported in Table 4. Gastrointestinal symptoms included those involving the stomach and diarrhoea or stomach worms, although stomach worms were almost always reported as a symptom of diarrhoea. Fever was not coded separately unless it was the only symptom mentioned.

As we would expect, the three most common illnesses were respiratory and gastrointestinal, followed closely by a combination of respiratory and gastrointestinal illness as part of the same disease episode. Almost all gastrointestinal illnesses reported involved diarrhoea. For this reason, and because of the greater heterogeneity of respiratory illnesses, the causes for most recent illnesses reported as gastrointestinal (or both gastrointestinal and respiratory) were examined.

The causes given for diarrhoea in the most recent illness episode are similar to those given in response to the general question, with the majority of mothers reporting the two major groups of causes shown in Fig. 1. However, there appear to be some differences between the two sets of responses. For the last illness episode, causes related to the cold-worm-eating group were about twice as common as were causes related to dirtiness, while the two sets of causes were given with roughly equal frequency in the case of the general health belief question. In addition, causes related to the sun, heat and fire (*fuego*) were somewhat more common for the last illness episode, as was the evil eye (although the evil eye was mentioned by only four women).

There are at least two possible reasons for the fact that dirtiness was less commonly reported as a cause for the last episode. The first is that even women who believe that dirtiness is a common cause of diarrhoeal disease in their community are less likely to believe it of themselves. Similarly, the authors speculate that even parents well-versed in the germ theory of disease are not as likely to attribute their child's diarrhoea episode to lapses in cleanliness as they are to say that lack of hygiene is a common cause of diarrhoeal illness. A second possible explanation is that when women are talking about general beliefs, they may be more likely to try to give interviewers the answer they think the interviewers want.

Discussion

This paper examines the symptoms and causes of diarrhoea and respiratory illness reported by women during in-depth interviews in four rural Guatemalan communities. In the case of diarrhoea, the results suggest that folk explanations involving the actions of stomach worms and the importance of hot and cold imbalances remain important in these communities, although few women report folk illnesses commonly cited in the literature. Lack of hygiene was reported as a cause more frequently than in earlier anthropological work in Guatemala. Women frequently cited symptoms of diarrhoea that would be associated with dehydration by public health workers, even though they did not use the word *dehydration*. This finding suggests that a mechanism for public health education is to alert women that these symptoms are danger signs that warrant immediate treatment. In the case of respiratory illness, the results are consistent with earlier research both within and outside of Central America which indicates that the most frequently reported causes were related to changes in climate and being cold or chilled.

These findings, like those of previous research, indicate that there are considerable differences between the biomedical perspective on the causes of diarrhoea and ARI, and rural Guatemalan parents' health beliefs. Based on responses about health beliefs, the types of measures that women in these communities are likely to undertake to prevent diarrhoea from hot-cold imbalance, arousal of stomach worms, and eating the wrong foods may fail to provide an adequate treatment for diarrhoea from a biomedical point-of-view. Earlier research also suggests that the treatment that women seek for these types of diarrhoea are less likely to involve modern medicine (Hurtado & Esquivel, 1986; Villatoro & Hurtado, 1985), even for children who are seriously dehydrated, because their causes are less likely to be the type that parents believe biomedicine can cure.

Diarrhoea caused by lack of hygiene, on the other hand, bears more similarities to biomedical ideas, although women's belief about the exact causal mechanisms may be quite different from those in the biomedical literature. Historians of the mortality decline in Europe during the 18th, 19th and 20th centuries have suggested that personal hygiene and sanitary conditions improved not because of widespread knowledge of the germ theory of disease, but because of changing tastes and rising standards of living (McKeown, 1976). From a biomedical perspective, preventive measures based on the belief that lack of hygiene causes diarrhoea are likely to be at least partially efficacious in reducing the transmission of diarrhoea.

Beliefs about the causes of respiratory illness are remarkably similar to those reported in other areas of the world, including Europe and the United States. The causal mechanism underlying the belief that changes in temperature or exposure to cold are associated with respiratory illness may be linked with biomedical ideas about susceptibility to illness, but, as noted above, there is little empirical evidence supporting such a link. From a biomedical perspective, preventive measures based on these beliefs are unlikely to have any effect on the transmission of respiratory illnesses. However, it is less clear whether these beliefs constitute a barrier to the use of biomedical treatments for respiratory illness.

One objective of this study was to determine whether current health beliefs in rural Guatemala constitute a greater barrier to the use of biomedical health care for the indigenous than the ladino population. The results suggest that health beliefs among these two groups are very similar. In fact, the one substantial difference by ethnicity is that indigenous women were *more* likely to cite dirtiness as a cause of diarrhoea than were ladino women.

Does the more frequent attribution of diarrhoea to dirtiness, as well as less frequent mention of folk illnesses, indicate a change in health beliefs in rural Guatemala? Comparison of the present results with those of earlier studies is complicated by the fact that each study poses a somewhat different question and uses different methods of analysis. Kendall *et al.* (1984), in their work in Honduras, warn that while diarrhoea is a commonly recognized illness, there are other folk illnesses which health workers would categorize as diarrhoea, but the local population would not. To the extent that this is true, responses to questions about diarrhoea may be restricted to a subset of what the biomedical profession considers as 'diarrhoeal disease' possibly only that subset believed to be caused by less traditional factors, such as dirt and lack of hygiene. Because respondents were asked about diarrhoea (*asientos*) rather than children's illnesses more generally (as in earlier work by Hurtado & colleagues) and were not probed about different types of diarrhoea (as did

Burleigh *et al.*, 1990), some may not have included *empacho*, attacks of worms, and similar illnesses in their discussion, thereby reporting a narrower range of symptoms and causes than they may have with alternative survey instruments.

In spite of these caveats, comparisons of this study with results from earlier ethnographic research in Guatemala and with studies elsewhere in Latin America support the notion that health beliefs in Guatemala are evolving. Evidence from studies in Nicaragua, Costa Rica, Peru and Ecuador indicates that belief in lack of hygiene as a cause of diarrhoea exists elsewhere in Latin America. The relatively high frequency of responses related to dirtiness in our study, in contrast to the absence of dirtiness in Esquivel and Hurtado's taxonomy, suggests a much stronger recognition of the role of hygiene today compared with the mid-1980s. At the same time, however, the growing acceptance of the importance of dirt and hygiene as causes of diarrhoea may not reflect an acceptance of biomedical perspectives of illness in rural Guatemala. McKee (1987) notes that, in Ecuador, mothers' classification of *infección* as a diarrhoeal illness brought about by consumption of dirty or contaminated food, dirty hands, or eating heavy foods reflects a change from traditional beliefs, but their understanding of *infección* suggests that 'a partial cognitive accommodation to modern medical therapies has gone forward without a true acceptance of the germ theory of disease. The folk taxonomy governing the meaning of diarrhoea has changed in this *one* category of illness, but otherwise has remained intact' (McKee, 1987, p. 1148). While further evidence is needed to draw a definitive conclusion, it appears that beliefs regarding causes of illness in Guatemala are undergoing similar types of change.

Acknowledgments

Support for this project from NICHD through grants R01 HD27361 to RAND and R01 HD31327 to Princeton University is gratefully acknowledged. The project was carried out in collaboration with the Instituto de Nutrición de Centro América y Panamá directed by Dr Hernán Delgado.

References

- ADAMS, R. N. (1952) *Un Análisis de las Creencias y Prácticas Médicas en un Pueblo Indígena de Guatemala*. Publicaciones Especiales de Instituto Indigenista Nacional No. 17. Editorial del Ministerio de Educación Pública, Guatemala.
- BARTLETT, A. A., HURTADO, E., SCHROEDER, D. & MÉNDEZ, H. (1992) Association of indicators of hygiene behavior with persistent diarrhea of young children. *Acta paediatr. Suppl.* 381, 66-71.
- BENENSON, A. S. (1995) *Control of Communicable Diseases Manual*. 16th Edition. American Public Health Association, Washington, DC.
- BLACK, R. E., CHIEN, L. C., HARKAVY, O., MUJIBUR RAHAMAN, M. & ROWLAND, M. G. M. (1983) Prevention and control of the diarrheal diseases. In: *Diarrhea and Malnutrition*. Edited by Lincoln C. Chen & Nevin S. Scrimshaw. Plenum Press, New York.
- BOERMA, J. T. & VAN GINNFKEN, J. K. (1992) Comparison of substantive results from demographic and epidemiological survey methods. In: *Measurement of Maternal and Child Mortality, Morbidity and Health Care*, chapter 3. Edited by J. T. Boerma. Ordina Editions, Liège, Belgium.

- BORRERO, I. H., FAJARDO, L. P., BEDOYA, A. M., ZEA, A., CARMONA, F. & DE BORRERO, M. F. (1990) Acute respiratory tract infections among a birth cohort of children from Cali, Colombia, who were studied through 17 months of age. *Rev. infect. Dis.* 12, suppl. 8, S950-S956.
- BULLA, A. & HITZE, K. L. (1978) Acute respiratory infections: A review. *Bull. Wld Hlth Org.* 56(3), 481-498.
- BURLEIGH, E., DARDANO, C. & CRUZ, J. R. (1990) Colors, humors and evil eye: Indigenous classification and treatment of childhood diarrhea in highland Guatemala. *Med. Anthropol.* 12(4), 419-441.
- CAMPBELL, H. (1995) Acute respiratory infection: A global challenge. *Arch. Dis. Child.* 73, 281-286.
- CERQUEIRO, M. C., MURTAGH, P., HALAC, A., AVILA, M. & WEISSENBAKER, M. (1990) Epidemiologic risk factors for children with acute lower respiratory tract infection in Buenos Aires, Argentina: A matched case-control study. *Rev. infect. Dis.* 12, suppl. 8, S1021-S1028.
- CHEN, L. C. (1983) Interactions of diarrhea and malnutrition: Mechanisms and interventions. In: *Diarrhea and Malnutrition*. Edited by Lincoln C. Chen & Nevin S. Scrimshaw. Plenum Press, New York.
- COSMINSKY, S. (1987) Women and health care on a Guatemalan plantation. *Social Sci. Med.* 25(10), 1163-1173.
- COSMINSKY, S. & SCRIMSHAW, M. (1980) Medical pluralism on a Guatemalan plantation. *Social Sci. Med.* 14, 267-278.
- CRUZ, J. R., CANO, F., BARTLETT, A. & MÉNDEZ, H. (1994) Infection, diarrhea, and dysentery caused by shigella species and campylobacter jejuni among Guatemala rural children. *Pediatr. infect. Dis.* 13(3), 216-223.
- CRUZ, J. R., PAREJA, G., DE FERNÁNDEZ, A., PERALTA, F., CÁCERES, P. & CANO, F. (1990) Epidemiology of acute respiratory tract infections among Guatemalan ambulatory preschool children. *Rev. infect. Dis.* 12, suppl. 8, S1029-S1034.
- DOUGLAS, R. G., LINDGRAM, K. M. & COUGHLIN, R. B. (1968) Exposure to cold environment and rhinovirus cold: Failure to demonstrate an effect. *New Eng. J. Med.* 279, 742-747.
- ESCOBAR, G. J., SALAZAR, E. & CHUY, M. (1983) Beliefs regarding the etiology and treatment of infantile diarrhea in Lima, Peru. *Social Sci. Med.* 17(17), 1257-1269.
- ESREY, S. A., FEACHEM, R. G. & HUGHES, J. M. (1985) Interventions for the control of diarrhoeal diseases among young children: Improving water supplies and excreta disposal. *Bull. Wld Hlth Org.* 63(4), 757-772.
- FEACHEM, R. G. (1984) Interventions for the control of diarrhoeal diseases among young children: Promotion of personal hygiene and domestic hygiene. *Bull. Wld Hlth Org.* 62(3), 467-476.
- FEACHEM, R. G. & KOBLINSKY, M. A. (1984) Interventions for the control of diarrhoeal diseases among young children: Breastfeeding. *Bull. Wld Hlth Org.* 62, 271-279.
- GORDON, J. E., BÉHAR, M. & SCRIMSHAW, N. S. (1964a) Acute diarrhoeal disease in less developed countries. 1. An epidemiological basis for control. *Bull. Wld Hlth Org.* 31, 1-7.
- GORDON, J. E., GUZMÁN, M. A., ASCOLI, W. & SCRIMSHAW, N. S. (1964b) Acute diarrhoeal disease in less developed countries. 2. Patterns of epidemiological behaviour in rural Guatemalan villages. *Bull. Wld Hlth Org.* 31, 9-20.
- GORTER, A. C., SÁNCHEZ, G., PAUW, J., PÉREZ, R. M., SANFORD, P. & SMITH, G. D. (1995) Diarrea infantil en la Nicaragua rural: Creencia y prácticas de salud tradicionales. *Boln of. sanit. pan-am.* 119(5), 377-390.
- HURTADO, E. & ESQUIVEL, A. (1986) *Guatemala*. INCAP publication C-292, Guatemala City.
- IYUN, B. F. & TOMSON, G. (1996) Acute respiratory infections - mothers' perception of etiology and treatment in South-Western Nigeria. *Social Sci. Med.* 42(3), 437-445.

- KENDALL, C., FOOTE, D. & MARTORELL, R. (1983) Anthropology, communications, and health: The mass media and health practices program in Honduras. *Hum. Org.* 42(4), 353–360.
- KENDALL, C., FOOTE, D. & MARTORELL, R. (1984) Ethnomedicine and oral rehydration therapy: A case study of ethnomedical investigation and program planning. *Social Sci. Med.* 19(3), 253–260.
- KRESNO, S., HARRISON, G. G., SUTRISNA, B. & REINGOLD, A. (1994) Acute respiratory illnesses in children under five years in Indramayu, West Java, Indonesia: A rapid ethnographic assessment. *Med. Anthropol.* 15, 425–434.
- KUNDI, M. Z. M., ANJUM, M., MULL, D. S. & MULL, J. D. (1993) Maternal perceptions of pneumonia and pneumonia signs in Pakistani children. *Social Sci. Med.* 37(5), 649–660.
- LOGAN, M. H. (1973) Humoral medicine in Guatemala and peasant acceptance of modern medicine. *Hum. Org.* 32(4), 385–395.
- MARTINES, J., PHILLIPS, M. & FEACHEM, R. A. G. (1993) Diarrheal diseases. In: *Disease Control Priorities in Developing Countries*. Edited by Dean Jamison *et al.* Oxford University Press, New York.
- McKEE, L. (1987) Ethnomedical treatment of children's diarrheal illnesses in the highlands of Ecuador. *Social Sci. Med.* 25(10), 1147–1155.
- McKEOWN, T. (1976) *The Modern Rise of Population*. Edward Arnold, London.
- MUSLEY, W. H. (1980) Biological contamination of the environment by man. In: *Biological and Social Aspects of Mortality and the Length of Life*. Edited by S. H. Preston. Ordina Editions, Liège, Belgium.
- MUSLEY, W. H. (1985) Will primary health care reduce infant and child mortality? A critic of some current strategies. In: *Health Policy, Social Policy, and Mortality Prospects*. Edited by J. Vallin & A. Lopez. Ordina Editions, Liège, Belgium.
- MULL, D. S. & MULL, J. D. (1994) Insights from community-based research on child pneumonia in Pakistan. *Med. Anthropol.* 15, 335–352.
- NICHTER, M. & NICHTER, M. (1994) Acute respiratory illness: Popular health culture and mother's knowledge in the Philippines. *Med. Anthropol.* 15, 353–375.
- PERLEY, A. R., GOLDMAN, N. & RODRIGUEZ, G. (1996) Prenatal and delivery care and childhood immunization in Guatemala: Do family and community matter? *Demography* 33(2), 231–247.
- PHELAN, P. D., OLINSKY, A. & ROBERTSON, C. F. (1994) *Respiratory Illness in Children*. Fourth Edition. Blackwell Scientific Publications, Oxford.
- ROHDE, J. E. (1986) Acute diarrhoea. In: *Strategies for Primary Health Care: Technologies Appropriate for the Control of Disease in the Developing World*. Edited by J. A. Walsh & K. S. Warren. University of Chicago Press, Chicago.
- ROSENTHAL, C. (1987) *Santa Maria de Jesus: Medical Choice in a Highland Guatemalan Town*. Unpublished dissertation presented to the Department of Anthropology, Harvard University.
- SCRIMSHAW, S. C. M. & HURTADO, E. (1988) Anthropological involvement in the Central American diarrheal disease control project. *Social Sci. Med.* 27(1), 97–105.
- SELWYN, B. J. (1990) The epidemiology of acute respiratory tract infection in young children: comparison of findings from several developing countries. *Rev. infect. Dis.* 12, suppl. 8, S870–S888.
- STANSFIELD, S. K. & SHEPARD, D. S. (1993) Acute respiratory infection. In: *Disease Control Priorities in Developing Countries*. Edited by Dean Jamison *et al.* Oxford University Press, New York.
- TEDLOCK, B. (1992) *Time and the Highland Maya*. University of New Mexico Press, Albuquerque, NM.
- TORÚN, B. (1983) Environmental and educational interventions against diarrhea in Guatemala. In: *Diarrhea and Malnutrition*. Edited by Lincoln C. Chen & Nevin S. Scrimshaw. Plenum Press, New York.

- TUPASI, T. E., MANGUBAT, N. V., SUNICO, E. S., MAGDANGAL, D. M., NAVARRO, E. E., LEONOR, Z. A., LUPISAN, S., MEDALLA, F. & LUCERO, M. G. (1990) Malnutrition and acute respiratory tract infections in Filipino children. *Rev. infect. Dis.* 12, suppl. 8, S1047-1054.
- UNICEF (1990) *The State of the World's Children*. Oxford University Press, Oxford.
- VIELMAN, L. & HURTADO, E. (1986) *Informe Final de la Investigación Etnográfica sobre Algunos Aspectos de Salud y Nutrición Realizada en La Colonia Juarez Guanagazapa*. Unpublished report prepared for the Ministerio de Salud Pública y Asistencia Social de Guatemala, Guatemala.
- VILLATORO, E. & HURTADO, E. (1985) *Informe Final de la Investigación Etnográfica sobre Algunos Aspectos de Salud y Nutrición en Una Comunidad de Huehuetenango*. Unpublished report prepared for the Ministerio de Salud Pública y Asistencia Social de Guatemala, Guatemala.
- WARREN, C. W., MONTEITH, R. S., JOHNSON, J. T., SANTISO, R., GUERRA, F. & OBERLE, M. W. (1987) Use of maternal-child health services and contraception in Guatemala and Panama. *J. biosoc. Sci.* 19, 229-243.
- WEISS, M. G. (1988) Cultural models of diarrheal illness: Conceptual framework and review. *Social Sci. Med.* 27(1), 5-16.
- WELLER, S. C., PACTER, L. M., TROTTER II, R. T. & BAER, R. D. (1993) Empacho in four latino groups: A study of intra- and inter-cultural variation in beliefs. *Med. Anthropol.* 15, 109-136.
- WORLD HEALTH ORGANIZATION (1989) *The Treatment and Prevention of Acute Diarrhoea: Practical Guidelines*. World Health Organization, Geneva.

Appendix

Interview guide (detailed questions shown only for sections 3 and 4)

1. Birth history.
2. Problems and care during pregnancy, delivery, and post-natal period (questions pertain to pregnancy resulting in last live birth).
3. Most recent childhood illness (of child <5 years old).
 - 3.1 What was the last one of your children under the age of 5 years who got sick? What was (s)he sick with? Tell me what happened.
(PROBE:) What else happened?
 - 3.2 How long did this illness last?
 - 3.3 Why do you think your child got sick?
 - 3.4 What did you do to treat/cure your child? Who did you take him/her to?
 - 3.5 Who gave you advice or help during your child's illness? What did this person say or do? Was the advice or help from this person helpful to you? Of all those who gave you advice or help, who gave you the most advice and/or help?
4. Beliefs about health in the community.
 - 4.1 Now I want to talk about something from which children frequently become sick: diarrhoea. Tell me please how one can tell that a child has diarrhoea. Why do children get diarrhoea?
How do you treat/cure children (who get diarrhoea)?
Where do you take them or with whom do you consult when they have diarrhoea?
 - 4.2 We have already talked about diarrhoea. I now would like you to tell me what illnesses of the chest or lungs children (in this community) get.

4.3 Tell me please, how does one know that a child has _____ (interviewer fills in one respiratory illness that the respondent has mentioned)?

Why do children get _____ (respiratory illness)?

How do you treat/cure children (who get this illness)?

Where do you take them or with whom do you consult when they have (respiratory illness)?

5. Social support.

6. Economic situation of the family.

7. Background of respondent.