SANITATION NORMS IN RURAL AREAS: A CROSS-CULTURAL COMPARISON

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An understanding of how people view and practice sanitation is considered essential if action is to be effectively geared toward improvements that will reduce morbidity and mortality from enteric and parasitic diseases. Sample households from rural areas of the Dominican Republic, Puerto Rico, and the southeastern United States are compared for this purpose. The results of the comparison indicate that despite wide disparities, practices of personal hygiene, waste disposal, water utilization, etc. in each of the areas studied could create situations favoring transmission of intestinal parasites and other disease agents.

While the diseases that tend to be epidemic have to a considerable extent been eradicated in the twentieth century, most of the debilitating ones that keep people from doing a full day's work, bring chronic illness to children, and retard the educational process remain largely unaffected. Enteric diseases, along with many of the parasitic ones, are still almost certainly as important contributors to ill health and death as they were a century ago. And most of these conditions are related to sanitation norms—that is, shared standards of behavior in a society that affect the transmission of infectious and communicable diseases.

Preston and Nelson note in their comprehensive study of mortality in 165 nations (1) that diarrheal diseases make for the principal distinction in leading causes of death between non-Western and southern and eastern European populations, on the one hand, and overseas European and northern/western European countries, on the other. They contend that this difference is most likely related to standards of nutrition and personal hygiene, while the improvement of medical care is probably relatively ineffective against the transmission of diarrheal diseases.

By the same token, Wolman notes that enteric diseases are either the first or second cause of mortality and morbidity throughout Central and South America and points out that direct contact with human excreta is clearly a factor in this high incidence (2). Similarly, DuPont insists that environmental sanitation is the most important mechanism for the control of enteric diseases (3). Following the same theme, Araújo Moraes concludes that "virtually all enteric infections can be controlled through personal cleanliness and food hygiene, and their prevalence is profoundly influenced by environmental sanitation" (4).

Orubuloye and Caldwell, attributing the declines in mortality in contemporary developing countries to medical progress, maintain that continued decrease is "not a matter of overcoming ignorance but of providing a sufficient density of health services of a reasonable character" (5). Although this conclusion may be open to some debate, the authors do show that one community with health facilities had lower death rates than another with none.
The inadequate environmental sanitation, sanitary practices, and living conditions confronted by much of the world's population are principal factors leading to high incidences of enteric and parasitic diseases. (Photos: Courtesy of the author.)
Obviously, the programs that are needed to improve health status in third world countries, especially in their isolated rural areas, will be different from those that have worked so well in the urban areas of the industrial nations. An initial step in this direction would be to secure an understanding of the norms of cleanliness and hygiene in different parts of the world.

Research Background

Sanitation norms in three different rural areas in the Western Hemisphere—in the southeastern United States, Puerto Rico, and the Dominican Republic—were recently studied by the Institute of Behavioral Research, University of Georgia, U.S.A., which collaborated with local institutions in the latter two instances.

The idea of a comparative study emerged from a project begun in 1964 which undertook to observe the changes in sanitation norms as a rural area in Georgia, Camden County, experienced rapid industrialization brought on by the building of a large space complex which promised to employ approximately 1,200 scientists and engineers. The basic thesis was that the increased population density resulting from the presence of this plant would quickly result in urban patterns of life. It was posited that in any sparsely populated rural area individuals are obliged to solve their own sanitation problems. The disposal of wastes is a typical example. As the population becomes more dense, however, collective solutions become imperative. It was decided that a study of sanitation norms in transition would provide valuable information, and a research grant was obtained for this purpose.

As the first step, base data were obtained from several hundred families in the county. As a result of the process of investigation, a variety of basic assumptions of the research design were questioned.

The first of these was that changes in sanitation norms are brought by an awareness of the transmission of diseases by vectors such as mice, ants, and flies. It was also assumed that individuals with more education would have a different motivation for trying to control such vectors than would those in the groups with less education. Contrary to expectations, people from the more advantaged socioeconomic groups tended to give as the reason for control such answers as being afraid of cockroaches or being appalled by their presence. At the other extreme, rather large numbers of relatively uneducated individuals specified that it is desirable to control such pests in order to cut disease rates. The less advantaged socioeconomic groups seemed much more conscious of the possibility that these vectors could transmit disease. They also gave other pragmatic reasons for control, such as that insects destroy food and clothing. Thus it appeared that esthetic questions were extremely important in the groups whose level of living was more comfortable, whereas the transmission of disease and the destructiveness of pests were of most concern for persons at the other end of the scale.

Questions were asked about the problems people had had with various pests over the preceding year. There was a tendency for individuals from the less advantaged groups not to comment on the presence of flies, rats, and insects. Their homes were without screens and sewerage. These groups generally had no complaint about the vectors unless they were causing some destruction or pain. People from the more comfortable socioeconomic groups, on the other hand, were inclined to comment on the presence of even a small number of insects or rodents. A similar pattern of answers was observed when comparisons were made about problems with water, garbage disposal, and the elimination of liquid wastes.

Another assumption was that cleanliness and sanitation would be regarded as synonymous. The field work revealed, however, that the concept of cleanliness is
based almost exclusively on visual and olfactory considerations. The microscopic organisms that transmit disease are simply not included in the picture, and the norms of cleanliness may or may not affect them. Consequently, the further study of sanitation norms has distinguished them from those of cleanliness, the latter being reflected usually in the visual absence of things designated “unclean” either by smell or, at times, by esthetic properties.

Also during the early field work it was discovered that many people had facilities in the home to ensure a more antiseptic environment than that which actually existed. Norms influencing sanitation seemed to have been established many years ago. They are not in the realm of “technic-ways” that would be associated with knowledge of the germ theory of disease. Certain sanitation norms persist that are dysfunctional for the health of the population. Many will recall that in the United States the farm family of the past obtained drinking water from a bucket and that it was consumed from a communal dipper. The study showed that people who had been accustomed to a communal dipper did not automatically, once the house had piped water and a sink, start using individual glasses each time a person got a drink. In many of the homes that were studied there was a communal glass used by all the members of the family. Similarly, in school those children who were accustomed to washing their hands in a basin tended to plug the hole in the school bathroom sink, fill it with water, and then lather their hands, while those who had been reared with modern plumbing generally washed their hands under a running stream of water.

There were also numerous individuals who had recently had toilets installed in their homes but had not yet become accustomed to using them. Men, especially, were inclined to continue to respond to nature at the edge of the fields or in an old privy that remained near the home. One man, for example, said that he just did not feel comfortable responding to nature in the house; the idea was “unclean” to him and he felt compelled to get away from his living quarters. Thus attitudes do not change immediately or completely with urbanization or with industrialization.

Methodology

The preliminary findings showed that changes in sanitation practices and norms were much more complex than it had been assumed. The survey instrument was therefore extensively revised. Additional field work was done in Camden County. Twenty per cent of all households were asked questions about the source of water, the storage and use of water in the home, the disposal of both solid and liquid wastes, personal hygiene, and other sanitation practices, problems, norms, and values. Later the identical questions were asked in surveys in both the Dominican Republic and Puerto Rico. The present analysis is based on the replies from these three investigations.

Although all three surveys were conducted among rural populations which are considered representative, the sampling procedures varied. In Camden County every single existing structure was mapped and its characteristics noted in a ledger. The sample, taken in 1965, was obtained by systematically selecting every fifth occupied dwelling on the list. The Puerto Rican survey was based on a 5 per cent cluster sample of all the homes in three municipios (subdivisions comparable to counties in the United States). The three municipios were selected because each was considered by agricultural experts to be typical of one of the three major agricultural areas of the country: sugarcane, tobacco, and coffee. The Dominican survey was based on a three-stage cluster sample of the rural areas of the entire country. There were 21 sample
areas allocated to provinces based on the percentage of the nation's total rural population in each. Twenty-one municipios were then randomly drawn within the selected provinces. Finally, five clusters of 10 homes each were randomly selected within each municipio. On the basis of these respective procedures 400 schedules were secured in Georgia in 1965, 800 in Puerto Rico in 1966, and 2,100 in the Dominican Republic in 1967.

Analysis of the Data

Water Supply

The contrasts in the sources and uses of water among the three study groups were extremely great. Surface waters dominated in the Dominican Republic; piped water was most common in Puerto Rico, although often obtained from surface waters; and piped water from ground sources was the norm in Camden County. Nevertheless, in both the latter areas there were still families that carried their water from unsafe streams and surface wells.

In the rural Dominican Republic the vast majority of the people (74.8 per cent) secured their water from some river or other surface source. There were public spigots in the towns and in some of the villages, but the ultimate source was often an untreated stream. Only 54 of the 2,043 families (or about 2 per cent of the population) reported having piped water in the home itself. Thus there were very few people living in the countryside whose water source could really be guaranteed as safe. On the other hand, the rural population in the Dominican Republic tends to be rather sparse, and with such a low density flowing water may perhaps be relatively safe at a given time.

Water can also be contaminated in the process of transporting it to the home or while it is stored there. In the rural Dominican Republic over three-fourths of the people said that they carry their water from a great distance. The pattern is for the woman of the house to go to the stream with a five-gallon can, fill it with water, and carry it back to the home. It is stored in a large clay jar and replenished as needed. Both the can in which the water is carried and the jar in which it is stored are subject to pollution. If the earthen jar, for example, contains microscopic organisms, they would remain for a long period of time and could generate much illness until individual resistance is built up. A great deal of parasitic infection has been estimated to exist in the Dominican Republic, although the precise incidence of the parasites has been impossible to determine in the absence of specific surveys on the subject.

Puerto Rico's rural population, on the other hand, reported that its water often is obtained from public faucets but the majority have it piped into the home (65.8 per cent). Since the population of Puerto Rico is much more dense than that of the Dominican Republic, and since there is a problem of contamination with the snail intermediate hosts of schistosomiasis, the streams are generally unsafe. As for storage, large barrels, milk cans, or five-gallon lard cans are preferred in Puerto Rico.

The situation in Camden County was quite different. There, 75.2 per cent of all the homes had piped water, even in the rural areas where the farms frequently have private systems. In the latter case the water usually came from deep wells, often artesian. With an artesian well relatively safe water can be had in the home on a permanent basis at quite low cost. There were also water systems in the three major population centers of the county which supplied a considerable percentage of the population. They are chlorinated, and hence the water is comparatively safe. Those homes in Camden County that did not have piped water tended to keep their supply in a bucket; also, some had a hand pump by the kitchen sink.
Personal Hygiene

In all three of the societies studied, cleanliness was a strong positive value. Almost all respondents in the three samples stated that they took a daily bath. However, there was considerable variation among the norms in regard to bathing, in part because of the facilities available. In Camden County 77.4 per cent of all the homes had a bathroom with a tub and a shower. In Puerto Rico 42.2 per cent of the homes had a shower only; 19.4 per cent had both a shower and a bathtub. In the Dominican Republic 66.4 per cent of the families said that they bathed in a metal tub or smaller container in the home and 31 per cent that they used a river or a stream; only 2.5 per cent had a bathtub or shower.

In both Puerto Rico and the Dominican Republic bathing consisted primarily of rinsing the body with cold water, soap often being omitted. There was also an almost complete absence of hot water for bathing in the Dominican homes, even in the urban areas where there were plumbing facilities. In Georgia, on the other hand, bathing was generally done in a bathtub, where the person used soap and hot water. Residents of the Dominican Republic and Puerto Rico, regardless of income level, very much preferred the shower to the bathtub; they felt that bathing in a tub is unclean and could not understand how a person would want to sit in water that contains dirt from his own body. In the rural Dominican Republic, where bathing was often reported to be done in the river, the differential modesty of males and females made for distinct practices. Sometimes the female would put soap on her body before going to the river, take her bath wearing a dress, and let the soap be washed off by the current of the water.

Both in the Dominican Republic and in Puerto Rico the people said they might bathe several times a day to remove accumulated dust or to cool off. In the Dominican Republic a large percentage of the rural population went without shoes. This was also true of many children in Puerto Rico. It was common in such circumstances for the person to rinse the dust away from his feet before going to bed at night. This custom was very much enforced in homes that used linen on the beds. In the rural Dominican Republic, however, a large percentage of the people slept on the bare bed springs or on a mattress without sheets. Hence there were no linens to soil, and washing the feet before bedtime might be ignored.

The cultural definition of cleanliness in the Dominican Republic and Puerto Rico appeared to be measured more in visual terms than in Camden County.

Liquid Waste

Because water that has been used for washing clothes or dishes or for bathing is often contaminated, public health practices would call for it to be disposed of in such a way as not to pollute water supplies or otherwise permit diseases to be transmitted.

In Camden County 80 per cent of the homes were connected to septic tanks or sewers, including some lines that drained into streams. Thus, only 20 per cent of the families had water to be discarded after bathing, washing dishes, or other household activities. The customary practice was to throw these wastewaters in the yard around plants. The water left over from the washing of clothes presented very little problem, since most families with plumbing had automatic washing machines (74.6 per cent). Those who did not were generally accustomed to go to a laundromat.

Questions were asked about the disposal of water after various uses in the Dominican Republic and Puerto Rico. In answer to "What do you do with wastewater from washing dishes?" 26.7 per cent in the Dominican Republic and 15 per cent in Puerto Rico said that they give it to the ani-
mals. Many considered that it contained nutrients of value, especially for pigs. Although this question was not asked in precisely the same form in Georgia, it may be noted that 73.2 per cent of the population had a kitchen sink or automatic dishwasher. It is almost certain that when dishes were washed in the sink the water drained into the septic tank or other lines. Only 1 per cent of the rural Dominican families disposed of dishwater in sewer lines or septic tanks, compared with 23.4 per cent in the Puerto Rican sample. The Dominicans who did not give the dishwater to animals threw it in the yard. Over one-fourth of the Puerto Ricans (27.7 per cent of the sample) who did not have plumbing also disposed of their water in this way. Nearly one-third (31.7 per cent) of the people threw the water into drainage ditches. Such drainage ditches seldom exist in rural Dominican villages.

With regard to water from clothes, 62.7 per cent of the Dominicans said that it flowed on downstream. Of those who washed their clothes at home, most simply threw the wastewater into the yard, as they did with what was left over from bathing.

The pattern in Puerto Rico was similar, except that only about 17 per cent washed clothes in a stream or aqueduct. A few more threw both bathwater and laundry water into drainage ditches rather than into their yards. There were practically no reports of wastewater being used to irrigate plants.

Garbage

In Georgia a large percentage of the sample indicated that scraps for meals were thrown away and hauled off by the garbage collector. This answer was almost universal among the people who lived in towns. Those who resided in rural areas and were in the lower income brackets said that their scraps were fed to the animals (31.2 per cent). Other methods, used by 19 per cent of the respondents, were to burn the garbage, haul it to a dump, or throw it in the woods, a swamp, or a stream.

In the Dominican Republic sample the situation was very different. Food was simply not thrown away. People tended to eat everything in the house. Many were too poor to have scraps to feed to pigs or chickens. It was common in this rural area to give away any food that remained from a meal. Food left on a plate by one person might readily be consumed by others. In fact, these people ate many things that would be discarded in Georgia or in Puerto Rico. Only 15.4 per cent of the respondents in the Dominican Republic indicated that they disposed of food scraps by burning, burying, or some other nonfunctional method. Over half (57.1 per cent) gave table wastes to animals, but 27.5 per cent insisted they had no leftovers at all. About one-third of this latter group, if they had any table scraps, gave them to children, neighbors, or others.

In Puerto Rico, on the other hand, only 1.9 per cent of the interviewees stated that they had no leftovers from meals. Some 20 per cent disposed of them as waste, but most (78.4 per cent) fed them to animals, especially pigs.

Solid Waste

The differences in volume of solid waste were striking. The urban part of Camden County, typical of modern industrial society, was faced with growing quantities of cans, paper, bottles, and boxes to dispose of. At the other extreme, such packaging materials were very scarce in the rural Dominican Republic: for example, in the stores the only item used for packaging was a small sheet of paper in which beans, rice and a few other commodities were wrapped. The situation in Puerto Rico was somewhere between the two extremes: in urban supermarkets wrappings and containers were provided as in the United States, but in the more rural areas one was expected to
bring one's own sack, bottle, etc., to be filled at the store. Certainly the rural, less industrialized areas enjoy the advantage of a relative lack of solid waste.

Sanitation Problems

Another series of questions had to do with problems of the respondents over the preceding year which would have some relevance for health. "During the last year have you had any problems with the water supply?" met with an affirmative reply from nearly 36 per cent of the interviewees in the Dominican Republic as compared with about one-fifth of the respondents in Puerto Rico and Georgia. There were great differences however, in what was considered to be a problem. Whereas in the Dominican Republic there were people who carried water two miles from a river in a five-gallon can and yet felt they had no problems, in the Georgia sample many of the complaints were simply that the water pressure was not as adequate as it should have been. In Puerto Rico there were reports of the water not being clean and perhaps having germs, but the main consideration was that water was not always available. The lines simply failed to function during part of the year. As can be seen, there were differences among the three areas as to what was perceived to be a problem.

In response to "Have you had problems with rats in the house in the past year?" 67 per cent of the Dominican Republic sample answered "yes," compared with 46 per cent in Puerto Rico and 24 per cent in Georgia. Here again there appeared to be differences in regard to what the problem was. Upon being asked to expand on their answer, the respondents in Puerto Rico and the Dominican Republic often explained that there were "too many," the assumption apparently being that a few rats were just a part of life and that only in large numbers were they cause for concern. By contrast, for the Georgia sample any rat in the home was a source of consternation.

In regard to mosquitoes, a considerable proportion of the persons interviewed in the Dominican Republic and in Puerto Rico stated that they had a problem, while in Georgia the percentage was not so great. The main complaint given in the former two samples was that there were too many of them. In Georgia, on the other hand, it seemed to be the presence of any mosquitoes in the home; those outside the dwelling were apparently not regarded as a problem. It may be noted that most of the homes in Georgia had screens, whereas relatively few of them did in Puerto Rico and practically none of them did in the Dominican Republic. In some areas of the Dominican Republic there are few if any mosquitoes, but in other parts of the country there are great numbers and most people sleep with nets over their beds. It was simply assumed that nothing could be done to keep them out of the house.

Cockroaches were considered to be a problem much more often in Puerto Rico than in Georgia, with the Dominican Republic somewhat intermediate. But again, in Georgia any cockroach in the home was cause for complaint, whereas in Puerto Rico and the Dominican Republic these insects were accepted as a part of life until their numbers increased.

Another question had to do with flies. The proportion of respondents stating they had a problem was somewhat less than 45 per cent in Georgia, as compared with slightly over 50 per cent in both Puerto Rico and the Dominican Republic. In all three areas there are many houseflies and the summer climates are quite similar.

The final question was about ants. Slightly over one-third (35.6 per cent) of the people in the Dominican Republic said that they had had a problem. This figure contrasted with 17.0 per cent in Puerto Rico and 26.7 per cent in Camden County. These responses evidently reflected some differ-
ences as to when the presence of ants was perceived as a problem.

Reasons for Control

Questions were asked in the three surveys about the reasons for controlling vectors in the household. Nearly one in five of the Georgia respondents (18.7 per cent) said they wanted to control flies, mice, mosquitoes, and ants because they were unclean. The comparable answer was given by only 1.5 per cent of the respondents in the Dominican Republic, Puerto Rico again being intermediate with 6.2 per cent. The percentages of people saying "because they are unsanitary" presented fewer differences (46 per cent in Georgia, 44.4 per cent in Puerto Rico, and 32 per cent in the Dominican Republic). One reason which was mentioned a great deal in Puerto Rico was that these vectors are destructive. It would appear that as the level of living declines and control becomes more difficult, cockroaches, mice, ants, flies, and mosquitoes become more of a problem because they destroy food, clothing, and other items that a poor population can ill afford to lose. However, by far the most prevalent answer in the Dominican Republic was that they are "bad" without further specification. Other people, especially in Georgia, expressed an antipathy toward all insects and rodents because they were afraid of them or thought they were ugly. These esthetic reasons seemed to increase as the level of education rose. In fact, the more advantaged the socioeconomic status within the Georgia sample, the more the concerns were focused on esthetic reasons rather than ones related to disease or destructiveness.

Infant mortality has been considered the best index of the health of a population. The death rates for children under one year in the three countries of the samples under study are therefore of interest. The figure for the Dominican Republic as a whole was 49.2 per 1,000 live births (7) in 1971, but the rate would undoubtedly be higher in the rural parts of the country. In the same year infant mortality was 28.9 per 1,000 live births for the municipios surveyed in Puerto Rico and 22.9 for the rural portions of the nonmetropolitan counties of Georgia. Infant deaths from diarrhea and other enteric diseases likewise showed a wide range in the three countries in 1973: 661.1 per 100,000 live births in the Dominican Republic, 175.8 in Puerto Rico, and 22.0 in the United States (8).

Almost certainly, sanitation practices are a major factor in these differentials. Consequently, further improvements in mortality in a developing nation would appear to be conditioned upon changes in sanitation and personal hygiene practices within the individual household. The expansion of medical facilities cannot be truly effective in reducing the death rates in the absence of changes in sanitation. Additional insight into variations in the attitudes that govern the practices of sanitation is essential for the establishment of new programs.

The germ theory of disease is less than a century old. Without such knowledge, why should isolated rural people have traditional norms for protection against bacteria and other microscopic organisms?

Another factor that is very important in sanitation norms and contributes to both morbidity and mortality is the general philosophy, especially prevalent among less advantaged groups, that there should be no waste. Water, food, and other items are used to the fullest. For example, in the absence of modern plumbing, water is carried to the home from a well or stream at considerable physical effort. After it is used for washing dishes, bathing, or cooking, it is often saved and put to still another functional use around the home. Dishwater is fed to the hogs; laundry water may be poured onto a garden plot. Similarly, food scraps are fed to chickens or other animals. Occasional
newspapers or magazines are used to start fires.

Norms affecting sanitation tend to have a functional basis other than disease control. For example, a pattern of sweeping the yard, permitting no vegetation to exist in the vicinity of the dwelling, has been common in the southern United States and continues today in Puerto Rico and the Dominican Republic. Daily the housewife takes a homemade broom and sweeps the dust away from the vicinity of the dwelling. Much of the sweeping is done to avoid dust being tracked into the home. At the same time, the destruction of vegetation near the home is intended to keep away snakes, ants, and other pests.

There is a great deal of concern these days about air pollution, and the burning of waste products is discouraged. However, the burning of scraps of wood and other organic debris that accumulate around the home or in the fields has been the only effective means of disposing of such wastes. Also, fields are sometimes cleared by fire in order to ready them for cultivation.

Conclusions

A basic perspective is needed for viewing sanitation and its relationship to health among the rural populations of the world, especially those in the developing countries.

To begin with, sanitation practices are normative. Western civilization has tended to consider personal hygiene an extremely private matter. As a result, the topic is seldom broached in conversation and few studies have ever been made of sanitation practices. Yet the fragmentary data that are available demonstrate that each society has its own customary procedures for bathing, the disposal of human waste, and other aspects of personal hygiene. In addition, there are norms covering the washing of clothes and dishes, the storage and use of water, etc. Another important factor in the understanding of sanitation norms is that cleanliness tends to be defined visually. If something appears clean, it is clean. Thus it often happens that the perception of sanitation problems is more important to people's behavior than what actually exists.

Improvements in housing do much to resolve the conditions which permit the transmission of communicable diseases by various vectors. Such features as piped water, refrigerators, flush toilets connected to adequate sewerage systems, automatic clothes washers and dishwashers, and facilities for the collection of garbage and solid waste all aid in preventing the spread of disease. Yet sometimes there are carryovers from the days when individuals had to cope with their own sanitation problems, and these patterns can work against the attainment of good health.

The cross-cultural comparison reported above shows that in the rural areas there were practices of personal hygiene, waste disposal, water utilization, etc. which could ultimately create situations conducive to health problems associated with intestinal parasites and endemic diseases.

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SUMMARY

Mortality rates have sharply decreased throughout the world in the twentieth century. While the communicable diseases that had been the principal killers of mankind have been largely brought under control, the enteric and other diseases, which are directly related to sanitation practices, have not been affected. Improvement in health status in the developing nations, especially in isolated rural areas, will hinge on changes in sanitation norms. Modification of these norms must be based on an awareness of what they are and of the values that are associated with them.

Sanitation norms in rural areas of three countries—in the southeastern United States, Puerto Rico, and the Dominican Republic—are reviewed on the basis of a study in which essentially the same survey instrument was used in the three samples. Sanitation norms relating to the source of water and storage for household use are compared, as are personal hygiene practices and patterns for the disposal of liquid wastes, garbage, and other solid wastes. Selected attitudinal values are also examined.

REFERENCES


