

CONSENSUS THEORY MODEL OF AIDS/SIDA BELIEFS IN FOUR LATINO POPULATIONS

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To describe Latino beliefs about AIDS (SIDA), Latino adults were sampled at two U.S. sites (Connecticut and Texas) and two international sites (Mexico and Guatemala). A 125-item questionnaire covered risk factors, symptoms, treatments, and sequelae of AIDS. The cultural consensus model was used to determine the cultural beliefs for each sample. Responses from 161 people indicated that a single set of beliefs was present at each site and that beliefs were shared across sites. Comparison of answers between samples indicated high agreement ($p < .0007$). The proportion of shared beliefs, however, decreased significantly between samples: .68 in Connecticut, .60 in Texas, .51 in Mexico, and .41 in Guatemala ($p < .05$). The proportion of positive answers similarly decreased from Connecticut to Guatemala ($p < .001$). Beliefs were stronger and more detailed in the higher prevalence areas. Furthermore, Latino beliefs tended to converge on biomedical beliefs about the disease.

AIDS/SIDA continues to be an intractable public health problem, disproportionately affecting minorities. Additionally, national surveys of knowledge, attitudes, and practices (KAP) in the United States indicate that Hispanics tend to score lower on knowledge tests about AIDS (Biddlecom & Hardy 1991; Hardy & Biddlecom 1992; Schoenborn, Marsh, & Hardy 1994). Given the paucity of published descriptions of Latino "explanatory models" of AIDS, it is unclear whether they may have beliefs about AIDS that differ from the biomedical model. An explanatory model (Kleinman, Eisenberg, & Good 1978) is a person's beliefs about how a disease is caused, how it affects the body, and how it may be treated. Kleinman and colleagues proposed that when individuals and health care providers have different "explanatory models" of a disease, compliance (and in this case, perhaps safe behaviors) may be reduced. Thus in

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this study we collect data regarding the perceived risks/causes, symptoms, treatments, and sequelae of HIV/AIDS to describe Latino explanatory models about AIDS. An alternative, but complementary, approach to a standard KAP or knowledge test approach is used, namely the cultural consensus model (Batchelder & Romney 1988; Romney, Weller, & Batchelder 1986), in order to obtain a systematic and quantitative assessment of Latino beliefs about AIDS.

KAP surveys have been used since the beginning of the AIDS epidemic to determine the level of awareness in the public and in at-risk populations. They are commonly administered in the form of true-false questions about beliefs, perceptions, misconceptions, and attitudes that individuals hold towards HIV transmission and AIDS. Test content has evolved through time as additional information has become available, although core questions have tended to remain relatively constant. Survey results have been used to describe both general (Hardy, 1990; McCaig, Hardy, & Winn, 1991) and special population segments such as adolescents (Anderson & Christenson, 1991; DiClemente, Lanier, Horan, & Lodico, 1991), college students (DiClemente, Forrest & Mickler, 1990; Dorman & Rienzo, 1988), gay men (Richardson, Schott, McGuigan & Levine, 1987; Rotheram-Borus & Koopman, 1991; St. Lawrence, Hood, Brasfield, & Kelly, 1989), injection drug users (Calsyn, Saxon, Freeman, & Whittaker, 1992; Feucht, Stephens, & Gibbs, 1991; Longshore, Hsieh, & Anglin, 1992), and minority populations (Arrufo, Covedale, & Vallbona, 1991; Flaskerud & Uman, 1993; Hall, Wilder, Bodenroeder & Hess, 1990; Marin & Marin, 1990; Nyamathi, Bennett, Leake, Lewis, & Flaskerud, 1993; Johnson et al., 1992; Thomas, Gilliam, & Owrey, 1989). Studies demonstrate a steady growth in knowledge, in the United States and elsewhere, as infection rates increase and the public is made aware of the risks of HIV transmission. Increases in knowledge scores, however, have not always been associated with reductions in risk-taking behaviors. There is a growing impression that these tests may have lost their utility for many populations, due to the high level of correct answers. At the same time, many HIV prevention programs use the tests to assess knowledge and to help target specific individuals and groups.

An additional limitation of a knowledge-testing approach is that responses are scored as "correct" or "incorrect," and respondents' knowledge is described in terms of *deviance from* the biomedical model. The model, then, is a deficit model in which errors can be identified, but it is not possible to distinguish between errors that are due to a lack of biomedical knowledge and those that are due to different *cultural beliefs*. For example, many Latinos share the belief that "walking upon a cold floor while barefoot" can cause a cold (Baer et al., 1999). While this belief is biomedically incorrect, it is part of a larger belief system where illness is believed to be the result of an imbalance in humoral (hot and cold) elements.

Obtaining a more accurate description of group beliefs or norms may help overcome some of the theoretical and practical weaknesses in existing KAP tests and may aid in the development of public health interventions designed to modify beliefs and practices. Beliefs are best estimated with an aggregation of informants' original, unrecoded responses, for example, the modal responses. A simple aggregation or majority response, however, may mask the presence of *multiple* underlying patterns of beliefs. If only one set of beliefs is present in a community, it is possible that a single health message or type of intervention may be effective for the group. With multiple belief systems or subcultures, a different strategy may be needed. Another complication is that groups vary in the *strength* of their beliefs,

and the strength of beliefs may affect group receptivity to new or different information.

Consensus theory provides estimates of the likelihood that a single belief system is present, what the group beliefs are, how much each respondent "knows" or corresponds to the group beliefs ("cultural competency"), and the overall "strength" of beliefs in the group. A cultural consensus analysis can identify items that are part of a group's beliefs, but does not assess performance in terms of biomedically correct answers. With the cultural consensus model, answers are assumed to be unknown and the objective is to find out what they are (respondents' beliefs). This model has been used successfully to assess beliefs about malaria (Ruebush, Weller, & Klein, 1992), causes of breast and cervical cancer (Chavez, Hubbell, McMullin, & Mishra, 1995; Chavez, Hubbell, McMullin, Martinez, & Mishra, 1995), psychiatric diagnoses (Fabrega, Ahn, Boster, & Mezzich, 1990), respiratory symptoms (Pachter, Niego, & Pelto, 1996), folk illnesses (Weller, Pachter, Trotter, & Baer, 1993) and interpretation of X-ray results (Weller & Mann, 1997). In this study, consensus modeling is used to describe Latino beliefs about AIDS. To represent some of the diversity among Latinos, four populations of Latinos are studied. The beliefs of each group are examined to see the extent to which there is a shared set of beliefs about AIDS, and then the similarity and differences in beliefs across the diverse groups is assessed.

METHOD

SETTING

The populations selected for study were Puerto Ricans in the northeastern United States, Mexican Americans on the U.S.-Mexican border, Mexicans in central Mexico, and Guatemalans in rural Guatemala. The four sites were selected for their diversity in rural/urban residency, educational level, and contact with U.S. culture. Hartford, Connecticut (1990 pop. 139,739), is a major industrial and commercial center, and roughly one third of the population is Puerto Rican. Edinburg, Texas (1990 pop. 29,885) is primarily a Mexican American community and is located on the Mexican border in the Lower Rio Grande Valley. The region is intermixed urban and rural, producing agricultural and petroleum products, and includes one of the three poorest standard metropolitan statistical areas in the United States. Guadalajara, Mexico, (1980 pop. 2,178,000) is a modern industrial city and agricultural center, the capital of the state of Jalisco, and the second largest city in Mexico. Residents are from both rural and urban backgrounds and are primarily mestizo (mixed ancestry, Spanish speaking). On the Pacific coastal plain of Guatemala, in the department of Esquintla, four small rural communities (pop. 500) were selected, because they are typical of the conditions of half the Guatemalan population. Residents are Spanish speakers of mixed European-Mayan Indian descent (*Ladinos*) and support themselves with wage labor on sugarcane and cotton plantations.

INSTRUMENT DEVELOPMENT

Data collection took place in two stages. Initially, open-ended semistructured interviews (Weller & Romney, 1988) were conducted at each of the four sites to identify locally perceived risk factors, symptoms, treatments, and consequences of AIDS. Responses from convenience samples of approximately 20 individuals at each site were

used to construct a culturally appropriate instrument. A preliminary questionnaire was drafted with 135 yes-no questions. Questions covered the content of the initial interview responses, other locally recognized illnesses, and a broad range of symptoms (Brodman, Erdman, & Wolff, 1949; Finkler, 1981). Interview materials were translated into Spanish appropriate for each site. Items exhibiting back translation problems were modified or omitted. The final questionnaire contained 125 items: 40 questions on risk factors, 60 questions on symptoms, and 25 questions on treatments and sequelae. In addition, respondents were asked about age, gender, and personal experience with AIDS. The study protocol was approved by the University of Texas Medical Branch Institutional Review Board.

PROCEDURE AND PARTICIPANTS

The belief questionnaire was administered to representative samples at each of the four sites. A multistage, random-sampling strategy was used to select households in each community. In Hartford, Connecticut, the five census tracts with the majority of the Puerto Rican population were selected. Then a simple random-sampling process was used to select streets, blocks, and housing units. In Edinburg, Texas, census tracts were used to sample from the entire city by selecting tracts, blocks, and then households. In Guadalajara, Mexico, three neighborhoods (middle class, working class, and lower class) within a single public health service area were chosen for a study. Blocks and then households were selected within each neighborhood. In Guatemala, an equal number of households were selected from each village by approaching every second to fourth household, depending on the size of the village.

Only adult Latinos who had heard of AIDS were interviewed. At the two U.S. sites, individuals had to self-identify as Latino (Puerto Rican in Connecticut and Mexican or Mexican American in Texas) and could respond in Spanish or English. Local interviewers were used at each site. A target or quota sample of 40 households was designated at each site. (In Edinburg, 41 locations were selected in case one location was nonresidential). If a selected household was not at-home, did not meet inclusion criteria, or declined participation, then a neighbor was substituted. A conservative sample size calculation based upon a relatively low level of agreement (.50 average cultural competency level), high accuracy (.95 of answers correct), and a high confidence level on classified answers (.999 Bayesian posterior probability) indicated that a minimum sample size of 29 per group would be necessary (Batchelder & Romney, 1988).

ANALYSIS

A cultural consensus analysis (Batchelder & Romney, 1988; Romney et al., 1986) was used to determine if a shared set of cultural beliefs was present and then provide an estimation of those beliefs. Consensus analysis provides a means to evaluate the concordance among respondents and to optimally aggregate their responses. Given a series of questions on a single topic, each individual's "cultural competency" regarding the set of questions is estimated and then, the competency scores are used to "weight" the responses and obtain a Bayesian confidence level for each answer.

Cultural competency scores are extracted from an interrespondent similarity matrix, similar to a factor analysis of people. In contrast to significance tests for concordance, where agreement is compared to chance or no agreement, a more stringent "test" is used, namely whether there is only a single response pattern. Goodness-of-fit criteria are used to determine if the model fits the data, that is, that there is a single fac-

tor or single response pattern across respondents (the ratio of the first and second eigenvalues $\geq 3:1$). Answers to the questions are obtained by calculating the Bayesian posterior probability that an answer is "yes" (and that the answer may be "no") given the pattern of responses across respondents and their individual competency scores. For example, an answer of "yes" classified at the .999 confidence level would mean that with .999 certainty the culturally correct answer is "yes." Thus the model: (a) assesses the concordance among respondents; (b) if and only if a single response pattern is present, then the model provides estimates of the culturally appropriate answers or norms for the questions; and (c) estimates how much each respondent knows or shares the group beliefs or norms (cultural competency scores). The average competency for a group of respondents provides information about the strength of beliefs in a group.

In this study, similarity between response profiles was measured with covariance and a conservative .999 confidence level was used to classify items as "yes" or "no" for each sample (Borgatti, 1990). Differences in competency scores by sociodemographic subgroups were tested with analysis of variance (and nonparametric tests) for categorical variables and with Pearson correlation coefficients for interval-scaled variables (Norusis, 1990). Answers were compared between samples with Kappa coefficients (Norusis, 1990).

RESULTS

One hundred sixty-one individuals were interviewed. Response rates varied from 65% in Texas to 77% in Connecticut, 88% in Mexico, and 95% in Guatemala. No one was encountered that had not heard of AIDS. Individuals with more than 10% missing data were dropped from the analysis (one from the Mexican sample and seven from the Connecticut sample). A question concerning the use of intravenous dextrose solution as a possible treatment also was dropped because of missing data. The question was retained only for the Guatemalan analysis, since it is an occasional rural Guatemalan practice. These results focus on the responses of 153 individuals to 124 questions about beliefs and sociodemographic variables.

Respondents in all four samples tended to be female and in the same age range, averaging about 38 years (Table 1). Family size and educational levels differed across sites. The majority of the Texas sample was born on the U.S. mainland (76%), whereas few (18%) of the Connecticut respondents were born there. The rate of "acquaintanceship" with someone with AIDS increased from Guatemala, to Mexico, to Texas, to Connecticut. Each of the U.S. samples had an individual with AIDS. In Connecticut a 44-year-old male with five children and in Texas a 22-year-old female with one child reported having AIDS. In the Mexico sample two women reported having AIDS, but since they were 76 and 83 years old it is more likely that they misunderstood the question.

Analysis indicated that relatively homogeneous beliefs existed at each site. The cultural consensus model goodness-of-fit criteria indicated that the model fit each data set: The ratio of eigenvalues exceeded the recommended 3:1 ratio (8.7 in Connecticut, 6.1 in Texas, 9.1 in Mexico, and 3.5 in Guatemala). Since cultural competency scores range between 0 and 1 and may be interpreted as the proportion of *shared* beliefs, the highest average level of shared beliefs and the most homogeneous responses about AIDS were in the two U.S. samples: .72 ($SD = .08$) in Connecticut and .62 ($SD = .10$) in Texas. Responses were more heterogeneous in Mexico ($M = .55$, SD

Table 1. Characteristics of Respondents at All Sites

Site	Guatemala	Mexico	Texas	Connecticut
Sample Size	40	39	41	33
Females	85%	100%	100%	52%
Age	38.5	40.1	38.6	36.7
Average number of children	2.9	4.8	2.2	3.0
Average household size	5.4	4.9	3.7	3.3
Average education (years)	1.3	6.7	10.3	9.8
Knows someone with AIDS	13%	13% (8%)*	39%	67%
Has a family member with AIDS	0%	8% (3%)*	15%	18%
Respondent has AIDS	0%	5% (0%)*	2%	3%

*Revised estimate minus the two cases that may be in error. See text for further explanation.

= .14) and in Guatemala ($M = .48$, $SD = .12$). Analysis with all respondents together showed that the four samples shared beliefs regarding AIDS ($M = .55$, $SD = .11$). The average competency level was significantly different among samples (Kruskal-Wallis, $p < .00005$) and decreased significantly between samples from Connecticut to Guatemala (Scheffe's test, $p < .05$).

A comparison of cultural competency scores with other variables indicated that beliefs tended not to vary by sociodemographic subgroups within each sample. The one exception was that younger respondents tended to know more of the cultural beliefs than did older respondents. In the Mexican sample younger age was associated with greater cultural competency ($r = -.54$, $p < .0001$) and in the Connecticut sample younger people ($r = -.38$, $p < .05$) and those with fewer children ($r = -.36$, $p < .05$) had greater competency. In fact, the two "AIDS cases" in the Mexican sample (72 and 83 year old) had the lowest competency scores (Mann-Whitney two-tailed test, $p < .005$), perhaps indicating that they were the least reliable respondents. In the Guatemalan and Texan samples, none of the sociodemographic variables was associated with cultural competency. Additionally, none of the acculturation variables (birthplace and language of interview) in the U.S. samples was associated with the degree of cultural competency.

Although the four samples were found to have similar beliefs overall, we conducted a detailed comparison of the answers from each sample. The answer to each question was classified as "yes" or "no" at the .999 confidence level or was unclassified. There was a strong similarity between samples in the classification of answers. Agreement, however, was highest between geographically closer samples: Connecticut and Texas had 76% identical answers ($kappa = .56$, $p < .0005$), Texas and Mexico had 74% ($kappa = .50$, $p < .0005$), and Mexico and Guatemala had 77% ($kappa = .56$, $p < .0005$). The lowest agreement occurred between Connecticut and Guatemala (63% matching answers, $kappa = .35$, $p < .0007$). The proportion of positive answers was significantly different across samples ($p \leq .001$), and decreased significantly between samples from Connecticut to Guatemala ($p \leq .0002$). Of the 124 items, 44% were classified affirmatively in Connecticut, 31% in Texas, and 23% in the Guatemalan and Mexican samples. When all four samples were analyzed together, 32% of answers were positive.

As would be expected, agreement between samples varied on some specific aspects of AIDS. Agreement was very high regarding risk factors for AIDS. Of 40 questions, 90% (36/40) had identical answers across at least three samples, and 73% (29/40) were identical across all four samples (Table 2). Sexual transmission, multiple

Table 2. Risk Factors Agreed Upon Across Sites

Affirmative Response	Negative Response
Can you get AIDS from sexual relations?	Can you get AIDS from wearing the clothing of an infected person?
Should you have sexual relations with only one person to avoid AIDS?	Can you get AIDS by being near someone who has it?
Should you avoid sexual relationships outside of the home (with bar girls, or people on the street) to avoid AIDS?	Can you get AIDS from a public bathroom? ^a Can you get AIDS by swimming in a public pool? ^a Can you get AIDS from kissing?
Are people who have many sexual relationships more susceptible to becoming infected with AIDS?	Is AIDS caused by parasites? Can drinking unboiled water cause AIDS? Can you catch AIDS from a mosquito bite?
Can you get AIDS from having sexual relations without a condom?	Does AIDS occur mainly in women? Is AIDS inherited? ^a
Are homosexuals more likely to get AIDS?	Can living in an unclean house cause AIDS?
Are prostitutes more susceptible to getting AIDS?	Can AIDS be caused by dirty air or air pollution?
Can you get AIDS from a prostitute?	Can drinking too much alcohol cause AIDS?
Can unborn children be infected with AIDS?	Can you get AIDS from eating spoiled food?
Should you avoid using injection needles or syringes used by another person?	Can AIDS come from eating a poor diet? Does lying cause AIDS?
Should you avoid contact with the blood of a person with AIDS?	Can AIDS be caused by drinking/eating icy things when one is sweating?
Can you get AIDS from a blood transfusion?	Can AIDS be caused by taking a bath while one has the cold/flu?
Can getting a tattoo give you AIDS? ^a	Can <i>susto</i> cause AIDS?
Does AIDS come from a virus ^a	Can <i>mal de ojo</i> cause AIDS?

^aAgreement among Connecticut, Texas, and Mexico samples only.

partners, and high-risk groups (homosexuals and prostitutes) are implicated in the cause and spread of AIDS as is contact with contaminated blood and syringes. All four samples believed that AIDS can be contracted from a blood transfusion. (The Mexico and Guatemalan samples also reported that you can become infected by *donating* blood.) The Connecticut, Texas, and Mexico samples believed that a virus causes AIDS and that tattooing can be a source of infection. AIDS is not thought to be spread by casual contact (being near someone who has it or wearing the clothes of an infected person). The Connecticut, Texas, and Mexican samples also believed it is not spread by using public bathrooms or public swimming pools. In addition, it is not believed to be transmitted by unboiled water, parasites, mosquitoes, or "lifestyle" factors (like diet, drinking alcohol, living in an unclean environment, etc). It is also not caused by "folk" illnesses such as *susto* (fright illness) or *mal de ojo* (evil eye), or hot-cold imbalances. Only the Connecticut sample believed that household bleach can kill the virus in syringes and needles.

Of the 60 questions concerning symptoms, 65% were classified similarly by at least three samples, and 40% were classified similarly by all four samples. However, most agreement concerned the symptoms *not* associated with AIDS (20/60). Only five (5/60) symptoms were reported by *all* four samples: weight loss, weakness, susceptibility to other illnesses, fever, and body aches. Additional symptoms reported by at least two samples included: loss of appetite, paleness, pneumonia, slow healing wounds, rash, boils, spots on the skin, a need for bed rest, fever and chills, painful/sore genitals, and tired-looking eyes with dark circles (Table 3). The Connecticut sample listed 12 additional symptoms not reported by the other three samples.

Of the 24 questions on treatments and sequelae for AIDS, 84% were agreed upon

Table 3. Symptoms Reported by One or More Samples

Connecticut	Texas	Mexico	Guatemala	
Y	Y	Y	Y	Is weight loss a symptom of AIDS?
Y	Y	Y	Y	Is weakness a symptom of AIDS?
Y	Y	Y	Y	Are people with AIDS more susceptible to getting other illnesses?
Y	Y	Y	Y	Do you have a fever with AIDS?
Y	Y	Y	Y	Do you have muscle and body aches/pains with AIDS?
Y		—	Y	Is there a loss of appetite with AIDS?
Y	—	Y	Y	Is paleness a symptom of AIDS?
Y	Y	N	N	Do you have a rash with AIDS?
Y	Y	N	N	Is pneumonia a symptom of AIDS?
Y	Y	N	N	Are slow healing wounds a sign of AIDS?
Y	Y	N	—	Are boils a symptom of AIDS?
Y	Y	N	—	Are spots/stains on the skin a sign of AIDS?
Y	Y	—	—	With AIDS do people have to stay in bed a lot?
Y	Y	—	—	Are fever and chills a symptom of AIDS?
Y	—	N	Y	Are painful or sore genitals a symptom of AIDS?
Y		N	Y	Are tired looking eyes/dark circles under the eyes a symptom of AIDS?
Y	N	N	N	Is chest congestion a symptom of AIDS?
Y	N	N	N	Do you have a sore throat with AIDS?
Y	N	N	N	Is having white spots in your mouth (thrush) a symptom of AIDS?
Y	N	N	N	Do you cough up blood with AIDS?
Y	N	N	N	Is a cold that won't go away a symptom of AIDS?
Y	—	N	N	Is increased mucus or phlegm a symptom of AIDS?
Y	—	N	N	Do you wake up at night soaked with sweat with AIDS?
Y	—	N	N	Do you have diarrhea with AIDS?
Y	N	—	N	Do persons with AIDS also often have tuberculosis (TB)?
Y	—	N	N	Is a cough a symptom of AIDS?
Y	N	—	N	Do you have a shortness of breath with AIDS?
Y	N	N	—	Are nerves (<i>nervios</i>) a symptom of AIDS?
—	Y	N	N	Do you have vomiting with AIDS?
—	Y	N	N	Is nausea a symptom of AIDS?
N	N	—	Y	Does your skin turn yellow with AIDS?
N	N	—	Y	Do you have a headache with AIDS?

Note. Y = yes; N = no; — = unclassified.

by at least three samples, and 67% were classified identically across all four samples. All four samples believed that people with AIDS will die and that they will do so only a few years after getting AIDS (Table 4). All samples agreed that although there is no cure for AIDS, a doctor is the best person to treat AIDS and that without treatment the person will die sooner. Only the Connecticut and Texas samples believed that there are medicines to help treat AIDS. All four samples reported that alternative treatments

Table 4. AIDS Treatments Agreed Upon Across Sites

Affirmative Answers About potential AIDS Treatments	Negative Answers About potential AIDS Treatments
Is a doctor the best person to treat AIDS?	Is there a cure for AIDS?
Must people with AIDS go to the hospital? ^a	Can aspirin help treat AIDS?
If you do not treat AIDS with medicine, will the person die sooner than those who are treated?	Can sedatives help cure AIDS?
Do people usually live only a couple of years after they get AIDS?	Are there homeopathic (<i>homeopata</i>) treatments for AIDS?
If you get AIDS, will you die?	Can herbalists help to treat AIDS?
Is rest good for people with AIDS? ^a	Can <i>manzanilla</i> (Camomile) tea help treat AIDS?
	Can <i>yerba buena</i> (spearmint) tea help cure AIDS?
	Does cactus juice (<i>Aloe, Nopal</i>) help cure AIDS?
	Can Eucalyptus balm (such as Vicks) help cure AIDS?
	Will rubbing the back and chest with alcohol help treat AIDS?
	Do women infected with the AIDS virus live longer than men who are infected?
	Can trying to relax (keeping calm) help cure AIDS?
	Can you treat AIDS with prayer?

^aAgreement among Connecticut, Texas, and Mexico samples only.

such as homeopathic or herbalist therapies, herbal teas, aspirin, sedatives, and alcohol rubs were not effective. The Connecticut, Texas, and Mexican samples believed that although rest is good for people with AIDS, relaxation will not help cure it. Guatemalans, however, thought that relaxation or keeping calm would help cure AIDS, as would prayer. In Connecticut, use of vitamins was considered helpful, and in Mexico a positive attitude was thought to help.

DISCUSSION

Consensus modeling provides a systematic method for exploring beliefs about AIDS. The comparison of responses across sites presents an informative picture of AIDS beliefs common to all four locations. Commonality is most heavily concentrated on transmission and consequences of AIDS and somewhat less on symptoms and treatments. This is perhaps due to public information campaigns having focused on the former, while the latter may be transmitted through personal experience as a consequence of higher community seroprevalence. The most striking finding is the consistency or similarity in beliefs despite such wide diversity in samples. Cross-cultural psychologists (Poortinga & Malpass 1986) have suggested that the most appropriate null hypothesis in cross-cultural or cross-national comparisons should be an assumption of differences, since there is a multitude of sources for differences. It is especially important, then, to discover *similar* beliefs across the four communities. It is also unlikely that meaningful gender differences exist within each sample, even though most of the respondents were female, given the similarity in beliefs across samples.

The consistency and scientific accuracy of cultural beliefs about AIDS parallel community experience with the disease and suggest a diffusion model for beliefs as well as for the disease. In 1995 the rate of HIV/AIDS (per 100,000) was 50.4 in Connecticut and 23.9 in Texas (Centers for Disease Control, 1995). In the U.S. Hispanic

subpopulation, the rate was 61.9 overall and 70.3 in Puerto Rico (Centers for Disease Control, 1995). In 1991 the rate was 3.5 in Mexico and .99 in Guatemala (Murillo & Castro, 1994). While our sample sizes are too small to provide accurate estimates of AIDS prevalence, the self-reported AIDS and acquaintanceship rates suggest a similar ordering. The level of shared beliefs decreased significantly from Connecticut to Guatemala, with the most homogeneous and most strongly shared beliefs about AIDS in the Connecticut sample. Answers also were most similar between samples that were geographically closer. The answers themselves illustrate the possible effects of diffusion of information and experience with a new disease. In high prevalence areas, the description of AIDS is more complete and more concordant with current scientific models of the causes, symptoms and treatments of AIDS. The description simplifies with fewer positive answers and less scientific accuracy in lower prevalence areas.

National U.S. data describing the AIDS knowledge of adults in different racial/ethnic groups show that a high proportion of respondents recognize scientifically correct answers (e.g., it reduces the body's natural protection against disease; it is an infectious disease caused by a virus; it can be passed on through sexual intercourse, from a pregnant woman to her unborn baby, or from sharing/using used needles; and there is no cure for it) (Hardy & Biddlecom, 1992; Schoenborn et al, 1994). Similarly, these items and related items appear in this study as part of beliefs about AIDS. All four samples believed that anyone can become infected with AIDS, AIDS can be transmitted through sexual intercourse (especially with multiple partners), condoms reduce the risk of sexual transmission, and homosexuals and prostitutes are at risk. Contaminated blood and syringes also were implicated by all samples. All four samples believed that you could "get AIDS from a blood transfusion," and the Mexican and Guatemalan samples believed that you could become infected if you *donated* blood. In U.S. national data, about two thirds of Hispanics (65% of Puerto Ricans and 67% of Mexican Americans) (Biddlecom & Hardy, 1991) thought that receiving a blood transfusion was unsafe and 36% thought you could get AIDS from donating blood (Schoenborn et al., 1994).

With regard to treatment and outcome of the disease, our results indicate that all four samples believe that people with AIDS are more susceptible to other illnesses, that there is no cure for AIDS, that you will die if you get it, and that people only live a few years after getting it. A number of questions concerned folk treatments (herbal teas, eucalyptus balm, cactus juice, massage, and prayer) and alternative healers (herbalists and homeopaths). The predominant belief is that these are not effective therapies for AIDS and that a doctor is the best source for AIDS treatment. While all four samples believed that a person will die sooner without treatment, only the U.S. samples believed that there are medicines to help treat AIDS. Similarly, in a recent survey in the United States (Schoenborn et al., 1994) most Hispanics reported that "there is no cure for AIDS" (84%), but that "there are drugs that can lengthen the life of someone with AIDS" (60%) and that "early treatment can reduce the symptoms" (54%).

Misperceptions about AIDS described in U.S. survey results (Biddlecom & Hardy, 1991) range from a fairly low error rate for "you can get it by working near someone with AIDS" (14% Puerto Rican and 13% Mexican American) to a moderate error rate for "using the same toilet" (26% Puerto Rican and 30% Mexican American), for transmission "from mosquitoes" (32% Puerto Rican and 30% Mexican-American) and for 'sharing utensils' (32% Puerto Rican and 31% Mexican-American). In our samples, beliefs about transmission indicate that AIDS is not thought to be transmitted by being near someone with AIDS nor by wearing their

clothes. The Connecticut, Texas, and Mexico samples did not think that using a public bathroom or swimming in a public pool were sources of infection, and the two U.S. samples did not think that the sharing of utensils was a source of transmission. All four samples believed that AIDS could not be transmitted by mosquitoes nor caused by parasites. Thus, even though the Mexican Americans and the Puerto Ricans had high error rates for those items on U.S. national surveys, these items do not appear to be part of shared beliefs about AIDS.

In the international samples in this study, some of the responses may reflect a different environment and experience. For example, rural Guatemalans are relatively unfamiliar with public toilets and pools due to their scarcity in Guatemala. Further, the use of disposable syringes was not common until recently in Mexico and Guatemala, so equipment for donating blood could possibly transmit HIV if not properly disinfected. Medicines such as AZT are not widely available in Mexico and Guatemala. The Guatemalan belief that AIDS could be "inherited" may actually reflect the notion that AIDS can be transmitted from mother to unborn child rather than true genetic inheritance. Similarly, the Guatemalan sample was the only sample that did not endorse a viral cause for AIDS. Although many rural Guatemalans understand contagion and transmission by contact with something that is contaminated, the difference between a virus and other "microbes" may be unclear. These responses may simply reflect a low educational level in this region of Guatemala and/or a lack of clarity in our questions.

In general, the people at each site have a much clearer idea about what AIDS is not rather than what it is. Ailments that have been known for generations are recognized by distinct patterns of symptoms and causes. Respondents separately and distinctly recognize colds, diabetes, cancer, parasites, depression, etc., and do not confuse them with AIDS. The converse, their familiarity with AIDS, is less strongly embedded in their cultural model of health and illness, and tends to be defined by a small number of items, linked to the contrasting conditions of what it is not. Both the lack of confusion about other illnesses and lack of knowledge about AIDS are favorable for the accurate presentation of current information about HIV transmission and its consequences, since prevention programs do not have to work against the inertia of disease confusion or false disease knowledge that is strongly embedded in the community.

Assessment of beliefs may provide useful information for future interventions. Results can indicate geographical regions (or subpopulations) where information diffusion may serve as a primary element in prevention efforts. For example, the greater variability in beliefs in south Texas suggests that group opinion may be more malleable than in Connecticut. Thus south Texas might benefit from a targeted information campaign to create a more complete description of AIDS symptoms and treatments with additional information on drug use and HIV. In Connecticut, effort might be directed at individual and small group activities, and broad information campaigns should be sparingly used to reinforce existing knowledge patterns. From a prevention viewpoint, the items at various sites where no consensus has been formed are excellent immediate targets for public information campaigns, since it is not a matter of changing a belief that must be addressed, but the issue of creating a knowledge base in the first place. For example, the lack of knowledge of treatments for HIV/AIDS is an area of knowledge that is missing in the general population (Schoenborn et al., 1994), and will need to be addressed.

The model also helps identify areas where belief change (replacement of existing consensus with opposing information) will need to be accomplished. Such HIV risk reduction efforts require more intensive resource concentration than simple informa-

tion dissemination and must be targeted at specific segments of the community to be effective. Consensus modeling is a useful tool to accomplish both the segmentation task (determining who needs the information) and the task of identifying the specific knowledge areas that need modification. Consensus modeling can be accomplished with far less expensive sampling costs, since small samples are usually adequate (Batchelder & Romney, 1988). Once the model is established, results can be used for individual intervention targeting and process monitoring, with minimal additional time and resource investment. The procedure is also valuable for cross-cultural, geographical, and multiethnic comparisons of beliefs about HIV/AIDS and other diseases in populations.

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