

HEALTH RISK BEHAVIORS AND HEALTH PERCEPTIONS IN THE PERUVIAN AMAZON

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Abstract. Behavioral health risk factor and health belief data for the indigenous population of the Peruvian Amazon are unavailable. Therefore, we conducted structured interviews of adults living in 5 towns in the remote Amazon region of Peru. Respondents ($n = 179$) were 67% women with a mean age of 35.4 years. The average household size was 6.7 people. A majority (72%) were unable to see a doctor when needed because of lack of money and distance. Only 6% reported excellent health, and nearly half (49%) reported fair health. Forty-eight percent drank alcohol and 73% smoked. Only 34% thought mosquitoes cause malaria, but 98% were using mosquito nets. In conclusion, our findings indicate the indigenous population of the Peruvian Amazon has limited access to basic health care. Although most of those surveyed use mosquito netting, few know that mosquitoes transmit malaria. Tobacco and alcohol use are major behavioral health risk factors.

INTRODUCTION

The Peruvian Amazon, which comprises two thirds of the total land area of Peru, is home to only 9–11% of Peru's population.^{1,2} Almost all 2,250 communities of this region have no roads or other means of transport other than small boats. Inhabitants of this region live in small villages set on the banks of the Amazon River.³ This river ranks as the largest in the world in terms of watershed area, draining a territory of > 6 million square kilometers, roughly half of which is in Brazil, with the rest in Peru, Ecuador, Bolivia, and Venezuela. It is along the main Amazon River and its tributaries where most of the native Indians and indigenous population reside.⁴ People in this region have little exposure to the modern world and are hard to reach because of lack of transportation other than the river.

In the early 1990s, the average life expectancy in Peru was 62.2 years, and the mortality rate was 9.2 per 1,000. The birth rate in Peru has dropped from 40.5 in 1975 to 34.3 in 1990.^{5–7} There is a sharp contrast in the social status of the wealthy in the major cities compared with the impoverished people who live in the jungle or Andean Mountain areas.⁸ Although the government has made some progress in improving medical facilities, sanitation remains inadequate, and a cholera epidemic in 1991 killed > 1,000 Peruvians and sickened another 150,000.³

Because of recent interest on the part of the Peruvian government and many nongovernmental organizations, this area is the site of many outreach programs to provide medical care and to improve the health of natives.⁹ There has been, to our knowledge, no published demographic or behavioral health risk data in the literature pertaining to the Amazonian population in Peru. Such data will play a crucial role in planning interventions to improve the health of the local community. The results of a demographic and behavioral health risk survey of adults in this remote Amazon region are reported.

MATERIALS AND METHODS

Structured in-person interviews were conducted of a representative sample of the native adult population in the remote region of the Peruvian Amazon along the Yanayaku

River, a tributary of Amazon River. The survey was conducted as a part of Project Amazonas medical expedition to the region in March and April of 1999. The survey included questions on demographics, health care access, alternative medicine use, health status and perception, health risk behaviors, and sanitation. The survey also included additional questions about alcohol consumption, smoking, and knowledge of malaria. The survey was conducted in Spanish. All subjects ≥ 15 years of age were asked to complete the survey with the help of a Spanish-speaking researcher. The response rate in the 5 towns visited was 100%. Because almost all adults attended the mobile medical clinics established by Project Amazonas and completed the survey at that time, this survey is representative of the local population. Parents who accompanied their children to clinic were asked to complete the survey. Two researchers, fluent in Spanish, assisted subjects in completing surveys, as did a dedicated translator. The survey was conducted at 5 sites along the Yanayaku River. These included the communities of Commandancia, Santa Rosa, Santa Ursula, Santo Thomas, and the area interspersed among these communities. Interviewers were instructed to gather objective data, without coaching or suggesting responses.

Data from surveys were checked for validity before they were entered into a computer, and the contents of computer files were double-checked against the original data sheets to correct any errors. All data were entered into Microsoft Excel 97 and then transported and analyzed by SAS (statistical analysis—version 6.12) statistical software package (SAS, Cary, NC). Means and standard deviations were generated on continuous variables. Frequency distributions were used for descriptive analysis. The chi-square test was used to assess differences in categorical variables between male and female respondents with $\alpha = 0.05$.

RESULTS

Demographics. The population survey consisted of all 179 adults living in the 5 locations visited by the expedition, with a response rate of 100%. Subjects ranged in age 15–90 years, with a mean age of 35.4 years; 67% ($n = 120$) were women. The majority of subjects were married (41%, $n = 72$), 37% ($n = 64$) were living as unmarried couples, 12%

TABLE 1
Demographics of study subjects, Amazon, Peru, 1999*

Variable	All (mean \pm SD)	Men (mean \pm SD) (<i>n</i> = 57)	Women (mean \pm SD) (<i>n</i> = 120)	<i>P</i> value†
Age (years)	35.4 \pm 15.8	37.9 \pm 17.2	34.1 \pm 15.0	0.15
Education level (number of school years completed)	5.4 \pm 4.6	5.6 \pm 4.2	5.3 \pm 4.8	0.6
No. of children	5.4 \pm 4.0	5.2 \pm 4.3	5.5 \pm 3.9	0.6
No. of live children	4.5 \pm 3.1	4.2 \pm 3.4	4.6 \pm 2.9	0.41
No. of people in the household	6.7 \pm 2.6	6.9 \pm 2.6	6.6 \pm 2.6	0.5
Quantity of alcohol consumed (drinks per day)	1.5 \pm 0.8	1.6 \pm 0.7	1.5 \pm 0.8	0.77
Age started drinking alcohol (years)	16.6 \pm 3.7	17.0 \pm 3.3	16.2 \pm 4.2	0.34
Quantity smoked (no. of cigarettes per day)	1.1 \pm 0.5	1.1 \pm 0.3	1.2 \pm 0.7	0.26
Age started smoking (years)	18.6 \pm 6.2	17.8 \pm 4.1	19.7 \pm 7.9	0.25
Years smoked (years)	16.7 \pm 17.1	19.2 \pm 21.2	14.1 \pm 11.3	0.35

* SD = standard deviation.

† *P* value is based on Student's *t*-test between men and women.

(*n* = 21) were single, 6% (*n* = 10) were divorced, and 5% (*n* = 8) were widowed. Approximately 19% (*n* = 33) had no formal education at all. About one third reported education through 11th grade. The number of people in each household varied from 1–15, with a mean of 7. The number of children in each household ranged from 0–17, with a mean of 5. These data are summarized in Table 1. Primary occupations reported were agriculture (49%, *n* = 86), fishing (41%, *n* = 72), and hunting (4%, *n* = 7), and 2.9% identified themselves as not working. There were no significant differences between men and women for mean age, number of years of education, number of children, number of live children, and total number of households (Table 1).

Health status and health care access. Approximately 19% (*n* = 34) of subjects reported not seeing a doctor ever, 25% (*n* = 44) had not seen a doctor in the last 5 years, and 72% reported that they were not able to see a doctor when needed. The most common reasons cited for inability to see a physician were financial constraints (57%), distance (34%), and absence of doctors in the area (4%). Sixty-six percent (*n* = 115) stated that they did not have access to a doctor at the time of the survey. Approximately 22% (*n* = 40) had

a history of ever being hospitalized for some reason. None reported present illnesses, although 11% (*n* = 16) reported taking medications regularly. About two thirds (66%, *n* = 114) had a death in their families during the past year. There was no difference between men (*n* = 17, 31%) and women (*n* = 30, 26%) who stated that they were unable to see a doctor in the last 5 years when needed (*P* = 0.47). There was no difference between men and women in reasons for not having access to a doctor when needed; 34% of men and 36% of women cited distance, whereas 63% of men and 59% of women reported financial constraints (*P* = 0.82; Table 2). Similarly, there were no significant differences between men and women in rates of hospitalization, time since last doctor's visit, or occurrence of death in the family (Table 2).

Health perception. Forty-nine percent of subjects rated their health condition as fair; 6% as excellent; and 19% (*n* = 34) as poor. The majority of respondents (67%, *n* = 118) were satisfied with their current health condition. More than half (57.4%, *n* = 94) considered vaccination to be effective in preventing diseases, whereas 13% considered it ineffective. There was no difference between men and women with regard to self-reported health status (Table 2).

TABLE 2
Sex-related health care access, health status, and perception, by gender, Amazon, Peru, 1999

Variable	Total responders	Response	Men, <i>n</i> (%)	Women, <i>n</i> (%)	<i>P</i> value†
Not able to see a doctor when needed	172	Yes	38 (69)	87 (74)	0.47
		No	17 (31)	30 (26)	
Reason why couldn't see a doctor	132	Due to distance	14 (34)	33 (36)	0.82
		Due to lack of money	26 (63)	54 (59)	
		No doctor available	1 (2)	4 (4)	
Access to a doctor if needed	173	Yes	20 (35)	37 (32)	0.78
		No	36 (63)	78 (67)	
Hospital admission	178	Yes	12 (21)	28 (23)	0.69
		No	46 (79)	92 (76)	
Last visit to a doctor	178	Within 1 year	12 (21)	22 (18)	0.83
		2–4 years	22 (39)	44 (37)	
		\geq 5 years	23 (40)	54 (45)	
Occurrence of death in the family	171	Yes	42 (75)	72 (63)	0.107
		No	14 (25)	43 (38)	
Health satisfaction	175	Yes	36 (63)	81 (69)	0.47
		No	21 (37)	37 (31)	
Self-perceived health condition	178	Excellent	8 (14)	18 (15)	0.74
		Fair	37 (64)	81 (67)	
		Poor	13 (22)	21 (18)	

† *P* value is based on chi-square test between men and women.

TABLE 3
Behavioral risk factors and personal health practices by gender, Amazon, Peru, 1999

Variable	Total responders	Response	Men, <i>n</i> (%)	Women, <i>n</i> (%)	<i>P</i> value†
Alcohol consumption	177	Yes	42 (74)	43 (36)	0.001
		No	15 (26)	77 (64)	
History of smoking	169	Yes	38 (68)	31 (27)	0.001
		No	18 (32)	82 (73)	
Boil drinking water	177	Yes	30 (53)	61 (51)	0.37
		Sometimes	7 (12)	8 (7)	
		No	20 (35)	51 (42)	

† *P* value is based on chi-square test between men and women.

Health risk behaviors. At the time of the survey, 48% ($n = 85$) of respondents reported that they consumed alcohol. About two thirds (67%, $n = 63$) consumed a locally brewed alcohol beverage called Masatto; 24% reported drinking beer. Masatto is prepared by women who chew manioc or yucca and spit it into a hollowed-out small log to ferment over the course of a day or two. The majority (63%, $n = 54$) of respondents consumed, on average, 1–2 drinks per week. Only 17% drank alcohol in the quantity of > 5 drinks per week. The average age when subjects began drinking was 16.6 years. There was no significant difference between sexes in terms of quantity of alcohol used or age at start of alcohol use. Men reported higher rate of alcohol consumption (42 of 57, 74%) than women (43 of 120, 26%, $P = 0.001$; Table 3). Half (51%, $n = 45$) considered alcohol bad for their health, whereas 30% felt that it was safe. About 10% of respondents agreed that they were drinking too much, and 22% reported health problems as a result of alcoholism. Two thirds of all respondents felt that their health would be improved by stopping alcohol.

Among all respondents, 41% ($n = 69/169$) reported ever smoking and 30% ($n = 57$) were currently smoking. Among current smokers, the majority were light smokers, with 90% reporting only smoking 2 or fewer cigarettes per day. The average age at the start of smoking was 18.6 years; the average number of years smoked among respondents at the time of the survey was 16.7 years. About 60% ($n = 46$) said that their health could improve by stopping smoking. Among smokers, 56% ($n = 43$) had a desire to stop. There were no significant difference between sexes for age at start of smoking, number of years smoked, or mean number of cigarettes smoked per day (Table 1). Men reported smoking more often than women ($P = 0.001$; Table 3).

Use of alternative care. Forty-seven percent ($n = 82$)

reported use of alternative medicine and 57% ($n = 101$) knew a healer in the area. About 23% ($n = 39$) felt that alternative medicine was ineffective, but a majority (72.6%, $n = 122$) regarded alternative medicine or a healer as always or sometimes effective. There was no difference between men and women in use of traditional healers or access to traditional healers, or in perception of their effectiveness (Table 4).

Sanitation. A local river was the source of drinking water for 95% ($n = 169$) of the respondents. Only 51% boiled the water before use. About 19% did not believe that boiling water had a role in disease prevention. Women reported not boiling water for drinking more often than men (42% for women, 35% for men), but results did not reach significance ($P = 0.37$; Table 3). Almost all subjects (98% women and 99% men) reported that they routinely washed their hands before eating and after defecation. Only 3% reported not using soap to wash their hands. When asked whether they had animals or domestic birds staying in or under their houses, 34% had ducks, 89% had chickens, 37% had dogs, 31% had pigs, 3% had monkeys, and 4% had other animals.

Malaria knowledge. Fifty-seven percent ($n = 99$) of subjects reported ever having malaria. Ninety-eight percent of respondents reported use of mosquito nets in their homes, even though only 34% believed mosquitoes were the cause of malaria. Significantly more men reported a history of malaria (41 of 56, 73%) than women (58 of 118, 49%, $P = 0.003$; Table 5). Of those reporting having malaria in the past, there was no difference between men and women for the type of malaria (i.e., vivax or falciparum). However, men reported being treated for malaria more often than women ($P = 0.015$; Table 5).

DISCUSSION

To our knowledge, this is the first survey of health demographics and health risk behaviors in the Peruvian Amazon. Like many underdeveloped and remote areas, the Peruvian Amazon is subject to poor sanitation and limited health care access.⁴ Family sizes are fairly large, and living conditions are crowded, with an average number of 7 people in a household. Respiratory ailments and intestinal infections are Peru's most serious health problems.¹⁰ According to 1993 census data, the infant mortality rate was 59 per 1,000 live births in Peru.¹ The fertility rate has dropped since 1960 from 6.5 to 4 children per woman in 1993, and the crude birth rate has also dropped from 35 to 26 births per 1,000 population.¹ The Peruvian Amazon was a neglected part of

TABLE 4
Use of and access to traditional healers, by sex of subject, Amazon, Peru, 1999

Variable	Total responders	Response	Men, <i>n</i> (%)	Women, <i>n</i> (%)	<i>P</i> value†
Use of traditional healer	173	Yes	26 (46)	55 (47)	0.82
		No	31 (54)	61 (53)	
Familiarity with a traditional healer	175	Yes	34 (61)	67 (56)	0.58
		No	22 (39)	52 (44)	
Perception of traditional healers	162	Always effective	15 (29)	27 (25)	0.77
		Sometimes effective	26 (50)	55 (50)	
		Not effective	11 (21)	28 (25)	

† *P* value is based on chi-square test between men and women.

TABLE 5
Malaria history, type, and treatment status, by sex of subject, Amazon, Peru, 1999

Variable	Total responders	Response	Men, <i>n</i> (%)	Women, <i>n</i> (%)	<i>P</i> value†
History of having malaria	174	Yes	41 (73)	58 (49)	0.003
		No	15 (27)	60 (51)	
Of those reporting having malaria, type of malaria	84	Vivax	17 (49)	29 (59)	0.33
		Falciparum	18 (51)	20 (41)	
Malaria was treated	97	Yes	37 (90)	39 (70)	0.015
		No	4 (10)	17 (30)	

† *P* value is based on chi-square test between men and women.

the country for a long time because of its being thinly populated and because it is difficult to access. More resources of the country were spent on major cities, especially the capitol, Lima. Peru has seen major migration to large cities, especially to Lima, during the last 40 years. About 50% of the population of Peru now lives along the coastal region.¹⁰

Our findings indicate very poor health care utilization and access. About one fifth of the population we surveyed had never seen a doctor, and 70% were unable to see a doctor when needed. This might be explained by the remoteness of their residence from the nearest city with a doctor or hospital. The majority of the population lives on riverbanks on the Amazon River and its tributaries. The sole transportation is by boat; it could take up to 12 hr to reach the nearest facility. The region we surveyed has a small government dispensary requiring a 4-hr boat ride. The nearest city from this region is Iquitos, one of the largest in the whole Peruvian Amazon. Despite their perceived lack of access to health care, 23% of respondents had been hospitalized in the past.

About 19% of subjects considered themselves to be in poor health, and 66% had reported a death in their family in the past year. Very few respondents were able to recognize the cause of their family members' deaths. This may indicate that because of poor health care access, most of the deaths occur in villages rather than hospitals, as in industrialized countries. People may also have ascribed death to witchcraft.¹¹ However, we did not ask whether they ascribed their family members' deaths to witchcraft. Potentially, this notion would discourage any search into the cause of death and may slow down any effort to access health care in timely fashion.

From Pan American Health Organization statistics,^{1,12,13} the major cause of death in Peru is infectious disease, followed by vascular disease and malignancy.¹ High prevalence and associated mortality of communicable diseases is a result of poor sanitary conditions, crowded living, and unsafe drinking water. Ninety-five percent of respondents in this survey drank river water, and only half (51%) said that they boiled water before consumption. More striking is the notion expressed by 20% of our respondents that boiling water has no health benefit.

Most of the survey respondents were women (67%). We conducted further analysis to see which age group is contributing to this difference. The distribution of men and women according to age groups was as follows: 1) aged < 35 years, 73% women; 2) aged 35–64 years, 62% women; and 3) age > 64 years, 50% women. This indicates that discrepancy is greater at younger age range. It is possible that men were in the fields and therefore not available for

this survey. Another possible reason is that men may have migrated to nearby cities to find work.

Our study found a large discrepancy in prevalence of smoking and alcohol use between men and women. Men reported a rate of alcohol use at least 3 times higher than that of women, and almost double the rate of smoking compared with women. We found it interesting that most of the respondents used mosquito nets at night, but 34% did think that mosquitoes cause malaria. The Peruvian government has been providing free mosquito nets to the local population to reduce the burden of malaria. We believe that there is room for improvement in malaria education. A higher proportion of men reported having malaria than women in this study (73% versus 49%). However, women were significantly less likely to have received treatment. This points out the difference in health care access to receive treatment for malaria compared with health care access in general. As noted above, there were no significant differences between men and women in health care access issues such as hospital admission, last visit to a doctor, health satisfaction, and inability and reason for not being able to see a doctor when needed.

The survey has several limitations, including being conducted in a nonrandom fashion in the setting of clinical encounter. Because almost everyone aged > 15 years was included, there was less of a need to perform random sampling. A small sample size makes it difficult to perform a subgroup analysis to further explore the associations of particular behaviors with demographic data. Survey findings may be indicative of local customs and values that may not hold true in other regions of the country. In addition, geographical isolation of small communities makes health beliefs and practices difficult to generalize. Although this survey was edited and translated by member of our team (D.G.) who has intimate knowledge of local health system and health behaviors of the native population, including a local health care worker in designing and conducting the survey would have enhanced the value of this work. We used the help of local health care workers to set up camps, gather subjects, and interpret verbal responses.

In summary, our survey results show that the population of the Peruvian Amazon is underserved in terms of health care access and utilization. Family size is fairly large, crowded conditions are common, and sanitation is not very good. These factors may contribute to a high prevalence of parasitic and communicable diseases. As pointed out by J. F. Martin in 1975, the biggest problems of this region are poverty, overcrowding, poor hygiene, and malnutrition.⁴ We anticipate that with the help of proper health education, learn-

ing basic sanitation methods, and access to appropriate drinking water sources, the health of this neglected region could be improved.

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