STATISTICAL REPORT:

Use of allopathic and traditional health care providers for HIV care in rural Mozambique:
HIV knowledge and health seeking behavior in Zambézia Province

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1   Introduction

Zambézia is currently experiencing one of the highest burdens of HIV in Mozambique. Many people within the district still lack access to modern medicine, education about risk factors leading to HIV infection, or practical alternatives to risky behavior perpetuated through cultural norms and poverty. Traditional healers are highly regarded members of their communities who have a strong influence on the understanding of disease causation and treatment of their patients. There is a lack of understanding about particular practices and beliefs of traditional healers in Zambézia Province. Negative stereotypes held by Western-educated physicians coupled with the mistrust of healers toward doctors have created barriers to collaboration. In an effort to diffuse this situation, we performed a qualitative study of the medical beliefs and practices of traditional healers in six districts in Zambézia using semi-structured key informant interviews and an ethnographic study.

1.1   Research Aims

1.1.1   To determine characteristics of patients who use traditional healers.

1.1.2   To determine characteristics of patients with varying levels of HIV knowledge.

2   Methods

2.1   Participants

This is a cross-sectional study 349 Mozambican adults. Currently, FGH clinics operate in six districts of Zambézia: Namacurra, Alto-Molocue, Gile, Ile, Inhassunge, and Lugela. Healers are identified in each community through word of mouth; communities were identified at random in each district. Patients were solicited for interviews through home-to-home visits. Only patients older than 18 years old were interviewed. We interview Mozambican patients in an effort to identify trends in behavior, knowledge and treatments. Interviews were conducted within the communities, locations determined at the request of the interviewee, and all patients had the goals of the research explained to them before the interview begins.

2.2   Outcomes

The primary outcomes among patient interviews will be the patient's use of a traditional healer and his/her knowledge of HIV/AIDS.

2.3   Data Sources and Measurements

The study contains 349 key informant interviews. Participants will be questioned about their experiences with traditional and modern medicine, health issues, views on the cause and treatment of particular illnesses, and preferences of medical practitioners.

2.4   Statistical Methods

1. To determine characteristics of patients who use traditional healers.
Summary characteristics will be tabulated by those patients who go to healers and those who did not. A logistic regression may identify whether demographics or HIV knowledge are predictive of using a traditional healer. Specifically, age, sex, education level, location, HIV knowledge, and belief in HIV/AIDS cure have been identified as predictors of interest. If needed, missing data methods will be considered. Options include complete case analysis or multiple imputation.

2. To determine characteristics of patients with varying levels of HIV knowledge.
Summary characteristics will be tabulated by patient's HIV knowledge. HIV knowledge will be measured

by the number of ways a participant correctly identifies a method of HIV transmission (range: 0-5). An ordinal (proportional-odds) logistic regression may identify whether demographics or health-seeking behavior are predictive of HIV knowledge. Specifically, age, sex, education level, location, condom use, and source of health information have been identified as predictors of interest. Additionally five separate logistic regressions using the same predictors may identify which demographics or health-seeking behavior are predictive of knowledge for each of five methods of transmission. If needed, missing data methods will be considered. Options include complete case analysis or multiple imputation.

R-software 2.11.1 (www.r-project.org) will be used for data analyses.

3   Results

3.1   Patients Characteristics

Table 1 summarizes patient characteristics by sex.

Table 1: Summary of Patient Characteristics by Sex

	Female (n=203)	Male (n=146)	Combined (n=349)	P-value[a]
Age[b]	29 (23, 38)	38 (27, 47)	32 (25, 43)	<0.001
Missing age, n(%)	30 (14.8%)	1 (0.7%)	31 (8.9%)	
Education level	4 (1, 7)	5 (4, 9)	5 (2, 8)	<0.001
Location, n(%)				<0.001
Alto Molocue	39 (19.2%)	59 (40.4%)	98 (28.1%)	
Inhassuange	82 (40.4%)	37 (25.3%)	119 (34.1%)	
Namacurra	82 (40.4%)	50 (34.2%)	132 (37.8%)	
Rural/Urban, n(%)				0.265
Rural	129 (63.5%)	102 (69.9%)	231 (66.2%)	
Urban	74 (36.5%)	44 (30.1%)	118 (33.8%)	
Civil status, n(%)				<0.001
Divorced	21 (10.3%)	5 (3.4%)	26 (7.4%)	
Married	146 (71.9%)	131 (89.7%)	277 (79.4%)	
Single	11 (5.4%)	9 (6.2%)	20 (5.7%)	
Widowed	25 (12.3%)	1 (0.7%)	26 (7.4%)	
Age at marriage	18 (16, 20)	21 (20, 25)	19 (17, 22)	<0.001
Missing age at marriage, n(%)	63 (31.0%)	33 (22.6%)	96 (27.5%)	
Number of spouses	1 (0, 1)	1 (1, 1)	1 (1, 1)	0.242
Missing number of spouses, n(%)	3 (1.5%)	2 (1.4%)	5 (1.4%)	
Number of previous spouses	1 (0, 1)	0 (0, 1)	0 (0, 1)	0.005
Missing number of previous spouses, n(%)	1 (0.5%)	2 (1.4%)	3 (0.9%)	
Number of children	3 (1, 5)	4 (2, 5)	3 (2, 5)	0.027
AIDS mentioned as most common ailment, n(%)				0.110
No	98 (48.3%)	84 (57.5%)	182 (52.1%)	
Yes	105 (51.7%)	62 (42.5%)	167 (47.9%)	
Respiratory ailments are common	119 (58.6%)	87 (59.6%)	206 (59.0%)	
Cervical cancer is common	80 (39.4%)	54 (37.0%)	134 (38.4%)	
Know someone with HIV/AIDS	59 (29.1%)	38 (26.0%)	97 (27.8%)	
How do people get infected with HIV/AIDS?[c]				
Sex	168 (82.8%)	133 (91.1%)	301 (86.2%)	
Razors	82 (40.4%)	48 (32.9%)	130 (37.2%)	
Mother to Child	3 (1.5%)	2 (1.4%)	5 (1.4%)	
Blood	12 (5.9%)	8 (5.5%)	20 (5.7%)	
Needles	36 (17.7%)	32 (21.9%)	68 (19.5%)	
How do you prevent HIV/AIDS infection?[c]				
Condoms	133 (65.5%)	100 (68.5%)	233 (66.8%)	
Do Not Share Razors	19 (9.4%)	16 (11.0%)	35 (10.0%)	
Have One Partner	33 (16.3%)	41 (28.1%)	74 (21.2%)	
Abstinence	6 (3.0%)	10 (6.8%)	16 (4.6%)	
Can you cure AIDS?, n(%)				0.506
Do not know	16 (7.9%)	7 (4.8%)	23 (6.6%)	
No	176 (86.7%)	130 (89.0%)	306 (87.7%)	
Yes	11 (5.4%)	9 (6.2%)	20 (5.7%)	
How do you learn about illness and treatment?[c]				
School	6 (3.0%)	13 (8.9%)	19 (5.4%)	
Radio	54 (26.6%)	63 (43.2%)	117 (33.5%)	
Traditional Healers	5 (2.5%)	4 (2.7%)	9 (2.6%)	
Traditional Healers	5 (2.5%)	4 (2.7%)	9 (2.6%)	
Community Health Workers	9 (4.4%)	13 (8.9%)	22 (6.3%)	
Traditional Healers	5 (2.5%)	4 (2.7%)	9 (2.6%)	
Clinics	99 (48.8%)	37 (25.3%)	136 (39.0%)	

[a] To compare the distribution of patient characteristics by sex, we employ chi-square tests. Similarly, we use a two-sample rank sum test for continuous variables by sex.

[b] Continuous variables are reported as medians (interquartile range).

[c] Percentages may sum to greater than 100% because multiple answers may be provided.

3.2 Patients who use Traditional Healers

Table 2 summarizes patient characteristics by use of Traditional Healers. To identify predictors of traditional healer usage, we use logistic regression. We multiply impute age for 31 patients missing this data. Age is a continuous predictor that is nonlinear with log-odds of healer use. To relax our linearity assumption, we model age using a 3 knot restricted cubic spline function (this is why age is summarized in reference to another age). Table 3 summarizes the model effects. Adjusting for sex and education, there are three significant predictors of visiting traditional healers; these are, age, district location and response to the existence of AIDS cure question. This model has decent predictive ability ($c = 0.76$).

Of the 288 patients who use traditional healers, we are interested in determining whether increased cost of visit was associated with increased patient satisfaction. Median (IQR) cost of visit for unsatisfied patients is 100 (30, 200) and for satisfied patients is 50 (30, 120). A test for incremental **cost by satisfaction** gives p=0.11.

Of the 288 patients who use traditional healers, we are interested in determining whether decreased education was associated with increased patient satisfaction. Median (IQR) education level for unsatisfied patients is 7 (3, 10) and for satisfied patients is 4 (2, 7). A test for incremental **education by satisfaction** gives p=0.006.

Table 2: Summary of Patient Characteristics and Response by Use of Traditional Healers

Do you visit traditional healers?	No (n=61)	Yes (n=288)	Combined (n=349)	P-value
Age	30 (23, 45)	33 (25, 43)	32 (25, 43)	0.430
Missing age, n(%)	4 (6.6%)	27 (9.4%)	31 (8.9%)	
Sex, n(%)				0.023
Female	27 (44.3%)	176 (61.1%)	203 (58.2%)	
Male	34 (55.7%)	112 (38.9%)	146 (41.8%)	
Education level	5 (3, 7)	4.5 (2, 8)	5 (2, 8)	0.610
Location, n(%)				<0.001
Alto Molocue	33 (54.1%)	65 (22.6%)	98 (28.1%)	
Inhassuange	18 (29.5%)	101 (35.1%)	119 (34.1%)	
Namacurra	10 (16.4%)	122 (42.4%)	132 (37.8%)	
Rural/Urban, n(%)				0.527
Rural	43 (70.5%)	188 (65.3%)	231 (66.2%)	
Urban	18 (29.5%)	100 (34.7%)	118 (33.8%)	
Civil status, n(%)				0.279
Divorced	4 (6.6%)	22 (7.6%)	26 (7.4%)	
Married	52 (85.2%)	225 (78.1%)	277 (79.4%)	
Single	4 (6.6%)	16 (5.6%)	20 (5.7%)	
Widowed	1 (1.6%)	25 (8.7%)	26 (7.4%)	
Age at marriage	19 (17, 25.5)	19 (17, 22)	19 (17, 22)	0.455
Missing age at marriage, n(%)	18 (29.5%)	78 (27.1%)	96 (27.5%)	
Number of spouses	1 (1, 1)	1 (1, 1)	1 (1, 1)	0.428
Missing number of spouses, n(%)	0 (0.0%)	5 (1.7%)	5 (1.4%)	
Number of previous spouses	0 (0, 1)	1 (0, 1)	0 (0, 1)	<0.001
Missing number of previous spouses, n(%)	0 (0.0%)	3 (1.0%)	3 (0.9%)	
Number of children	2 (1, 4)	3 (2, 5)	3 (2, 5)	0.026
AIDS mentioned as most common ailment, n(%)				0.003
No	43 (70.5%)	139 (48.3%)	182 (52.1%)	
Yes	18 (29.5%)	149 (51.7%)	167 (47.9%)	
Respiratory ailments are common	35 (57.4%)	171 (59.4%)	206 (59.0%)	
Cervical cancer is common	24 (39.3%)	110 (38.2%)	134 (38.4%)	
Know someone with HIV/AIDS	16 (26.2%)	81 (28.1%)	97 (27.8%)	0.886
How do people get infected with HIV/AIDS?				

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Table 2 – Continued

Do you visit traditional healers?	No (n=61)	Yes (n=288)	Combined (n=349)	P-value
Sex	51 (83.6%)	250 (86.8%)	301 (86.2%)	
Razors	17 (27.9%)	113 (39.2%)	130 (37.2%)	
Mother to Child	0 (0.0%)	5 (1.7%)	5 (1.4%)	
Blood	0 (0.0%)	20 (6.9%)	20 (5.7%)	
Needles	7 (11.5%)	61 (21.2%)	68 (19.5%)	
How do you prevent HIV/AIDS infection?				
Condoms	40 (65.6%)	193 (67.0%)	233 (66.8%)	
Do Not Share Razors	3 (4.9%)	32 (11.1%)	35 (10.0%)	
Have One Partner	12 (19.7%)	62 (21.5%)	74 (21.2%)	
Abstinence	1 (1.6%)	15 (5.2%)	16 (4.6%)	
Can you cure AIDS?, n(%)				0.082
Do not know	5 (8.2%)	18 (6.2%)	23 (6.6%)	
No	49 (80.3%)	257 (89.2%)	306 (87.7%)	
Yes	7 (11.5%)	13 (4.5%)	20 (5.7%)	
Condom Usage, n(%)				0.315
Do not know/No answer	0 (0.0%)	2 (0.7%)	2 (0.6%)	
No	19 (31.1%)	116 (40.3%)	135 (38.7%)	
Yes	42 (68.9%)	170 (59.0%)	212 (60.7%)	
How do you learn about illness and treatment?				
School	5 (8.2%)	14 (4.9%)	19 (5.4%)	
Radio	24 (39.3%)	93 (32.3%)	117 (33.5%)	
Community Meetings	13 (21.3%)	46 (16.0%)	59 (16.9%)	
Community Members	3 (4.9%)	55 (19.1%)	58 (16.6%)	
Community Health Workers	2 (3.3%)	20 (6.9%)	22 (6.3%)	
Traditional Healers	0 (0.0%)	9 (3.1%)	9 (2.6%)	
Clinics	20 (32.8%)	116 (40.3%)	136 (39.0%)	
Provider Usage, n(%)				<0.001
Missing	2 (3.3%)	14 (4.9%)	16 (4.6%)	
Hospital only	55 (93.2%)	2 (0.7%)	57 (17.1%)	
Hospital first	4 (6.8%)	127 (46.4%)	131 (39.3%)	
TH only	0 (0.0%)	34 (12.4%)	34 (10.2%)	
TH first	0 (0.0%)	53 (19.3%)	53 (15.9%)	
Both at the same time	0 (0.0%)	10 (3.6%)	10 (3.0%)	
Depends on illness	0 (0.0%)	48 (17.5%)	48 (14.4%)	
Provider Usage, n(%)				<0.001
Missing	2 (3.3%)	14 (4.9%)	16 (4.6%)	
Hospital first/only	59 (100.0%)	129 (47.1%)	188 (56.5%)	
TH first/only	0 (0.0%)	87 (31.8%)	87 (26.1%)	
Both at the same time	0 (0.0%)	10 (3.6%)	10 (3.0%)	
Depends on illness	0 (0.0%)	48 (17.5%)	48 (14.4%)	
Visits a specific TH	-	123 (42.7%)	-	
Satisfied with last visit	-	232 (80.6%)	-	
How much do you pay (*MZN*)?	-	50 (30, 150)	-	
Missing/non-cash amount	-	84 (29.2%)	-	

[a] To compare the distribution of patient characteristics by use of traditional healers, we employ chi-square tests. Similarly, we use a two-sample rank sum test for continuous variables by use of traditional healers.

[b] Continuous variables are reported as medians (interquartile range).

[c] Percentages may sum to greater than 100% because multiple answers may be provided.

Table 3: Model Effects: Patients who use Traditional Healers

	Odds Ratio	Lower 95%	Upper 95%	P-value
Age				0.016
25 (ref)	1			
35	1.95	1.21	3.15	
45	1.80	0.99	3.30	
Male	0.59	0.30	1.17	0.133
District				<0.001
Namacurra (ref)	1			
Alto Molocue	0.15	0.06	0.33	
Inhassuange	0.47	0.20	1.10	
Education (per level)	0.98	0.88	1.08	0.643
Can you cure AIDS?				0.048
No (ref)	1			
Do not know	0.88	0.27	2.88	
Yes	0.26	0.09	0.76	

3.3 Patients who identify routes of transmission

Table 4 summarizes patient characteristics by those who identify zero routes of infection versus those who identify one or more. To identify predictors of HIV knowledge, we fit a proportional-odds model with number of correct routes of infection as the outcome. Additionally five separate logistic regressions using the same predictors would identify which demographics or health-seeking behavior are predictive of knowledge for each of five methods of transmission; however, 'Mother to Child' and 'Blood' were too rarely identified for modeling. We multiply impute age for 31 patients and condom usage for 2 patients missing this data. Tables 5 and 6 summarize the model effects.

Table 4: Summary of Patient Characteristics and Response by Knowledge of HIV Transmission

Identify one of five routes of transmission?	None (n=47)	1 (n=164)	2 (n=59)	3 or more (n=79)	Combined (n=349)	P-value
Age	38 (25, 50)	35 (25, 45)	30 (23.5, 38)	29 (23, 40)	32 (25, 43)	0.003
Missing age, n(%)	14 (29.8%)	11 (6.7%)	4 (6.8%)	2 (2.5%)	31 (8.9%)	
Sex, n(%)						0.005
Female	35 (74.5%)	82 (50.0%)	41 (69.5%)	45 (57.0%)	203 (58.2%)	
Male	12 (25.5%)	82 (50.0%)	18 (30.5%)	34 (43.0%)	146 (41.8%)	
Education level	3 (0, 4.5)	4 (2, 7)	7 (4, 10)	7 (4, 10)	5 (2, 8)	<0.001
Location, n(%)						<0.001
Alto Molocue	8 (17.0%)	69 (42.1%)	12 (20.3%)	9 (11.4%)	98 (28.1%)	
Inhassuange	25 (53.2%)	55 (33.5%)	16 (27.1%)	23 (29.1%)	119 (34.1%)	
Namacurra	14 (29.8%)	40 (24.4%)	31 (52.5%)	47 (59.5%)	132 (37.8%)	
Rural/Urban, n(%)						<0.001
Rural	39 (83.0%)	115 (70.1%)	26 (44.1%)	51 (64.6%)	231 (66.2%)	
Urban	8 (17.0%)	49 (29.9%)	33 (55.9%)	28 (35.4%)	118 (33.8%)	
Civil status, n(%)						0.203
Divorced	5 (10.6%)	10 (6.1%)	8 (13.6%)	3 (3.8%)	26 (7.4%)	
Married	36 (76.6%)	136 (82.9%)	42 (71.2%)	63 (79.7%)	277 (79.4%)	
Single	2 (4.3%)	5 (3.0%)	5 (8.5%)	8 (10.1%)	20 (5.7%)	
Widowed	4 (8.5%)	13 (7.9%)	4 (6.8%)	5 (6.3%)	26 (7.4%)	
Age at marriage	18 (17, 20)	19 (18, 25)	19 (16.5, 21.5)	19.5 (17, 21)	19 (17, 22)	0.831
Missing age at marriage, n(%)	19 (40.4%)	46 (28.0%)	16 (27.1%)	15 (19.0%)	96 (27.5%)	
Number of spouses	1 (1, 1)	1 (1, 1)	1 (0, 1)	1 (1, 1)	1 (1, 1)	0.899
Missing number of spouses, n(%)	0 (0.0%)	1 (0.6%)	1 (1.7%)	3 (3.8%)	5 (1.4%)	
Number of previous spouses	1 (0, 1)	0 (0, 1)	1 (0, 1)	0 (0, 1)	0 (0, 1)	0.264
Missing number of previous spouses, n(%)	0 (0.0%)	1 (0.6%)	0 (0.0%)	2 (2.5%)	3 (0.9%)	
Number of children	4 (2.5, 5)	3 (2, 5)	3 (1.5, 4)	3 (1, 5)	3 (2, 5)	0.051
AIDS mentioned as most common ailment, n(%)						0.133
No	29 (61.7%)	91 (55.5%)	28 (47.5%)	34 (43.0%)	182 (52.1%)	
Yes	18 (38.3%)	73 (44.5%)	31 (52.5%)	45 (57.0%)	167 (47.9%)	
Respiratory ailments are common	25 (53.2%)	94 (57.3%)	37 (62.7%)	50 (63.3%)	206 (59.0%)	
Cervical cancer is common	16 (34.0%)	71 (43.3%)	22 (37.3%)	25 (31.6%)	134 (38.4%)	
Know someone with HIV/AIDS	4 (8.5%)	49 (29.9%)	18 (30.5%)	26 (32.9%)	97 (27.8%)	
How do people get infected with HIV/AIDS?						
Sex	0 (0.0%)	163 (99.4%)	59 (100.0%)	79 (100.0%)	301 (86.2%)	
Razors	0 (0.0%)	1 (0.6%)	52 (88.1%)	77 (97.5%)	130 (37.2%)	
Mother to Child	0 (0.0%)	0 (0.0%)	1 (1.7%)	4 (5.1%)	5 (1.4%)	
Blood	0 (0.0%)	0 (0.0%)	5 (8.5%)	15 (19.0%)	20 (5.7%)	
Needles	0 (0.0%)	0 (0.0%)	1 (1.7%)	67 (84.8%)	68 (19.5%)	
How do you prevent HIV/AIDS infection?						
Condoms	10 (21.3%)	107 (65.2%)	50 (84.7%)	66 (83.5%)	233 (66.8%)	
Do Not Share Razors	0 (0.0%)	5 (3.0%)	12 (20.3%)	18 (22.8%)	35 (10.0%)	

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Table 4 – Continued

Identify one of five routes of transmission?	None (n=47)	1 (n=164)	2 (n=59)	3 or more (n=79)	Combined (n=349)	P-value
Have One Partner	3 (6.4%)	48 (29.3%)	8 (13.6%)	15 (19.0%)	74 (21.2%)	
Abstinence	0 (0.0%)	2 (1.2%)	5 (8.5%)	9 (11.4%)	16 (4.6%)	
Can you cure AIDS?, n(%)						<0.001
Do not know	12 (25.5%)	10 (6.1%)	1 (1.7%)	0 (0.0%)	23 (6.6%)	
No	31 (66.0%)	146 (89.0%)	53 (89.8%)	76 (96.2%)	306 (87.7%)	
Yes	4 (8.5%)	8 (4.9%)	5 (8.5%)	3 (3.8%)	20 (5.7%)	
Condom Usage, n(%)						<0.001
Do not know/No answer	0 (0.0%)	1 (0.6%)	0 (0.0%)	1 (1.3%)	2 (0.6%)	
No	39 (83.0%)	62 (37.8%)	17 (28.8%)	17 (21.5%)	135 (38.7%)	
Yes	8 (17.0%)	101 (61.6%)	42 (71.2%)	61 (77.2%)	212 (60.7%)	
How do you learn about illness and treatment?						
School	0 (0.0%)	7 (4.3%)	6 (10.2%)	6 (7.6%)	19 (5.4%)	
Radio	8 (17.0%)	55 (33.5%)	18 (30.5%)	36 (45.6%)	117 (33.5%)	
Community Meetings	7 (14.9%)	32 (19.5%)	5 (8.5%)	15 (19.0%)	59 (16.9%)	
Community Members	8 (17.0%)	28 (17.1%)	8 (13.6%)	14 (17.7%)	58 (16.6%)	
Community Health Workers	3 (6.4%)	2 (1.2%)	3 (5.1%)	14 (17.7%)	22 (6.3%)	
Traditional Healers	0 (0.0%)	3 (1.8%)	2 (3.4%)	4 (5.1%)	9 (2.6%)	
Clinics	14 (29.8%)	62 (37.8%)	34 (57.6%)	26 (32.9%)	136 (39.0%)	

[a] To compare the distribution of patient characteristics by knowledge of HIV transmission (an ordered variable), we employ rank sum tests. Similarly, we use Spearman rank correlation tests for continuous variables by knowledge of HIV transmission.

[b] Continuous variables are reported as medians (interquartile range).

[c] Percentages may sum to greater than 100% because multiple answers may be provided.

Table 5: Proportional-Odds Model Effects: Predictors of Patient Knowledge of HIV Transmission

	Odds Ratio	Lower 95%	Upper 95%	P-value
Predictors of suggesting more routes of transmission (proportional-odds):				
Age (per 10 years)	0.97	0.80	1.19	0.796
Male	0.75	0.47	1.19	0.223
District				<0.001
Namacurra (ref)	1			
Alto Molocue	0.42	0.24	0.73	
Inhassunge	0.36	0.22	0.59	
Education (per level)	1.18	1.10	1.26	<0.001
Use condoms	2.58	1.56	4.28	<0.001
Identify AIDS as common	1.11	0.70	1.74	0.659

Table 6: Model Effects: Predictors of Patient Knowledge of HIV Transmission

	Odds Ratio	Lower 95%	Upper 95%	P-value
Predictors of suggesting sex as route of transmission:				
Age (per 10 years)	1.05	0.75	1.47	0.781
Male	0.76	0.32	1.83	0.547
District				0.015
Namacurra (ref)	1			
Alto Molocue	2.33	0.84	6.44	
Inhassunge	0.54	0.25	1.17	
Education (per level)	1.13	1.00	1.28	0.047
Use condoms	7.08	2.97	16.88	<0.001
Identify AIDS as common	1.53	0.72	3.23	0.266
Predictors of suggesting razors as route of transmission:				
Age (per 10 years)	0.89	0.69	1.14	0.352
Male	0.53	0.30	0.95	0.034
District				<0.001
Namacurra (ref)	1			
Alto Molocue	0.25	0.13	0.50	
Inhassunge	0.37	0.21	0.65	
Education (per level)	1.19	1.10	1.29	<0.001
Use condoms	1.94	1.07	3.53	0.029
Identify AIDS as common	1.09	0.63	1.86	0.766
Predictors of suggesting needles as route of transmission:				
Age (per 10 years)	1.01	0.76	1.34	0.940
Male	1.16	0.60	2.23	0.654
District				<0.001
Namacurra (ref)	1			
Alto Molocue	0.21	0.09	0.49	
Inhassunge	0.35	0.18	0.67	
Education (per level)	1.14	1.04	1.25	0.006
Use condoms	1.51	0.74	3.12	0.260
Identify AIDS as common	1.08	0.59	2.01	0.796

3.4 Patients who identify methods of prevention

Table 7 summarizes patient characteristics by those who identify zero, one, two or more methods of prevention. To identify predictors of knowledge of HIV prevention, we fit a proportional-odds model with number of correct methods of prevention as the outcome. Additionally four separate logistic regressions using the same predictors would identify which demographics or health-seeking behavior are predictive of knowledge for each of four methods of prevention; however, 'Do not share razors' and 'Abstinence' were too rarely identified for modeling. We multiply impute age for 31 patients and condom usage for 2 patients missing this data. Tables 8 and 9 summarize the model effects.

Table 7: Summary of Patient Characteristics and Response by Knowledge of HIV Prevention

Identify one of four methods of prevention?	None (n=53)	1 (n=237)	2 or more (n=59)	Combined (n=349)	P-value
Age	33 (25, 46.5)	33 (25, 45)	29 (23, 37)	32 (25, 43)	0.050
Missing age, n(%)	17 (32.1%)	12 (5.1%)	2 (3.4%)	31 (8.9%)	
Sex, n(%)					0.002
Female	42 (79.2%)	133 (56.1%)	28 (47.5%)	203 (58.2%)	
Male	11 (20.8%)	104 (43.9%)	31 (52.5%)	146 (41.8%)	
Education level	3 (0, 5)	4 (2, 7)	8 (6, 10)	5 (2, 8)	<0.001
Location, n(%)					<0.001
Alto Molocue	6 (11.3%)	80 (33.8%)	12 (20.3%)	98 (28.1%)	
Inhassuange	33 (62.3%)	63 (26.6%)	23 (39.0%)	119 (34.1%)	
Namacurra	14 (26.4%)	94 (39.7%)	24 (40.7%)	132 (37.8%)	
Rural/Urban, n(%)					0.018
Rural	44 (83.0%)	151 (63.7%)	36 (61.0%)	231 (66.2%)	
Urban	9 (17.0%)	86 (36.3%)	23 (39.0%)	118 (33.8%)	
Civil status, n(%)					0.024
Divorced	6 (11.3%)	17 (7.2%)	3 (5.1%)	26 (7.4%)	
Married	34 (64.2%)	197 (83.1%)	46 (78.0%)	277 (79.4%)	
Single	4 (7.5%)	10 (4.2%)	6 (10.2%)	20 (5.7%)	
Widowed	9 (17.0%)	13 (5.5%)	4 (6.8%)	26 (7.4%)	
Age at marriage	18 (17, 19)	19 (17, 22.8)	20 (18, 22)	19 (17, 22)	0.016
Missing age at marriage, n(%)	29 (54.7%)	55 (23.2%)	12 (20.3%)	96 (27.5%)	
Number of spouses	1 (0, 1)	1 (1, 1)	1 (1, 1)	1 (1, 1)	0.174
Missing number of spouses, n(%)	1 (1.9%)	3 (1.3%)	1 (1.7%)	5 (1.4%)	
Number of previous spouses	1 (0, 1)	1 (0, 1)	0 (0, 1)	0 (0, 1)	0.013
Missing number of previous spouses, n(%)	1 (1.9%)	1 (0.4%)	1 (1.7%)	3 (0.9%)	
Number of children	3 (3, 5)	3 (2, 5)	2 (1, 5)	3 (2, 5)	0.041
AIDS mentioned as most common ailment, n(%)					0.375
No	23 (43.4%)	128 (54.0%)	31 (52.5%)	182 (52.1%)	
Yes	30 (56.6%)	109 (46.0%)	28 (47.5%)	167 (47.9%)	
Respiratory ailments are common	30 (56.6%)	131 (55.3%)	45 (76.3%)	206 (59.0%)	
Cervical cancer is common	18 (34.0%)	96 (40.5%)	20 (33.9%)	134 (38.4%)	
Know someone with HIV/AIDS	9 (17.0%)	63 (26.6%)	25 (42.4%)	97 (27.8%)	
How do people get infected with HIV/AIDS?					
Sex	19 (35.8%)	223 (94.1%)	59 (100.0%)	301 (86.2%)	
Razors	7 (13.2%)	76 (32.1%)	47 (79.7%)	130 (37.2%)	
Mother to Child	0 (0.0%)	2 (0.8%)	3 (5.1%)	5 (1.4%)	
Blood	1 (1.9%)	8 (3.4%)	11 (18.6%)	20 (5.7%)	
Needles	5 (9.4%)	39 (16.5%)	24 (40.7%)	68 (19.5%)	
How do you prevent HIV/AIDS infection?					
Condoms	0 (0.0%)	177 (74.7%)	56 (94.9%)	233 (66.8%)	
Do Not Share Razors	0 (0.0%)	3 (1.3%)	32 (54.2%)	35 (10.0%)	

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Table 7 – Continued

Identify one of four methods of prevention?	None (n=53)	1 (n=237)	2 or more (n=59)	Combined (n=349)	P-value
Have One Partner	0 (0.0%)	53 (22.4%)	21 (35.6%)	74 (21.2%)	
Abstinence	0 (0.0%)	4 (1.7%)	12 (20.3%)	16 (4.6%)	
Can you cure AIDS?, n(%)					0.012
Do not know	9 (17.0%)	13 (5.5%)	1 (1.7%)	23 (6.6%)	
No	40 (75.5%)	211 (89.0%)	55 (93.2%)	306 (87.7%)	
Yes	4 (7.5%)	13 (5.5%)	3 (5.1%)	20 (5.7%)	
Condom Usage, n(%)					<0.001
Do not know/No answer	0 (0.0%)	2 (0.8%)	0 (0.0%)	2 (0.6%)	
No	39 (73.6%)	88 (37.1%)	8 (13.6%)	135 (38.7%)	
Yes	14 (26.4%)	147 (62.0%)	51 (86.4%)	212 (60.7%)	
How do you learn about illness and treatment?					
School	0 (0.0%)	12 (5.1%)	7 (11.9%)	19 (5.4%)	
Radio	9 (17.0%)	86 (36.3%)	22 (37.3%)	117 (33.5%)	
Community Meetings	5 (9.4%)	42 (17.7%)	12 (20.3%)	59 (16.9%)	
Community Members	10 (18.9%)	37 (15.6%)	11 (18.6%)	58 (16.6%)	
Community Health Workers	2 (3.8%)	13 (5.5%)	7 (11.9%)	22 (6.3%)	
Traditional Healers	1 (1.9%)	6 (2.5%)	2 (3.4%)	9 (2.6%)	
Clinics	19 (35.8%)	96 (40.5%)	21 (35.6%)	136 (39.0%)	

[a] To compare the distribution of patient characteristics by knowledge of HIV prevention (an ordered variable), we employ rank sum tests. Similarly, we use Spearman rank correlation tests for continuous variables by knowledge of HIV transmission.
[b] Continuous variables are reported as medians (interquartile range).

[c] Percentages may sum to greater than 100% because multiple answers may be provided.

Table 8: Proportional-Odds Model Effects: Predictors of Patient Knowledge of HIV Prevention

	Odds Ratio	Lower 95%	Upper 95%	P-value
Predictors of suggesting more methods of prevention (proportional-odds):				
Age (per 10 years)	0.86	0.69	1.09	0.216
Male	1.44	0.83	2.48	0.191
District				0.177
Namacurra (ref)	1			
Alto Molocue	0.91	0.49	1.68	
Inhassunge	0.60	0.35	1.04	
Education (per level)	1.17	1.08	1.26	<0.001
Use condoms	3.50	1.92	6.37	<0.001
Identify AIDS as common	0.63	0.38	1.06	0.081

Table 9: Model Effects: Predictors of Patient Knowledge of HIV Prevention

	Odds Ratio	Lower 95%	Upper 95%	P-value
Predictors of suggesting condom use for prevention:				
Age (per 10 years)	0.69	0.54	0.89	0.005
Male	0.94	0.49	1.81	0.858
District				0.001
Namacurra (ref)	1			
Alto Molocue	0.27	0.13	0.56	
Inhassunge	0.46	0.24	0.89	
Education (per level)	1.09	1.00	1.20	0.051
Use condoms	5.00	2.73	9.16	<0.001
Identify AIDS as common	1.06	0.58	1.94	0.838
Predictors of suggesting monogamy for prevention:				
Age (per 10 years)	1.45	1.11	1.89	0.007
Male	1.56	0.76	3.21	0.227
District				<0.001
Namacurra (ref)	1			
Alto Molocue	5.81	2.71	12.46	
Inhassunge	0.86	0.37	2.03	
Education (per level)	0.92	0.83	1.03	0.156
Use condoms	0.46	0.22	0.93	0.031
Identify AIDS as common	0.80	0.39	1.63	0.534

3.5 Knowledge of HIV Transmission by How Patients Learn About Illness and Treatment

To identify which sources of learning predict increased understanding of HIV transmission, we fit a proportional-odds model with number of correct routes of infection as the outcome. Table 10 summarizes the model effects.

Table 10: Model Effects: Knowledge of HIV Transmission by Source of Knowledge

	Odds Ratio	Lower 95%	Upper 95%	P-value
School	4.41	1.86	10.46	<0.001
Radio	2.48	1.57	3.91	<0.001
Community Meetings	1.58	0.90	2.78	0.112
Community Members	1.68	0.95	2.98	0.076
Community Health Workers	10.14	3.89	26.44	<0.001
Traditional Healers	3.95	1.15	13.60	0.029
Clinics	1.97	1.24	3.13	0.004

3.6 Knowledge of HIV Prevention by How Patients Learn About Illness and Treatment

To identify which sources of learning predict increased understanding of HIV prevention, we fit a proportional-odds model with number of correct methods of preventing HIV/AIDS as the outcome. Table 11 summarizes the model effects.

Table 11: Model Effects: Knowledge of HIV Prevention by Source of Knowledge

	Odds Ratio	Lower 95%	Upper 95%	P-value
School	5.81	2.20	15.37	<0.001
Radio	2.27	1.36	3.79	0.002
Community Meetings	2.34	1.24	4.41	0.009
Community Members	1.60	0.84	3.03	0.153
Community Health Workers	3.66	1.41	9.52	0.008
Traditional Healers	2.01	0.47	8.49	0.343
Clinics	1.68	1.01	2.82	0.048

3.7 Patients and Provider Usage

Table 12 summarizes patient characteristics by provider usage. Forty-eight patients who said they would go to both providers at once were dropped along with 26 who refused to answer or responded with a non-provider.

Table 12: Summary of Patient Characteristics and Provider Usage

How do you decide when to go to TH or clinic?	Hospital only/first (n=188)	TH only/first (n=87)	Combined (n=275)	P-value[a]
Age[b]	32 (25, 43.5)	35 (24, 45)	32 (25, 45)	0.654
Missing age, n(%)	13 (6.9%)	10 (11.5%)	23 (8.4%)	
Sex, n(%)				0.073
Female	114 (60.6%)	42 (48.3%)	156 (56.7%)	
Male	74 (39.4%)	45 (51.7%)	119 (43.3%)	
Education level	4 (2, 7)	4 (2, 7)	4 (2, 7)	0.488
Location, n(%)				0.011
Alto Molocue	68 (36.2%)	16 (18.4%)	84 (30.5%)	
Inhassuange	59 (31.4%)	33 (37.9%)	92 (33.5%)	
Namacurra	61 (32.4%)	38 (43.7%)	99 (36.0%)	
Rural/Urban, n(%)				0.197
Rural	122 (64.9%)	64 (73.6%)	186 (67.6%)	
Urban	66 (35.1%)	23 (26.4%)	89 (32.4%)	
Civil status, n(%)				0.221
Divorced	16 (8.5%)	4 (4.6%)	20 (7.3%)	
Married	148 (78.7%)	73 (83.9%)	221 (80.4%)	
Single	9 (4.8%)	7 (8.0%)	16 (5.8%)	
Widowed	15 (8.0%)	3 (3.4%)	18 (6.5%)	
Age at marriage	19 (17, 23)	19 (18, 21)	19 (17, 22)	0.502
Missing age at marriage, n(%)	50 (26.6%)	24 (27.6%)	74 (26.9%)	
Number of spouses	1 (1, 1)	1 (1, 1)	1 (1, 1)	0.509
Missing number of spouses, n(%)	2 (1.1%)	1 (1.1%)	3 (1.1%)	
Number of previous spouses	1 (0, 1)	1 (0, 1)	1 (0, 1)	0.698
Missing number of previous spouses, n(%)	1 (0.5%)	1 (1.1%)	2 (0.7%)	
Number of children	3 (1.8, 5)	3 (1, 5)	3 (1, 5)	0.932
AIDS mentioned as most common ailment, n(%)				0.116
No	105 (55.9%)	39 (44.8%)	144 (52.4%)	
Yes	83 (44.1%)	48 (55.2%)	131 (47.6%)	
Respiratory ailments are common	114 (60.6%)	53 (60.9%)	167 (60.7%)	
Cervical cancer is common	75 (39.9%)	37 (42.5%)	112 (40.7%)	
Know someone with HIV/AIDS	55 (29.3%)	23 (26.4%)	78 (28.4%)	
How do people get infected with HIV/AIDS?[c]				
Sex	163 (86.7%)	70 (80.5%)	233 (84.7%)	
Razors	67 (35.6%)	27 (31.0%)	94 (34.2%)	
Mother to Child	2 (1.1%)	2 (2.3%)	4 (1.5%)	
Blood	11 (5.9%)	5 (5.7%)	16 (5.8%)	
Needles	32 (17.0%)	16 (18.4%)	48 (17.5%)	
How do you prevent HIV/AIDS infection?[c]				
Condoms	124 (66.0%)	58 (66.7%)	182 (66.2%)	
Do Not Share Razors	12 (6.4%)	11 (12.6%)	23 (8.4%)	
Have One Partner	44 (23.4%)	17 (19.5%)	61 (22.2%)	
Abstinence	10 (5.3%)	2 (2.3%)	12 (4.4%)	
Can you cure AIDS?, n(%)				0.930
Do not know	12 (6.4%)	6 (6.9%)	18 (6.5%)	
No	165 (87.8%)	75 (86.2%)	240 (87.3%)	
Yes	11 (5.9%)	6 (6.9%)	17 (6.2%)	
How do you learn about illness and treatment?[c]				
School	16 (8.5%)	2 (2.3%)	18 (6.5%)	
Radio	64 (34.0%)	24 (27.6%)	88 (32.0%)	
Community Meetings	40 (21.3%)	10 (11.5%)	50 (18.2%)	
Community Members	25 (13.3%)	17 (19.5%)	42 (15.3%)	
Community Health Workers	7 (3.7%)	8 (9.2%)	15 (5.5%)	
Traditional Healers	2 (1.1%)	6 (6.9%)	8 (2.9%)	
Clinics	74 (39.4%)	32 (36.8%)	106 (38.5%)	

[a] To compare the distribution of patient characteristics by provider usage, we employ chi-square tests. Similarly, we use a two-sample rank sum test for continuous variables by provider usage.
[b] Continuous variables are reported as medians (interquartile range).
[c] Percentages may sum to greater than 100% because multiple answers may be provided.

This is the odds of visiting TH only/first versus hospital only/first.

Table 13: Model Effects: Patients and Provider Usage

	Odds Ratio	Lower 95%	Upper 95%	P-value
Age				0.920
25 (ref)	1			
35	0.92	0.60	1.40	
45	0.91	0.54	1.56	
Male	2.52	1.37	4.66	0.003
District				0.001
Inhassunge (ref)	1			
Alto Molocue	0.26	0.12	0.55	
Namacurra	0.85	0.46	1.60	
Education (per level)	0.94	0.86	1.03	0.192
Routes of Transmission (per 1 increase)	0.88	0.66	1.17	0.369