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Factors Influencing Hiv Testing In A Small Public Hospital In Manglaralto Ecuador

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ABSTRACT

Increasing rates of HIV testing is critical to reducing the spread of the HIV epidemic in Ecuador. HIV testing serves a number of purposes; it can be a gateway for people to enter the HIV care continuum, it may reduce risk behaviors among those tested, and it can influence social norms around HIV. This study investigated individual, interpersonal, institutional, and community level factors influencing HIV testing. A cross sectional survey was administered to a convenience sample of patients at a small, rural, public hospital in coastal Ecuador. Educational attainment, HIV knowledge, and perception of confidentiality of test results were significantly associated with HIV testing. Individual risk behaviors and community level attributable stigma were not significantly associated with HIV testing. These results indicate a variety of targets for future research and intervention development, both at the individual and institutional level, to increase rates of HIV testing in this setting.

INTRODUCTION

There are currently 1.5 million people living with human immunodeficiency virus (HIV) in Latin America, which represents an overall prevalence of approximately 0.5% in this region (UNAIDS, 2013). The prevalence of HIV in Ecuador among adults ages 15 to 49 was estimated at 0.6% in 2012 (UNAIDS, 2013). However, in some vulnerable populations in Ecuador, HIV prevalence exceeds 5% (UNAIDS & Ministerio de Salud Pública del Ecuador, 2006). Therefore, Ecuador is described as a country with a concentrated, but rapidly growing epidemic (Cruz Roja Ecuatoriana, 2010; UNAIDS & Ministerio de Salud Pública del Ecuador, 2006).

In Ecuador 74% of the cases of HIV/AIDS are concentrated primarily in coastal regions (Pan American Health Organization, 2012). The Santa Elena province, where this study was conducted, is a coastal province with the third highest HIV incidence rate in Ecuador at 10.87 cases per 100,000 inhabitants (Ministerio de Salud Pública del Ecuador, 2010b). Pregnant women are a particularly high-risk population in coastal Ecuador with an estimated prevalence of HIV in this group greater than 1% (Sanchez-Gomez et al., 2014). This high prevalence among a general population sample indicates that the HIV epidemic in Ecuador may be transitioning from concentrated to generalized, with a majority of new infections arising from sexual risk behaviors in the general population (Sanchez-Gomez et al., 2014; UNAIDS, 2008).

Identifying barriers and enablers to HIV testing is critical to reducing the spread of the HIV epidemic. Estimates from ENDEMAIN 2004, a national health survey conducted in 2004 focused on maternal and child health in Ecuador (El Centro de Estudios de Población y Desarrollo Social, 2013), show that 44.2% of women knew where to get tested, but only 13.6% of women had taken an HIV test (UNAIDS & Ministerio de Salud Pública del Ecuador, 2006).

Additionally, women in urban areas were almost three times more likely to receive an HIV test than those in rural areas (UNAIDS & Ministerio de Salud Pública del Ecuador, 2006). These statistics indicate low overall rates of HIV testing and significant disparities in HIV testing.

Increasing rates of HIV testing is a critical component of a successful national HIV program (Ministerio de Salud Pública del Ecuador, 2010a; UNAIDS, 2010). HIV testing and counseling serve as a gateway for persons to enter the HIV treatment cascade or care continuum: receive an HIV diagnosis, get linked to care, receive medications and support for adherence to treatment, and eventually reduce an individual's viral load (U.S. Department of Health and Human Services, 2013; World Health Organization, 2003). Voluntary Counseling and Testing for HIV aims to prevent HIV transmission, prevent HIV acquisition, promote early and appropriate use of health services, change social norms towards HIV, and provide counseling for adherence to treatment (UNAIDS, 2001). Studies have shown that HIV testing and counseling can reduce sexual risk behaviors associated with HIV transmission risk, though some studies only show risk reduction in certain populations or for certain risk behaviors (Bunnell et al., 2006; Cremin et al., 2010; Denison, O'Reilly, Schmid, Kennedy, & Sweat, 2008).

Very little information exists on barriers and enablers to HIV testing in Ecuador. Previous studies have focused on antenatal care services and HIV prevalence (Sanchez-Gomez et al., 2014), patterns of HIV risk among men who have sex with men (MSM) (Jacobson et al., 2014), and prevention of mother-to-child transmission (Dearborn, Lewis, & Mino, 2010). To the authors' knowledge, this is the first study to investigate factors influencing HIV testing in Ecuador.

A variety of factors are associated with HIV testing, including those at individual, interpersonal, institutional, and community levels. Therefore, this study examines the factors

influencing HIV testing from an ecological perspective, which previous research has identified as a beneficial model for identifying determinants of risk or protection behaviors for sexually transmitted infections including HIV (DiClemente, Salazar, & Crosby, 2007; DiClemente, Salazar, Crosby, & Rosenthal, 2005). At the individual level, we considered the following factors that have been previously associated with HIV testing: demographic features, including education level, gender, and marital status (Bhoobun et al., 2013; Regan et al., 2013); HIV knowledge (Regan et al., 2013; Sherr et al., 2007); HIV risk behavior (Schwarcz et al., 2011); and perceived need for an HIV test (Pisculli et al., 2011). At the interpersonal level, we considered if participants had an acquaintance with HIV (Regan et al., 2013; Sambisa, Curtis, & Mishra, 2010). At the institutional level, we asked about perceived confidentiality of test results and knowledge of where to seek treatment if diagnosed with HIV (Bhoobun et al., 2013; Dandorf, Khan, & Rogers, 2013). Finally, at the community level, we asked about attributed stigma, defined as the attitudes which an individual attributes to others in a community (Visser, Kershaw, Makin, & Forsyth, 2008), as stigma has been identified to have a strong influence on HIV testing rates (Fortenberry et al., 2002; Meiberg, Bos, Onya, & Schaalma, 2008; UNAIDS & Ministerio de Salud Pública del Ecuador, 2006; Young & Zhu, 2012).

The primary aims of this study are to better understand which factors are associated with HIV testing in a small public hospital setting in Manglaralto, Ecuador. This exploratory study will identify future targets for research and intervention development in this setting.

METHODS

Study Location and Population

This cross sectional study was conducted in the Manglaralto Hospital, a small public

hospital in the Santa Elena province on the Southwestern coast of Ecuador. The Manglaralto Hospital is the smaller of two hospitals in the province and serves all of the residents in the northern portion of the province. The hospital provides free HIV testing and counseling to anyone who requests it as well as offering HIV tests to all women during pregnancy as outlined in the national HIV testing guidelines (Ministerio de Salud Pública del Ecuador, 2010a). The study population consisted of all persons over age 18 who were seeking care or accompanying someone seeking care at the Manglaralto Hospital.

Study Procedures

A short self-administered survey was offered to a convenience sample of patients in the hospital waiting room during a specific block of time (for example, 6-7am, 9-11am, or 1-3pm) each weekday for six weeks between June 18 and August 1, 2013. Recruitment into the study occurred during a range of times on each day of the week allowed for a broader survey population. While the hospital waiting room is a fluid environment and it was not possible to ask every single person present, the survey was offered to an estimated 90% of the patients present during survey hours. The number of people present in the waiting room, the number of people offered the survey, and the primary reason for declining participation for those who did not wish to participate were recorded for each day of surveying. Of those offered the survey, 65% agreed to participate in the study. The most common reasons for refusing to participate were discomfort with the survey material (49%) and lack of time (12%).

All participants gave verbal consent prior to participating in the survey. Then, participants were offered the option to fill in the paper-and-pen survey on their own or, in the case of a low reading level, with the assistance of a study team member. If assisted, the study team member would read each question and answer choices to the participant and then the

participant would either circle their response or indicate their response verbally to the study team member. Though surveys were completed in a public waiting room setting, every effort was made to ensure confidentially of the participants results. Surveys were conducted in Spanish by undergraduate and graduate students from Yale University and the University of Massachusetts Medical School. All study procedures and materials were reviewed and approved by the Yale University Human Subjects Committee prior to data collection.

Survey Instrument

This survey investigated potential factors associated with HIV testing which was assessed by asking participants if they had received an HIV test in the last year. Participants were categorized as having received an HIV test if they answered "yes" and not having received an HIV test if they answered "no" or "I don't know." The survey instrument had four sections of factors associated with HIV testing: (1) individual measures, (2) interpersonal measures, (3) institutional measure, and (4) community measures.

Individual Measures

Demographic features were gathered using a subset of questions from the 1999 and 2000 Family Health International 1999 HIV/AIDS/STD Behavioral Surveillance Survey for Adults (Family Health International & USAID, 2000). The survey asked about age, gender, marital status, and highest level of education completed.

HIV Knowledge was assessed using the HIV-KQ-18 (Carey & Schroder, 2002), a short set of 18 HIV-related statements addressing methods of virus transmission, behaviors that reduce or increase risk of transmission, and nature of the illness. Two items, one regarding the efficacy of skin condoms and one regarding the use of baby oil as a lubricant, were removed from the scale as they were not relevant to this population. Internal consistency for this modified 16-item

scale was good; Chronbach's alpha = 0.79. Participants answered "true", "false", or "I don't know" for each statement. Scores for individual items were averaged to create an overall knowledge score, which was treated as a continuous variable. This scale was chosen because it has been used with low-literacy populations (Carey & Schroder, 2002; Pisculli et al., 2011) such as the patient population at the Manglaralto Hospital.

HIV Risk behaviors were assessed using questions from the 1999 and 2000 Family Health International 1999 HIV/AIDS/STD Behavioral Surveillance Survey for Adults (Family Health International & USAID, 2000). Risk behavior was categorized based on previous literature where available (Chedraui, Hidalgo, Chavez, & San Miguel, 2004; Hidalgo, Chedraui, & Chavez, 2005; Madkour, Farhat, Halpern, Godeau, & Nic Gabhainn, 2010). An individual's overall HIV risk behavior was assessed using the questions presented in the table below. Each high-risk behavior was coded as (1) and each low-risk behavior was coded as (0). Variables were averaged to calculate total risk score.

Question	**Low Risk**	**High Risk**
Thinking about all of the times that you have had sex in the last year, how often did you use a condom?	Always, Often, Sometimes	Almost never, Never
Did you use a condom the last time that you had sex?	No	Yes
How old were you the first time you had sex?	≥ age16	≤ age 15
In the last 12 months have you had sex with a partner that was not your wife or husband or whom you were not living with?	No	Yes
In the last 12 months have you had sex in exchange for money or other things?	No	Yes
How many partners have you had sex with in the last year?	≤ 1	>1
Have you had sex in the last 12 months with someone who was 10 or more years older than you?	No	Yes
(For men only) In the last 12 months have you had sex with a male partner?	No	Yes

Perceived need for an HIV test was evaluated through one question asking "Do you think that you need an HIV test today?" Participants who responded "yes" were considered to

perceive a need for the test; those who answered "no" were not.

Interpersonal Measure

Knowledge of someone with HIV was assessed using one question taken from the 1999 and 2000 Family Health International 1999 HIV/AIDS/STD Behavioral Surveillance Survey for Adults. The question asked, "Do you know or have you known someone who has HIV?" with answer choices "yes" and "no".

Institutional Measures

Knowledge of where to receive HIV treatment was measured with one question asking, "If you had HIV, would you know where to receive treatment?" with response choices "yes" or "no".

Belief that HIV test results would be kept confidential was assessed with one question asking, "If you had received HIV test in the hospital today, do you think that your results would have been kept confidential?" with answers "yes" or "no".

Community Measure

Attributable stigma was measured using a set of five stigma questions adapted from the Attributed Stigma Scale (Visser et al., 2008). Each item was a statement about the community, such as "The majority of people think that contracting HIV is a punishment for bad decisions", to which participants answered "yes" or "no". Each response indicating the presence of stigma was scored as (1) and each response indicating the absence of stigma was scored as (0). Responses were then averaged to give a stigma score between 0 and 1, with higher scores indicating an increased perceived presence of community level stigma. The test for internal reliability of this scale gave a Chronbach's alpha of 0.67.

Statistical Analysis

Data were entered and validated; any discrepancies were manually checked and corrected. Survey data were analyzed using SAS software version 9.3. The study team collected 343 surveys from participants. For the final analysis, 136 participants were excluded due to missing data, leaving 207 participants. Those who were excluded from the analysis were significantly older and had lower levels of education than those who remained in the final analysis but did not differ on gender distribution, marital status, or prevalence of HIV testing in the last year. The comparison of those excluded and those included in this analysis is presented in *Appendix 1*.

The outcome of interest was having received an HIV test in the last year. To determine the factors significantly associated with HIV testing in this community, a multiple logistic model was used to determine the odds ratio for each factor under consideration. To further analyze the effect of the different variables on HIV testing, the likelihood ratio test with backwards elimination was used to determine which characteristics should be kept in the final multivariate logistic regression model.

RESULTS

Sample Characteristics

Table 1 presents the demographics of the sample. The mean age of the participants surveyed was 33.5 years of age (SD = 12.1). The sample was 61.8% female, and the majority of the sample (62.3%) was married. Very few participants were divorced or widowed. More than half (55.6%) of the sample had not received education beyond primary school.

More than half of participants (64.3%) had not received an HIV test in the last year. The average score on the HIV knowledge questions was 48.2% correct. The mean risk score was 0.274, indicating that, on average, participants reported participating in just over 2 of the 8 risk behaviors. The majority of participants (76.8%) thought that they needed an HIV test. Just over one third (35.8%) of the sample knew someone with HIV. Most participants (69.6%) knew where to seek treatment for HIV, and a similar proportion (70.1%) believed the results of an HIV test would be kept confidential at the hospital. The mean attributable stigma score was 0.54, indicating that participants perceived that just over half of the statements indicating stigma in the community were true.

Differences between those who had and had not received an HIV test

The unadjusted odds ratios in *Table 2* represent the differences in characteristics between those who had or had not received an HIV test in the last year. Three characteristics that differ significantly between the two groups are marital status, HIV knowledge score, and perceptions of confidentiality of the HIV test results. Those who were divorced or widowed were 12.36 times more likely than those who were single to have received an HIV test (95% CI: 1.25, 122.62). Those who had received an HIV test in the last year were significantly more knowledgeable about HIV. Those who believed the hospital would maintain confidentiality of the test results had 2.15 (95% CI: 1.10, 4.20) times the odds of receiving an HIV test in the last year than those who did not believe the hospital would maintain confidentiality.

Logistic Regression Model

Table 2 presents the results of the multivariate logistic regression. In the final model two individual factors, the highest level of education completed and HIV knowledge score, were both significantly associated with having received an HIV test in the last year. Highest level of

education achieved was significantly associated with HIV testing, but the relationship was non-linear. Those with a secondary education had 0.41 (95% CI: 0.20, 0.85) times the odds of receiving an HIV test of those with a primary education or less; conversely, those with at least a college education had 0.64 (95% CI: 0.24, 1.70) times the odds of receiving an HIV test as those with a primary education. The odds of receiving an HIV test among those with a perfect knowledge score were 8.04 (95% CI: 1.8, 35.82) times the odds among those who answered no knowledge questions correctly. One community level factor, belief that the hospital would keep their HIV test results confidential, was included in the reduced model. Those who believed that their HIV test results would be kept confidential were 2.18 (95% CI: 1.09, 4.35) times more likely to have received an HIV test in the last year than those who did not believe that the results would be kept confidential.

DISCUSSION

This study found that highest level of education completed, HIV knowledge, and the belief that HIV test results would be kept confidential are three factors associated with HIV testing in this population. The results regarding highest level of education completed indicate that both those who have completed high school and those who have completed college have lower odds of receiving an HIV test in the last year than those with a primary education. This finding contradicts other studies that have shown that HIV testing is associated with higher education levels (Bhoobun et al., 2013; Sherr et al., 2007), but supports other findings that have shown that educational attainment was associated with HIV test refusal (Pisculli et al., 2011). These findings indicate the presence of an association between education level and HIV testing; more research is needed to understand the mechanisms underlying this association.

The positive association between higher HIV knowledge and HIV testing has been documented in previous studies (Regan et al., 2013; Sherr et al., 2007). Given that this positive association persists in this community, health intervention efforts targeting HIV knowledge may be particularly successful at effecting change in an individual's decision to receive an HIV test. However, future research investigating the association between HIV knowledge and HIV testing longitudinally is needed to better understand if there is a causal relationship.

Of particular concern is the finding that HIV testing was not associated with individual risk behavior. In Ecuador many of the HIV testing recommendations are based on individual risk behaviors (Ministerio de Salud Pública del Ecuador, 2010a). Yet, the results of this study do not indicate that the individuals in this study sought out HIV testing based on their risk profile. Therefore, future HIV testing campaigns in the region may want to include elements to increase awareness of personal HIV risk or activities for individuals to assess personal HIV risk, and then emphasize the need for HIV testing among those at high risk.

One institutional level factor was identified in this study as relevant to HIV testing in this community. The belief that the test results would be kept confidential is significantly positively associated with HIV testing. This finding supports previous research also indicating that trust in confidentiality of test results is associated with a higher rate of HIV testing (Bhoobun et al., 2013; Dandorf et al., 2013). Confidentiality of HIV test results is an important factor for the hospital to consider in the delivery of their services as it has clear implications on willingness to access health services.

In this population attributable stigma is not associated with HIV testing in the last year. This is surprising given the number of previous studies finding that stigma was associated with HIV testing (Fortenberry et al., 2002; Meiberg et al., 2008; UNAIDS & Ministerio de Salud

Pública del Ecuador, 2006; Young & Zhu, 2012). There are two possible explanations for this null finding. First, overall levels of stigma in the community were moderate; therefore, there may not have been sufficiently high levels of stigma or sufficient variation in perception of stigma in the community to detect an association. Second, the Attributable Stigma Scale used in this survey was adapted from a previous study in South Africa (Visser et al., 2008) and may not be an accurate measure of attributable stigma in this setting.

This study had some limitations. The participants were drawn from a convenience sample of the patient population in the Manglaralto Hospital. Therefore, the results are not necessarily representative of the entire population of the region. Additionally, those who were excluded from the analysis due to missing data varied from those included on age and educational attainment, which may also affect generalizability of results. The survey did not ask women participants to indicate if they were pregnant in the last year. In Ecuador, the HIV testing guidelines suggest that all women receive two HIV tests during their pregnancy (Ministerio de Salud Pública del Ecuador, 2010a). Therefore, some of the associations between individual features and HIV testing may be confounded by this variable. However, a secondary analysis of interaction with gender and HIV knowledge, attributable stigma, or risk behavior found no significant effects. Finally, surveys were completed in a public waiting room setting; though every effort was made to ensure confidentially of the participants results, there may be some underreporting of highly stigmatized or less socially desirable behaviors.

Despite these limitations, this study is the first to present evidence as to the factors associated with HIV testing in a small rural public hospital setting in Ecuador. These findings identify a number of areas that could be the target of future research and intervention

development. Increasing rates of HIV testing is a critically important component to reducing the incidence of HIV and curbing the spread of the HIV epidemic in Ecuador.

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Table 1. Demographics of the sample population[a]

Characteristic	(N=207) [b]
Age (years)	33.5 ± 12.1
Gender	
Female	128 (61.8)
Male	79 (38.1)
Marital Status	
Single	45 (21.7)
Married	129 (62.3)
Living with someone, not married	28 (13.5)
Divorced	3 (1.5)
Widowed	2 (1.0)
Highest level of education completed	
Primary or less	113 (55.6)
Secondary	67 (32.4)
College or above	27 (13.0)

[a] Table values are mean ± SD for continuous variables and n (column %) for categorical variables.
[b] Percentages may not sum to 100% due to rounding.

Table 2. Unadjusted and adjusted associations between correlates of HIV testing (N = 207)

Characteristic	Unadjusted OR (95% CI)	Adjusted OR (95%CI)
Individual		
Age	1.00 (0.97, 1.02)	--
Gender		
Men	Reference	--
Women	1.61 (0.88, 2.94)	--
Marital Status		
Single	Reference	--
Living Together	2.32 (0.84, 6.37)	--
Married	1.77 (0.82, 3.82)	--
Divorced or Widowed	12.36 (1.25, 122.62)*	--
Highest Level of Education completed		
Primary or less	Reference	Reference
Secondary	0.62 (0.32, 1.19)	0.41 (0.20, 0.85)*
College or above	1.08 (0.46, 2.54)	0.64 (0.24, 1.70)
Knowledge Score	4.65 (1.31, 16.51)*	8.05 (1.81, 35.82)*
Risk Score	1.35 (0.22, 8.14)	--
Perceived need for HIV test		
Yes	1.15 (0.58, 2.27)	--
No	Reference	--
Interpersonal		
Knows someone with HIV		
Yes	1.65 (0.92, 2.97)	--
No	Reference	
Institutional		
Knows where to receive treatment		
Yes	1.43 (0.76, 2.70)	--
No	Reference	--
Believes results would be kept confidential		
Yes	2.15 (1.10, 4.20)*	2.18 (1.09, 4.35)*
No	Reference	Reference
Community-level		
Attributable Stigma Score	0.98 (0.40, 2.38)	--

* Indicates significance at $p<0.05$

Appendix 1. Comparison between those who included in and excluded from analysis

Characteristic	Included [a] (N=207)	Excluded [a.b] (N=136)	Measure of difference
Age (years)	33.5 ± 12.1	39.6 ± 14.4	t=4.07, p<0.01*
Gender			χ^2 = 0.37, p = 0.54
Female	128 (61.8)	84 (65.1)	
Male	79 (38.1)	45 (34.9)	
Marital Status			χ^2 = 4.9, p = 0.30
Single	45 (21.7)	26 (19.9)	
Married	129 (62.3)	80 (61.1)	
Living with someone, not married	28 (13.5)	18 (13.7)	
Divorced	3 (1.5)	1 (0.8)	
Widowed	2 (1.0)	6 (4.6)	
Highest level of education completed			χ^2 = 16.1, p<0.01
Primary or less	113 (55.6)	97 (74.1)	
Secondary	67 (32.4)	30 (22.9)	
College or above	27 (13.0)	4 (3.1)	
HIV test in last year			χ^2 = 1.92, p = 0.17
Yes	74 (35.8)	37 (28.5)	
No	133 (64.3)	93 (71.5)	

[a] Column values are mean ± SD for continuous variables and n (column %) for categorical variables.
[b] Numbers may not sum to total and percentages may not sum to 100 due to missing data and rounding.