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Predictors of Adherence to Latent Tuberculosis Infection Therapy in Latino Immigrants

Rita L. Ailinger, PhD, RN

School of Nursing & Health Studies, Georgetown University

Pat Black, MSN

Nursing Doctoral Program, George Mason University

Nga Nguyen, MPH, RN

Arlington County, VA, Tuberculosis Control Program

Howard Lasus, PhD

University Libraries, George Mason University

Abstract

Adherence to Latent Tuberculosis Infection (LTBI) therapy is a continuing community problem. The purpose of this study was to examine the predictors of adherence to LTBI therapy in Latino immigrants at a public health clinic. A descriptive study was conducted to examine 153 randomly selected records from a population of Latino immigrant clients who had received a recommendation for 9 months of Isoniazid (INH) therapy. Most of the clients were women (64%), the mean age was 26.1, and the mean time in the U.S. was 4.58 years. The majority came from El Salvador, Bolivia, or Guatemala. Adherence dropped off in a linear fashion from month 1 (84%) to month 8 (34%). None of the demographic factors predicted adherence. Implications for community health nursing are discussed.

According to the Centers for Disease Control and Prevention (CDC, 2005), treating persons at high risk for Latent Tuberculosis Infection (LTBI) has become a priority in the U.S., as active tuberculosis (TB) rates decline. LTBI is defined as the occurrence of *M. tuberculosis* organisms (tubercle bacilli) in persons with negative chest X-rays. Although antibiotics to treat active TB were discovered early in the 20th century, TB continues to be a public health problem. To this end, targeted tuberculin testing of high-risk groups is recommended. These groups include close contacts to persons with TB disease and recent immigrants from regions where TB is endemic, such as Latin America. The purpose of this study was to examine the predictors of adherence to LTBI therapy in Latino immigrants at a public health clinic.

Although the population of Latinos in the United States is 13%, 29% of the TB cases in the United States are among Latinos (U.S. Census, 2004; CDC, 2005). When immigrants have a positive tuberculin skin test with an induration of 10 mm or more, and a normal chest X-ray, LTBI treatment is recommended. The estimated total number of people who start LTBI therapy in the United States is 291,000–433,000, which extrapolates to the prevention of 4,000–11,000 cases of active TB (Sterling et al., 2006).

Correspondence to: Rita L. Ailinger.

Correspondence should be addressed to Rita L. Ailinger, PhD, RN, School of Nursing & Health Studies, Georgetown University, 3700 Reservoir Road NW, Washington, DC 20057. E-mail: rla22@Georgetown.edu.

Treatment for LTBI includes taking one dose of Isoniazid (INH) a day for 9 months combined with monthly clinic visits for monitoring of side effects. In his review article, Horsburgh (2004) opined that it is well documented that treating people for LTBI can contribute to the eradication of TB.

REVIEW OF LITERATURE—ADHERENCE TO LTBI THERAPY AMONG LATINOS

Adherence to LTBI therapy has long been a problem in the United States. In 1997, the adherence rate for LTBI therapy among high-risk persons was 62%. The *Healthy People 2010* objective is to raise that rate to 85% (U.S. Department of Health and Human Services, 2000). A Medline search from 2001-2006 encompassed the literature review on adherence among Latinos. There were few studies of Latinos that provide insights into factors that are related to adherence. These few studies reflect the need for building the science base in health disparities research.

In reports of Latino adolescents on LTBI therapy, the factors that made a difference were parental support, more acculturation, higher academic performance and coaching (Salabarria et al., 2001). In a study of the potential influence of INH side effects on therapy adherence among 96 Latino adolescents, the authors found that about 70% had at least one side effect but that side effects were not related to adherence (Berg et al., 2004). In a related study of adolescents, the authors found that Latino ethnicity was a significant variable in predicting adherence to treatment (Morisky et al., 2003). The use of self-report and urine testing among adolescents on LTBI therapy were found to be related (Blumberg et al., 2005).

In the two recent reports on adult samples which included Latinos, one found that Hispanics adhered better than non-Hispanics, and the other found that no demographic factors predicted adherence. In that study, of 53 adult Latino immigrants, the authors found that adherence dropped 26% from the 2nd to 9th month of therapy and the mean number of months adherent was 7.4 (Ailinger et al., 2006).

These studies signal the need for more health disparities research. The gap in knowledge on adherence to LTBI therapy among Latinos continues; therefore this study was conducted. The focus was on Latino immigrants for whom LTBI had been recommended at a public health clinic. The research questions were: (a) What is the percent of clients who adhere to LTBI therapy over the course of 9 months? (b) What is the relationship between the demographic factors of age, education, number of years in U.S., region of origin, gender, occupation, and months of adherence? (c) What factors predict adherence?

METHODOLOGY

Sample

The study was approved by the University Human Subjects Review Board. From the list of all the Latino clients seen by the clinic for LTBI in 2004-2005, 160 records were randomly chosen. Of these records, two clients had been treated with Rifampin and five records were incomplete, leaving a total of 153 for data analysis. These records were examined and data on demographics, course of therapy, side effects, elevated liver enzymes, and adherence to therapy were extracted from the records.

Adherence was defined as the number of doses of INH taken, as reported by the client. Full adherence is defined by the CDC as completion of 270 doses in 12 months. The researchers noted the number of months that the client was adherent, that is, that he or she came to a clinic appointment and reported taking the INH. Because clients did not have to return to this clinic

after their ninth visit (when they were given the INH for the 9th month) adherence reported here includes 8 months of therapy. If a client received medical advice to stop taking INH, that was noted. Clients were considered nonadherent if they did not show up for their clinic appointment and did not respond to the public health nurse's phone calls or letter. Twenty-four clients were nonadherent for starting therapy

Data Analysis

The data were analyzed using descriptive statistics to examine the continuous variables, *t* tests to look at differences in mean adherence by gender, and ANOVAs to look at differences in mean adherence by categorical variables (marital status, occupation, region or origin). Correlations between continuous demographic variables (age, number of year in U.S., number of years education) and system variable (number of Public Health Nurses (PHNs) seen by each client) and the dependent variable adherence (doses and months) were examined. Multiple regression was performed on the continuous variables to explore possible predictors of adherence.

RESULTS

A summary of selected demographic features is indicated in Table 1. Regions of origin of these clients were Central America (60%), South America (37%), and Mexico and Cuba (3%; see Table 2 for distribution by countries of origin). Ninety percent ($n = 138$) of clients were reactors, 6.5% ($n = 10$) were contacts to active TB cases, and 3.3% ($n = 4$) were converters. Reasons for TB screening were most often from maternity clinic referrals (34%, $n = 52$); school entrance (18%, $n = 27$); employment (12%, $n = 18$); active TB contacts (11%, $n = 17$); and other referral (11%, $n = 17$), such as immigration, drug rehabilitation, medical referral, and correctional facility. The mean number of different public health nurses that clients saw during their treatment was 3.39 (range = 1-7, $SD = 1.5$).

In terms of adherence, the mean number of months adherent in this sample was 4.71 (range = 0-8, $SD = 3.1$; see Figure 1) and the mean number of INH doses taken was 143 with a range of 0-240 ($SD = 69$). A total of 52 clients (34%) completed the 8 months of LTBI therapy and were given their final month supply. Seventy-two clients (47%) completed 6 months of LTBI therapy. Fifty-eight clients (38%) reported side effects and of those only four cases (3%) were discontinued with medical advice. Over 12% ($n = 19$) of clients had elevated liver enzymes. Side effects occurred most often in the first month of therapy in 24 clients (16%). Another five clients (3.3%) stopped because of pregnancy or other medical condition, five clients (3.3%) transferred to another jurisdiction, and eight clients (5.2%) were unable to be located.

When the relationship between demographic variables (age, years of education, years in United States) and adherence were examined there were no significant correlations. There was no statistically significant difference in mean number of months adherent or doses by gender, marital status, occupation, or region of origin. Only two factors were significantly related to adherence: the occurrence of side effects ($r = .212, p = .015$) and the number of different PHNs who saw the client during treatment ($r = .646, p \leq .001$). When the cases that did not return to start treatment ($n = 24$) were eliminated from the analysis, the results were virtually the same.

The multiple regression performed on the continuous independent variables (age, number of years education, number of years in United States, side effects, number of PHNs) and the dependent variable of months adherent showed only that the number of PHNs was significant.

DISCUSSION

The demographic profile of the population in this study aptly describes the Latino population served by this public health clinic throughout the years. This is a newly arrived group of immigrants, more women than men, more single heads of households than family units, less than high school education as the mean, mostly manual labor workforce, and of Central American origin. The findings of this study concur with another report that demographic factors did not predict LTBI adherence (Ailinger et al., 2006).

The sample in this study was somewhat self-selected because the clients made the final decision whether to start treatment for LTBI or not. Clients had the option to refuse therapy, as the LTBI treatment is a CDC recommended preventive measure, not a requirement. In the initiation of treatment in this study, 16% did not start treatment even though it had been recommended. The majority of clients, however, chose to start the treatment.

The lifetime risk for TB disease in people with LTBI varies with individual risk factors such as a recent known contact to an infectious TB case or having an immunosuppressive health condition. The assumption is that the higher risk TB reactors would more likely opt for the treatment and complete treatment than others. However, the findings of this study indicated that the major risk factor was being foreign-born from a high endemic country. Clients were mostly referred from other community health clinics through routine Tuberculin Skin Test screening. The number of known TB contacts in this study was quite low (6.5%) and their adherence rate was not different than those in other risk categories. This suggests that community health nurses need to continue to advocate for TB screening of new immigrants.

The CDC guidelines on length of therapy for LTBI have changed in the past 2 decades from 1 year to 6 months, and most recently to 9 months. These changing guidelines are an attempt to balance the objectives of adequate protection from LTBI treatment and better adherence. It is a well-known fact that adherence drops with the number of months on therapy with an average of 4.71 months adherence in this study. The 8 month completion rate in this study appears to be quite low at 34%. However, the CDC guidelines to calculate the completion rate allow health departments to include completion of 6-month therapy and to include only the number of people that actually started treatment as the baseline. The people who have to discontinue treatment based on medical advice are also removed from the baseline total number. Therefore the actual completion rate in this study, from the CDC perspective, would be higher (= 92, 71%).

Previous reports have suggested that more education may influence adherence, however that was not found in this study. The lack of difference in adherence between genders suggests that assumptions about men discontinuing INH therapy because they do not want to give up drinking alcohol were not found in the evidence of this study.

Although Berg and colleagues (2004) had found that side effects were not related to adherence, in this study there was a significant correlation between side effects and adherence. This finding is an important consideration for community health nurses who counsel clients about INH side effects. The other significant correlation between number of PHNs seen by clients and number of months adherent is somewhat surprising. One would assume that continuity of care by the same nurse would be the best intervention, however, it was not supported in this study. This finding implies that if the various nurses deliver messages that are consistent and clear, that adherence will not be affected.

The drop in adherence from month 1 to month 8 indicates that more culturally relevant measures need to be addressed. The findings could serve as a motivator for community health nurses to develop cultural interventions that may increase LTBI adherence among Latino immigrants.

Furthermore, these interventions could be tested in nursing research studies that would provide the evidence for changing community health practice.

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FIGURE 1.
Percent distribution of clients adherent by month of therapy.

TABLE 1
Characteristics of Latent Tuberculosis Infection Patients (N = 153)

Variable	Range	M	SD	N	%
Age	18-56	26.17	6.6		
Years lived in United States	1-22	4.58	4.11		
Years of education		10.17	3.31		
Gender	0-18				
Woman				97	63
Man				56	37
Marital status					
Single				82	54
Married				57	37
Separated				8	5
No information				6	4
Occupations					
Skilled and unskilled				57	37
Students				31	20
Postpartum mothers				27	18
Missing data				38	25

TABLE 2

Percent Distribution of Clients by Country of Origin

<i>Country</i>	<i>N</i>	<i>%</i>
El Salvador	54	35.3
Bolivia	27	17.6
Guatemala	20	13.1
Honduras	14	9.2
Argentina	14	9.2
Peru	9	5.9
Mexico	4	2.6
Costa Rica	3	2.0
Ecuador	2	1.3
Nicaragua	2	1.3
Paraguay	1	.7
Colombia	1	.7
Brazil	1	.7
Cuba	1	.7