

## Factors Associated with Participation by Mexican Migrant Farmworkers in a Tuberculosis Screening Program.

# Factors Associated With Participation by Mexican Migrant Farmworkers in a Tuberculosis Screening Program

Jane E. Poss

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- ▶ **Background:** Tuberculosis is an important public health concern among migrant farmworkers in the United States; providing appropriate screening and treatment is difficult due to their highly mobile existence.
- ▶ **Purpose:** To analyze the relationship between variables (susceptibility, severity, barriers, benefits, cues to action, normative beliefs, subjective norm, attitude, and intention) from the Health Belief Model (HBM) and the Theory of Reasoned Action (TRA) and participation by Mexican migrant farmworkers in a tuberculosis screening program.
- ▶ **Method:** A convenience sample of 206 migrant farmworkers were recruited after a presentation of a tuberculosis education program and were tracked during the administration and reading of the tuberculosis skin test. Participants were interviewed in Spanish by the principal investigator using the Tuberculosis Interview Instrument (TII) developed for this study.
- ▶ **Results:** Most subjects were male, aged 18–27 years, and had less than a sixth-grade education. Of the 206 subjects, 152 (73.4%) received the skin test, 149 (98%) had the skin test read, and 44 (29.5%) had positive skin tests. Based on logistic regression analysis, the model that best predicted intention included cues to action, subjective norm, susceptibility, and attitude. Participation in screening was best predicted by a model containing only two variables: intention and susceptibility.
- ▶ **Conclusions:** In this study, logistic regression analysis revealed that a more parsimonious model than the full HBM and TRA model accurately predicted both intention and behavior. The findings may be helpful in developing tuberculosis education and screening programs for Mexican migrant farmworkers.
- ▶ **Key Words:** tuberculosis • migrant farmworkers

Approximately 4 million migrant and seasonal farmworkers work in the United States. Among migrant farmworkers, tuberculosis (TB) is one of the chief public health concerns. Studies have documented rates of positive TB skin tests in migrant workers as high as 37% on the peninsula shared by Delaware, Maryland, and Virginia (Jacobson, Mercer, Miller, & Simpson, 1987), 41% in North Carolina (Ciesielski, Seed, Esposito, & Hunter, 1991), 44% in Florida (Centers for Disease Control [CDC], 1992) and 48% in Virginia (CDC, 1986).

Because migrant workers are at high risk for TB, it is important to ensure that they receive appropriate screening, diagnostic studies, and treatment; however, this is difficult due to their highly mobile existence. TB screening requires administration of a Purified Protein Derivative (PPD) skin test that must be read after 48–72 hours. Treatment for TB infection requires 6–9 months of uninterrupted, carefully monitored chemoprophylaxis.

A review of the literature revealed no studies that have examined participation of migrant farmworkers in TB screening and treatment programs. The purpose of this study was to analyze the relationship between psychosocial variables from a framework comprised of the Health Belief Model (HBM) and Theory of Reasoned Action (TRA) and participation of Mexican migrant farmworkers in a TB screening program.

The HBM was developed in the 1950s to explain preventive health behavior (Rosenstock, 1960, 1966, 1974). The model postulates that in order for individuals to participate in screening, they must believe that (a) they are personally susceptible to the illness (perceived susceptibility), (b) contracting the illness would have a negative

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*Jane E. Poss, DNSc, ANP, C, is Associate Professor and Director of the Community Health Nursing/Family Nurse Practitioner Programs at the University of Texas at El Paso, El Paso, Texas.*

impact on their life (perceived severity), (c) taking a particular action would be beneficial by reducing the threat of illness (perceived benefits), and (d) taking action would not involve overcoming barriers (perceived barriers). In addition, the presence of an internal or external stimulus (cues to action) is postulated to trigger health behavior.

The TRA was introduced in 1967 by Fishbein and further developed by Fishbein and Ajzen (1975). According to the TRA, behaviors that are under volitional control are the result of intention (Ajzen & Fishbein, 1980), which is determined by two factors: attitude toward the behavior and subjective norm. Attitude is a person's overall evaluation of performing a behavior while subjective norm is the perception of social pressures to act. A person's attitude toward a behavior is in turn determined by (a) the belief that a given outcome will occur if he or she performs the behavior, and (b) the evaluation of the outcome of performing the behavior. The subjective norm is determined by a person's beliefs about what particular salient individuals want him or her to do and the motivation to comply with these referents.

The HBM and TRA have common characteristics and are combined to form the theoretical framework for this study (see Figure 1). Both are based on a value-expectancy theory of behavior and posit that beliefs about behavioral consequences predict behavior. The HBM has been used extensively to study health-related behaviors, and there is a substantial body of literature to support its use. The HBM has been criticized because it lacks a normative component, and may not be applicable in cross-cultural research. Conversely, the TRA incorporates peer group norms, a concept that adds a more culturally based perspective on behavior.

When the HBM and TRA are integrated to form a new model, several concepts can be combined to maintain par-

simony. The concepts *perceived barriers* and *perceived benefits* from the HBM are equivalent to *behavioral beliefs* from the TRA. In this study the resulting concept, *behavioral beliefs*, was operationalized following the well-delineated TRA guidelines.

### Relevant Literature

Two studies of participation in TB screening were found. Other investigations of preventive health behaviors based on the HBM and TRA are discussed in this section because they provide relevant background information.

**Health Belief Model:** An early study of TB prevention behaviors by Hochbaum (1956) found that those who felt susceptible to TB were more likely than those who did not to have a screening chest x-ray. However, Hochbaum's study was not a test of the full HBM. A second TB-related study, conducted by Wurtele, Roberts, and Leeper (1982), analyzed compliance of participants with a TB detection drive. The authors added behavioral intention, a TRA-like concept, as a predictor variable. Stepwise discriminant analysis revealed that intention alone accounted for about 71% of the variance in behavior.

The HBM has been applied to studies of participation in immunization programs (Aho, 1979; Cummings, Jette, Brock, & Haefner, 1979; Larson, Bergman, Heidrich, Alvin, & Schneeweiss, 1982; Larson, Olsen, Cole, & Shortell, 1979; Rundall & Wheeler, 1979), and screening for breast cancer (Aiken, West, Woodward, & Reno, 1994; Calnan, 1984; Champion, 1985; Fulton et al., 1991; Hallal, 1982), colon cancer (Macrae, Hill, St. John, Ambikapathy, & Garner, 1984), genetic disease (Becker, Kaback, Rosenstock, & Ruth, 1975), hypertension (King, 1982), and general health status (Norman, 1993, 1995). Most studies have demonstrated support for the model.

Cummings et al. (1979) studied influenza vaccination in adults and added to the HBM two TRA-like concepts: behavioral intention and social influences. Stepwise multiple regression analysis revealed that a model without the HBM variables was able to explain 40% of the variance in behavior; however, path analysis showed that most of the influence of the HBM variables on behavior was mediated through their effect on intention.

Rundall and Wheeler (1979) also applied the HBM to a study of influenza vaccination. Logit analysis revealed that the model accounted for 34% of the variance in vaccination behavior. Bodenheimer, Fulton, and Kramer (1986) applied a modified version of the HBM (that included locus of control, knowledge, and intention) to healthcare workers' acceptance of hepatitis B vaccination. Stepwise multiple regression revealed that perceived benefits, susceptibility, and severity explained 20% of the variance in vaccine acceptance. Sixty-one percent of those who intended to receive the vaccination eventually did, while only 4% of those who did not intend to were ever vaccinated.

Champion (1985) used the HBM to study breast self-examination (BSE) frequency in women. Stepwise multiple regression revealed that 26% of the variance in BSE was accounted for by all the HBM variables tested together. In a study of compliance with mammography screening rec-

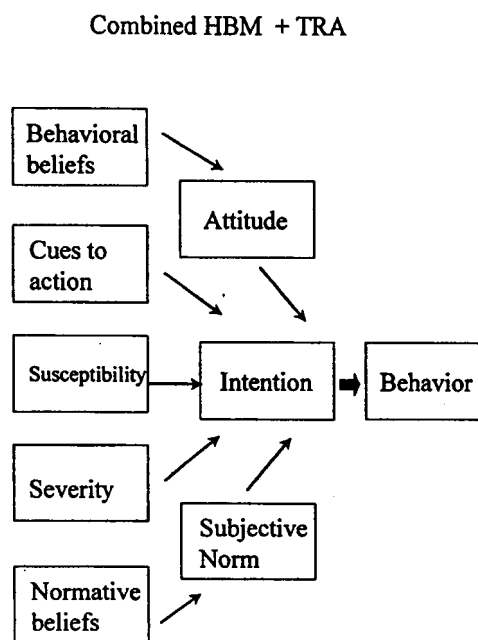


Figure 1. Combined Health Belief Model and Theory of Reasoned Action.

ommendations, Aiken et al. (1994) tested the original HBM concepts. Four of the HBM concepts plus an interaction term (susceptibility x barriers) accounted for 16% of the variance in compliance, and each of the individual concepts except severity added significantly to the predictive power of the regression equation.

Norman (1995) examined the predictors of attendance at screening examinations at general practitioners' offices. Norman added two variables, intention to attend and general health value, to the HBM. Logistic regression analysis revealed that the HBM variables accounted for 56% of the variance in intention to attend, with benefits and barriers emerging as significant independent predictors.

**Theory of Reasoned Action:** The TRA has been used to study a variety of health-related behaviors including contraceptive choice (Adler, Kegeles, Irwin, & Wibbelsman, 1990; Davidson & Morrison, 1983), AIDS-preventive behaviors (Fisher, Fisher, & Rye, 1995), condom use (Boyd & Wandersman, 1991; Jemmott & Jemmott, 1991), vaccination behavior (Montano, 1986), and BSE (Lierman, Young, Kasprzyk, & Benoliel, 1990). An extensive literature review failed to uncover any TRA-based studies of TB screening behavior.

Jemmott and Jemmott (1991) applied the TRA to a study of condom use among Black female students. Multiple regression analysis revealed that 62% of the variance in intention was predicted by attitude and subjective norm. Boyd and Wandersman's (1991) study of condom use revealed that 38% of the variation in intention to use a condom was explained by the behavioral and normative beliefs concepts, while 34% was explained by the intervening variables of attitude and subjective norm. In this study, the best model for predicting behavior included all of the TRA variables plus two HRA-like concepts: susceptibility and fear of AIDS.

Morrison, Gillmore, and Baker (1995) applied the TRA and an augmented version of the TRA, the Theory of Planned Behavior, to a study of condom use. Separate multiple regressions were performed for respondents who had a steady partner and those who had casual partners, and revealed that attitude and subjective norm accounted for 44% and 25% of the variance in intention, respectively. Adler et al. (1990) used the TRA to study contraceptive use in adolescents and concluded that attitude and social norm contribute significantly to adolescent decision making about contraception. Intention, even when measured 1 year previously, was significantly related to future behavior.

Lierman et al. (1990) applied the TRA to a study of BSE practices among women. Multiple regression revealed that behavioral and normative beliefs accounted for 32% of the variance in intention and 39% of the variance in actual behavior. Montano (1986) used the TRA to study influenza vaccination and found that attitude and social norm accounted for 62% and 31% of the variance in intention and behavior, respectively.

**HBM and TRA:** Several studies reviewed above incorporated components of one model into the other; for example, adding intention as a concept in HBM-based studies or including concepts such as perceived susceptibility in the

TRA. Only one published study was found that synthesized the HBM and TRA to form a theoretical framework to study condom use among Thai men (VanLandingham, Suprasert, Grandjean, & Sittitrai, 1995). These researchers combined the HBM concepts severity, barriers, and benefits with the concept behavioral beliefs from the TRA. Logistic regression analysis classified 70% of the subjects into the correct condom-usage category.

The HBM, the TRA, and a model combining the two have been used successfully to study participation in screening programs as well as health behaviors and beliefs. The TRA includes a normative component and incorporates a methodology aimed at eliciting the basic concerns and beliefs of a group under investigation, making it useful for studying culturally diverse populations.

**Hypotheses:** The study had two dependent variables (a) *intention* to participate in the TB screening program, and (b) *behavior* (participation in the program). When behavior was the dependent variable, intention was treated as one of the independent variables in the model. The following hypotheses were examined:

- I. There is a positive relationship between the following variables (susceptibility, severity, cues to action, attitude, and subjective norm) and intention to participate in a TB screening program.
- II. There is a positive relationship between behavioral beliefs and attitude.
- III. There is a positive relationship between normative beliefs and subjective norm.
- IV. There is a positive relationship between intention to participate and behavior.
- V. There is a positive relationship between the following variables (susceptibility, severity, cues to action, attitude, and subjective norm) and behavior.

**Definition of Terms:** The following definitions were applied in this study: *Mexican migrant farmworkers* were defined as individuals 18 years of age or older who establish a temporary abode to work in agriculture on a seasonal basis and who either were born in Mexico or who had one parent born in Mexico; *Susceptibility, Severity, Attitude, Subjective norm, Behavioral beliefs, Normative beliefs, and Intention* were scores obtained on the corresponding subscales of the TB Interview Instrument (TII); *Cues to Action* referred to attendance at the TB education program; and *Behavior* was participation in the TB screening program.

## Method

**Sample:** A convenience sample of 206 Mexican migrant farmworkers was chosen from 20 migrant camps in Orleans and Monroe Counties. Subjects were excluded from the study if they had a history of a positive PPD skin test or active TB. Participation in the study was voluntary, and all explanations about the study, including the informed consent, were presented verbally in Spanish by the bilingual principal investigator. Subjects gave verbal consent to be interviewed, and the study was approved by the Human Subjects Review Committee of the State Uni-

versity of New York at Buffalo School of Nursing and the board of directors of the Oak Orchard Community Health Center (OOCHC). Participants were given a baseball cap at the conclusion of their interview.

**Procedure:** The study was carried out in conjunction with an established TB education and screening program conducted by the OOOHC in northwestern New York state. All phases of the program took place in the migrant camps with the exception of chest radiographs which were performed at a local hospital. The optional education program was presented in Spanish on Monday evenings by bilingual, bicultural health promoters using popular education methods such as skits, demonstrations, and audience participation. Health promoters were Mexican migrant workers who have attended a series of classes and received on-the-job training about culturally appropriate, low-literacy educational techniques and health-related topics such as TB education, detection, and treatment.

Farmworkers were tested on Tuesday evenings with an intradermal injection of 0.1 ml of 5 tuberculin units (TU) of purified protein derivative (PPD) and the tests were read on Thursday evenings. Those with positive skin tests were transported to local hospitals for chest radiographs. The principal investigator, working with the OOOHC program, recruited subjects in the migrant camps and interviewed them in Spanish either on Monday, after the educational program, or on Tuesday. Subjects were then tracked to determine if they had a skin test on Tuesday and a skin test reading on Thursday. Participants who did not want to receive a skin test were interviewed only. The study was conducted between May and September, 1997.

**Interview Instrument:** The 66-item Spanish-language TII was developed specifically for the present study. Development of the TII was guided by a qualitative study of migrant farmworkers' explanatory models about TB (Poss, 1998). Categories that emerged from the qualitative analysis were used to develop the closed-ended questions for the TII, according to the guidelines of Ajzen and Fishbein (1980).

The TII was developed in English and written at Flesch-Kincaid Grade Level of 4.6. It was translated into equivalent Spanish by a Mexican American bilingual outreach worker and then back-translated into English by a second bilingual Mexican American. The results were compared with the original English version, and necessary modifications were made. These procedures for establishing equivalency of instruments follow guidelines of Brislin, Lonner, and Thorndike (1973) and Marín and Marín (1991).

The TII consists of nine sections: demographic information and eight Likert-type subscales to measure the independent variables. The instrument was reviewed for content validity by Champion—an expert in instrumentation using the Health Belief Model. The TII was pilot tested on a sample of 20 migrant farmworkers, after which instrument subscales were tested for internal consistency reliability using Cronbach's alpha and revised. Final coefficient alphas for the subscales ranged from 0.71 to 0.96 based on responses of 206 subjects in the major study.

Items in the subscales were measured on a five-point Likert-type scale. The response format, formulated for populations with low literacy levels, was coded as follows: "Definitely Yes" = +5, "Probably Yes" = +4, "No opinion" = +3, "Probably No" = +2, and "Definitely No" = +1. Negatively worded items were reverse scored. Items on the Behavioral Beliefs and Normative Beliefs Subscales were coded to allow calculation of a multiplicative score as proposed by Ajzen and Fishbein (1980, p. 66). For these subscales, items related to strength of belief were scored on the unipolar scale described above. Each belief question was followed by an evaluation question. The evaluation of each outcome was scored on a bipolar scale with anchors of +2 and -2. Each respondent's score on the strength of belief question was multiplied by the score on the evaluation question. The results for the entire subscale were then added to form a sum-of-products score (Lauver & Knapp, 1993).

**Data Analysis:** The characteristics of the sample, including demographic and social data, were summarized using descriptive statistics. Pearson product moment correlation was used to study the relationships between the variables in the combined model. Logistic regression was applied to find the model that best predicted each dependent variable.

## Results

The sample consisted of 206 migrant farmworkers—164 (79.6%) males—ranging in age from 18–67 years, with a mean age of 29 years ( $SD = 10.7$  years). Approximately 60% of the study participants were between the ages of 18 and 27 years. Fifty percent (103) of the participants were married, 39.3% (81) were single, 4.4% (9) reported living with a partner, and 6.3% (13) were divorced or separated. About one-third of the respondents had less than a 4th grade education and another third had attended school for 4–6 years. Fifty-two farmworkers (25.2%) had a 7th–9th grade education, and 28 (13.6%) had a 10th–12th grade education.

Study subjects had worked as migrant farmworkers 1–40 years ( $M = 7$  years,  $SD = 7.73$ ). The majority of subjects (80.1%) had worked between 1–10 years in agriculture. About one-third of workers (33.5%) reported that they lived in Mexico during the winter, while 56 (27.2%) resided in Texas, 45 (21.8%) lived in Florida, and 36 (17.5%) lived in New York state. PPD skin testing was performed on 152 (73.4%) subjects, 149 (98%) had their skin test read, and, of those, 44 (29.5%) had positive results.

**Testing of Hypotheses:** Descriptive statistics for each of the TII subscales are shown in Table 1. Pearson correlation coefficients between the model variables revealed significant correlations between intention to have the PPD skin test and all of the TII subscales (Table 2). There also were significant correlations between the predictor variables and intention to have the skin test read (Table 3). Hypothesis I was supported based on the significant correlations between the model variables and intention to participate in screening. Intention was most strongly related to subjective norm, but all variables had low to moderate correlations

**TABLE 1. Mean, Standard Deviation (SD), and Range for TII Subscales (N = 206)**

Subscale	Mean	SD	Range
Behavioral beliefs	38.23	18.43	-44-98
Susceptibility	16.72	6.01	5-25
Severity	33.15	6.42	12-40
Normative beliefs	17.01	12.14	-14-30
Subjective norm	8.26	2.12	2-10
General attitude	17.55	2.75	5-20

(Munro, Visintainer, & Page, 1986) with both intention to have the skin test and to have it read.

The developers of the TRA proposed that behavioral beliefs would be positively related to general attitude. In this study, a moderately strong, positive correlation was found between behavioral beliefs and general attitude ( $r = 0.64$ ,  $p < 0.01$ ), with the  $r^2$  indicating that behavioral beliefs accounted for about 41% of the variance in general attitude, thus supporting Hypothesis II.

The correlation coefficient between normative beliefs and generalized subjective norm about screening showed a moderate, positive relationship ( $r = 0.60$ ,  $p < 0.01$ ) indicating that subjects who felt that specific others, including coworkers, friends, and family wanted them to have the skin test were more likely to believe that generalized others also believed they should be tested. Thus, about 36% of the variance in subjective norm was accounted for by specific normative beliefs. Therefore, Hypothesis III was supported.

Intention to participate in the screening showed a strong positive correlation with actual participation in the screening program. Specifically, intention to have the skin test was positively correlated with having the test ( $r = 0.84$ ,

$p < 0.01$ ) and intention to have the test read was positively correlated with having it read ( $r = 0.80$ ,  $p < 0.01$ ), accounting for 70% and 64%, respectively, of the variance in actual behavior. These results provided support for Hypothesis IV.

There were positive, significant relationships between all the antecedent variables and actual participation in the screening program (see Tables 2 and 3). Therefore, the results of the Pearson correlations provided support for the association between the variables from the combined HBM and TRA model and participation in the screening program as posited in Hypothesis V.

**Testing the Model:** The default setting in the SPSS Logistic Regression procedure was used to enter all the predictor variables simultaneously into the equation. The dependent variables in this study included (a) intention to have the skin test, (b) intention to have the skin test read, (c) having the skin test, and (d) having the skin test read. A separate logistic regression analysis was run for each variable, and the resulting models for each dependent variable were compared to determine which was best in terms of parsimony and interpretability.

First, intention to have the skin test was regressed on all of the predictor variables. The model chi-square (the difference between the -2LL for the two models) was 135.44 ( $df = 7$ ,  $p < 0.00001$ ) indicating a statistically significant improvement in prediction using the model with all of the variables over using only the constant. Next, three variables (behavioral beliefs, severity, and normative beliefs) that showed nonsignificant Wald statistics were omitted from the logistic regression analysis and a new model was generated (see Table 4). The difference between the -2LL for these two models was 4.37 ( $df = 4$ , not significant).

The goal of model testing in logistic regression analysis is to find a model that is *not* statistically different from the full model (Tabachnick & Fidell, 1996). Therefore, because there was no statistically significant difference between these two models, the reduced model was

**TABLE 2. Correlations Among Predictor Variables, Intention to Have PPD, and PPD Given (N = 206)**

	Intention to Have PPD	PPD Given	Behavioral Beliefs	Education	Susceptibility	Severity	Normative Beliefs	General Attitude
Intention to have PPD								
PPD given	.84**							
Behavioral beliefs	.36**	.38**						
Education	.53**	.40**	.20*					
Susceptibility	.50**	.54**	.24**	.34**				
Severity	.44**	.46**	.41**	.31**	.53**			
Normative beliefs	.55**	.48**	.42**	.30**	.36**	.41**		
General attitude	.50**	.47**	.64**	.25**	.31**	.46**	.49**	
Subjective norm	.65**	.58**	.44**	.35**	.38**	.38**	.60**	.55**

\* $p = 0.05$  (2-tailed).\*\* $p = 0.01$  (2-tailed).

**TABLE 3. Correlations Among Predictor Variables, Intention to Have PPD Read, and Having PPD Read (N = 206)**

	Intention to Read PPD	PPD Read	Behavioral Beliefs	Education	Susceptibility	Severity	Normative Beliefs	General Attitude
Intention to read PPD								
PPD read	.80**							
Behavioral beliefs	.36**	.36**						
Education	.54**	.38**	.20*					
Susceptibility	.49**	.49**	.24**	.34**				
Severity	.43**	.37**	.41**	.31**	.53**			
Normative beliefs	.55**	.51**	.42**	.30**	.36**	.41**		
General attitude	.50**	.45**	.64**	.25**	.31**	.46**	.49**	
Subjective norm	.64**	.55**	.44**	.35**	.38**	.38**	.60**	.55**

\* $p = .05$  (2-tailed).\*\* $p = .01$  (2-tailed).

selected. Further reductions in this model did not improve its predictive ability.

The statistic labeled Exp (B) in Table 4 is the odds ratio. For education, the odds ratio was 9.93, indicating that subjects who attended the education program were about 10 times more likely to intend to be skin tested than those who did not attend. However, based on the model used in this study it is not possible to posit a causal relationship between attending the education program and participation. Overall, this four-variable model resulted in the classification of 89.8% of cases into the correct category. Of these cases, 94.9% of those who intended and 74.0% of those who did not intend to have the test were classified correctly.

Next, intention to have the skin test read was regressed on all of the predictor variables. The results of this analysis were identical to the first regression analysis because the two variables (intention to have the test and intention to have it read) were highly intercorrelated ( $r = 0.99$ ,  $p < 0.01$ ).

Having the skin test was then regressed on all of the predictor variables. As was done previously, the variables that showed nonsignificant Wald statistics were omitted from the logistic regression and a new, two-variable model was generated (see Table 5). The difference between the model chi-square for these two models was 7.86 ( $df = 6$ ),

indicating no statistically significant difference between the full and reduced model.

The odds ratio for intention was 4.47, indicating that subjects who intended to have the skin test were four times more likely than nonintenders to actually be tested. Overall, this two-variable model resulted in the classification of 93.7% of cases into the correct category. Of these cases, 97.4% of those who had the skin test and 83.3% of those who did not were classified correctly.

Finally, actually having the skin test read was regressed on all of the predictor variables following the procedures outlined above (see Table 6). Overall, this two-variable model resulted in the classification of 92.7% of cases into the correct category. Of these cases, 97.3% of those who had the skin test and 80.7% of those who did not were classified correctly.

## Discussion

The majority of migrant farmworkers in this study participated in screening. Seventy-five percent of the subjects received a skin test and 98% returned to have the test read. Of the participants whose skin test was read, 29.5% tested positive. These results are similar to the 1994–1995

**TABLE 4. Logistic Regression Analysis: Four-Variable Model Dependent Variable = Intention to Have PPD (N = 206)**

Variable	B	SE	Wald	df	Sig	R	Exp(B)	
Education		2.295	0.550	17.448	1	0.0000	0.260	9.927
Subjective norm		0.532	0.136	15.194	1	0.0001	0.240	1.702
Susceptibility		0.148	0.050	8.720	1	0.0031	0.172	1.160
General attitude		0.274	0.109	6.308	1	0.0120	0.137	1.315
Constant	-11.160		2.053	29.550	1	0.0000		

**TABLE 5. Logistic Regression Analysis: Two-Variable Model Dependent Variable = Having PPD (N = 206)**

Variable	B	SE	Wald	df	Sig	R	Exp(B)
Susceptibility	0.202	0.062	10.661	1	0.0011	0.191	1.224
Intention	1.500	0.213	49.310	1	0.0000	0.448	4.468
Constant	-7.424	1.312	32.087	1	0.0000		

OOCHC screening program in which 99% of workers had their skin test read, and 25% had a positive test (Poss & Rangel, 1997). This high rate of participation suggests that, given the opportunity to be tested in a culturally appropriate and geographically accessible program presented in Spanish by bilingual, bicultural health promoters, migrant farmworkers will participate in screening. Farmer (1997) has argued that structural barriers, inadequate access to care, racism, and environmental factors, not individual patient's beliefs, play a primary role in the TB epidemic that disproportionately affects the world's poor.

The results of this study cannot be generalized to settings where migrant farmworkers must travel to obtain healthcare services. In this study, all phases of the program were offered in the migrant camps, thus obviating the need to travel to distant sites or to use healthcare facilities staffed by providers with different cultural and linguistic backgrounds.

All of the research hypotheses were supported in this study. There were significant correlations in the predicted direction between the model variables and both intention and actual participation (Hypotheses I and V). In addition, relationships between the intermediate variables in the HBM and TRA model were in the predicted direction (Hypotheses II, III, and IV).

The correlation between behavioral beliefs and general attitude ( $r = .64$ ) was somewhat stronger than that observed by other researchers. Morrison et al. (1995) found correlations between behavioral beliefs and general attitude toward condom use of 0.37 ( $p < 0.01$ ) and 0.48 ( $p < 0.001$ ) for heterosexual adults with steady and casual partners, respectively. In Montano's (1986) study of vaccination behavior, the correlation between behavioral beliefs and attitude was 0.57 ( $p < 0.01$ ).

The relationship between normative beliefs and subjective norm ( $r = 0.60$ ) was slightly weaker than in other studies using the TRA. Morrison et al. (1995) found correlations between normative beliefs and subjective norm of

0.75 ( $p < 0.001$ ) and 0.67 ( $p < 0.001$ ) for adults with steady and casual partners, respectively. The correlation between these variables was 0.73 ( $p$  value not reported) in the 1990 study by Marín, Perez-Stable, Otero-Sabogal, & Sabogal of Hispanic smokers and 0.8 ( $p < 0.01$ ) in Lierman et al.'s (1990) study of BSE.

Based on the values of Hispanic culture, it was anticipated that subjective norm would contribute to the explanation of intention and behavior. One of the basic cultural values attributed to Hispanics is collectivism, evidenced by high levels of personal interdependence, conformity, and readiness to be influenced by others (Marín & Marín, 1991). In their research on smoking cessation, Marín et al. (1990) found that family-related reasons for quitting smoking were more important for Hispanic than for non-Hispanic White smokers.

Wurtele et al. (1982) found that intention to have a PPD skin test read accounted for about 71% of the variance in actual behavior. In their study, intention was measured only 48 hours before the behavior; this may account for the strong relationship. The timing was similar to the present study where intention was measured within 24 hours of having a skin test and 72 hours of having it read, and the correlations between intention and behavior were .84 and .80, respectively. Lierman et al. (1990) concluded that intention was strongly correlated with performing BSE ( $r = 0.75$ ,  $p < 0.01$ ), while Montano and Taplin (1991) found a moderate correlation between intention to have a mammogram and behavior ( $r = 0.50$ ,  $p < 0.01$ ) and Montano (1986) found a somewhat higher correlation between intention to be vaccinated and behavior ( $r = 0.69$ ,  $p < 0.01$ ).

In this study, logistic regression analysis revealed that a more parsimonious model than the full HBM and TRA model predicted both intention and behavior. Essentially, intention to take part in screening was best explained by four variables: subjective norm, general attitude, perceived susceptibility, and attending the education program. The

**TABLE 6. Logistic Regression Analysis: Two-Variable Model Dependent Variable = Having PPD Read (N = 206)**

Variable	B	SE	Wald	df	Sig	R	Exp(B)
Susceptibility	0.122	0.049	6.245	1	0.0125	0.132	1.130
Intention	1.337	0.188	50.501	1	0.0000	0.447	3.806
Constant	-5.906	1.009	34.245	1	0.0000		

model for actual participation included only two variables: intention and perceived susceptibility.

The findings of this study suggest several lines of future inquiry. The research instrument developed for this study, the TII, could be tested with migrant farmworkers in other settings or modified to study migrant workers' behaviors related to screening for diseases other than TB. The combined HBM and TRA model could be applied to study postscreening behaviors, including having a chest radiograph and, when indicated, initiating and following through with isoniazid (INH) prophylaxis. This application would test whether the model is able to explain behaviors that occur weeks to months after the initial interviews. This study should be considered an initial application of the combined model to a research problem. However, nurses who offer educational programs to migrant farmworkers may wish to incorporate some of the study results in designing such programs. ▣

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