Using Structural Equation Modeling to Identify Predictors of Sexual Behaviors Among Hispanic Men Who Have Sex with Men

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Abstract:

Men who have sex with men (MSM) are at an increased risk of contracting HIV infection and other sexually transmitted infections (STIs) because of participation in high-risk sexual behaviors.1 High-risk sexual behaviors include sexual activity without condoms, anal intercourse, or sexual behaviors under the influence of drugs and alcohol.1 Participation in high-risk sexual behaviors places MSM of all ages, races, and ethnicities at risk for HIV and STIs, but Hispanic MSM are at a particular risk of HIV infection related to a number of factors including behavioral, cultural, social, and socioeconomic factors affecting Hispanic MSM.2 The rate of new cases of HIV infection among Hispanic MSM (27.7/100,000) was nearly triple the rate of new cases of HIV infection among White MSM (9.2/100,000); nearly 60% of all new infections of HIV are among Hispanic MSM.2

A number of research studies have been conducted on the sexual behaviors of the general population of MSM, but less is known about the predictors of sexual behaviors among Hispanic MSM. Drawing on the available research knowledge base of the general population of MSM and research with Hispanic MSM when available, a review of the literature was conducted before study development to identify variables to include in this study.

Keywords: Hispanics | sexual behaviors | structural equation modeling

Article:

REVIEW OF THE LITERATURE

Alcohol Abuse and Sexual Behaviors

In the general population of MSM, alcohol use and abuse have been associated with participation in unprotected anal intercourse (UAI), a high-risk sexual behavior. In a national survey of MSM (n = 2916), a large number of the participants reported alcohol usage before and during sexual behaviors (49%; n = 1412). Those participants who reported alcohol use and abuse were more likely to engage in UAI (odds ratio [OR] = 1.9, 95% confidence interval [CI] = 1.7–2.3).3

Only one study that examined the influence of drugs and alcohol on the sexual behaviors of Hispanic MSM could be located. In a study of 193 Hispanic MSM, those who used drugs and alcohol were more likely to participate in high-risk sexual behaviors (OR = 1.8, 95% CI = 1.31–2.49).4

Body Image and Sexual Behaviors

In a study conducted with the general population of MSM (n = 535), those MSM who reported an average body image were more likely to engage in UAI than those men who reported an obese body image (13.3% vs 21.6%; $P<.01$).5 In another study of a sample of the general population of MSM (n = 316), researchers reported that normal weight or overweight men were more likely to engage in UAI than obese men (OR = 3.6, 95% CI = 1.08–12.20). Using bivariate regression analysis, the researchers concluded that men with a higher or more positive body image were more likely to engage in UAI than those with a lower or negative body image (OR = 1.4).6 Studies that examined the influence of body image, body mass index, or exercise on the sexual behaviors of Hispanic MSM are lacking.

Depression, Self-esteem, and Sexual Behaviors

In a study conducted with a predominantly Hispanic sample of MSM (n = 155), depressive symptoms and self-esteem influenced sexual behaviors. Depressive symptoms accounted for 14.4% of the variance in sexual behaviors ($R2 = 0.144$, $F[1, 203] = 4.312$, $P = .039$) and self-esteem accounted for 17% of the variance in sexual behaviors ($R2 = .170$, $F[1, 203] = 6.076$, $P = .015$).7

Eating Attitudes/Behaviors and Sexual Behaviors

Studies that have examined the relationship of eating attitudes/behaviors and sexual behaviors are nonexistent. MSM have a higher risk for eating disorders than heterosexual men,8, 9 but little is known about eating attitudes/behaviors among Hispanic MSM as well as the influence of eating attitudes/behaviors on sexual behaviors in this subpopulation of MSM.

HIV Status and Sexual Behaviors

Two recent studies that examined the influence of HIV status on the sexual behaviors of Hispanic MSM were identified. Carballo-Dieguez and colleagues10 compared HIV-infected (n = 50) and HIV-uninfected Hispanic MSM (n = 200) in terms of sexual negotiation and condom usage. The

HIV-infected men had significantly more sexual partners than men without HIV infection (M = 6.1 vs 1.5, t[35] = –2.07, P = .046). HIV-infected men were more likely to request that partners refrain from condom usage (χ2 [1, N = 115] = 4.40, P = .035).

Another study explored the impact of HIV medications, HIV viral load, and sexual risk practices of 395 Hispanic MSM. HIV-infected men were twice as likely to report insertive unprotected anal intercourse than men who were not infected with HIV or men who were not aware of their HIV status (OR = 2.04, 95% CI 1.07–3.87). No relationship was found between receptive anal intercourse and HIV status.[11]

Demographic Variables and Sexual Behaviors

Evidence of the influence of certain demographic variables on sexual behaviors among the general population of MSM can be found in the literature. Kelly and colleagues[12] reported that MSM who were younger in age and had lower levels of education were more likely to participate in high-risk sexual behaviors. In the general population of MSM, income did not have any influence on sexual behaviors.[13]

When conducting research with Hispanic populations, it is important to consider the influence of acculturation as a demographic variable. Instruments have been developed to measure levels of acculturation among Hispanics, but proxy measures of acculturation such as length of time in the United States and language preference and fluency can be used to assess acculturation.[14] Among Hispanic MSM, the combined influence of a preference for Spanish language and foreign birth accounted for 2.3% of the variance in sexual behaviors (R2 = 0.023, F[2, 200] = 3.420, P = .035).[7] Limited English proficiency[15] and recent immigration[16] have been associated with high-risk sexual behaviors. Length of time living in the United States and language preference were collected as proxy measures of acculturation for this study.

This study was designed to test a conceptual model (Fig. 1) that predicts the sexual behaviors of Hispanic MSM. This conceptual model is rooted in the epidemiologic theory of the Web of Causation.[17, 18] The Web of Causation, which is based on systems theory, states that single explanations of health conditions or health-risk conditions are not adequate to explain how and why these conditions occur. Instead, there is an interrelatedness of physical, psychological, and social factors, causes, and contributing factors to health and health-risk conditions. The goal of this theory is to find the interrelated causes of health conditions and health risks that may be altered through an intervention to decrease the sequel of these health conditions.

METHOD

Sample

A convenience sample of 100 community-dwelling Hispanic MSM ages 18 and older (M = 32.47, SD ± 7.29, range = 18–51) who resided in South Florida participated in the study. A more complete demographic profile of the study's participants is included in Table 1.

Measures

Six instruments and the demographic questionnaire were used in this study. The instruments were chosen to operationalize the study variables of alcohol abuse, body image, depression, eating
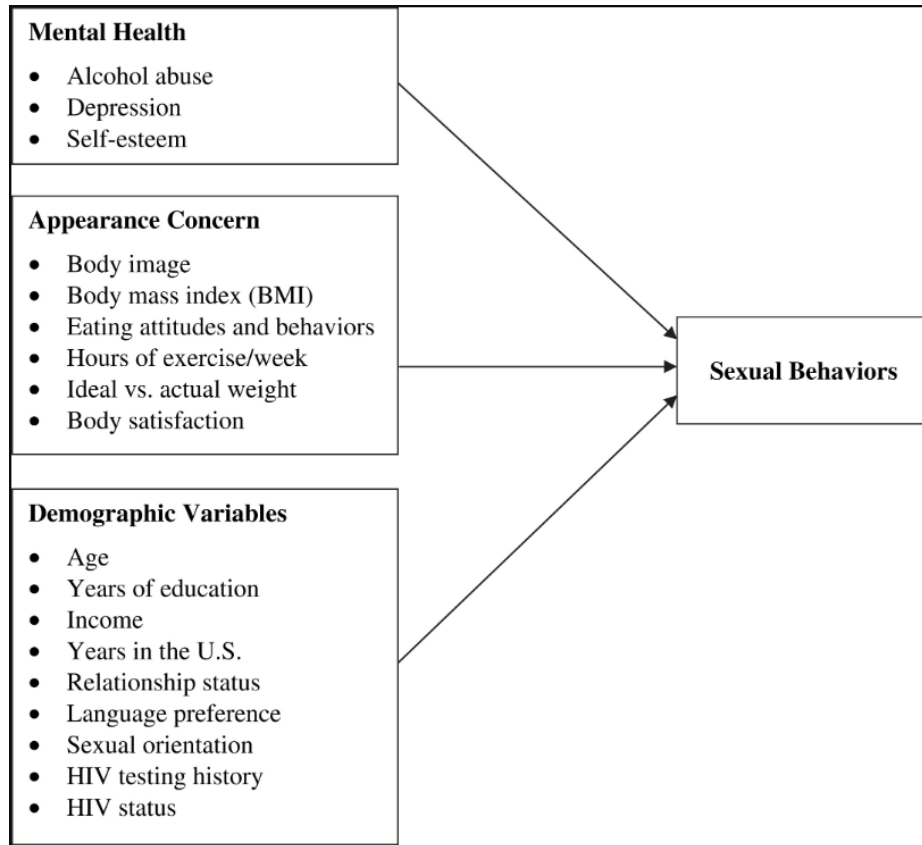
Fig. 1. Proposed model of predictors of sexual behaviors among Hispanic MSM.

attitudes and behaviors, self-esteem, and sexual behaviors. Alcohol abuse was measured by the CAGE Questionnaire.19 Body image was assessed by the Adonis Complex Questionnaire (ACQ).20 Depressive symptoms were measured by the Center for Epidemiologic Studies-Depressed Mood Scale (CES-D).21 Eating attitudes and behaviors used to assess risk for eating disorders were measured by the Eating Attitudes Test (EAT-26).22 Self-esteem was measured using the Rosenberg23 Self-Esteem Scale (RSES). Sexual behaviors were measured using the Safer Sex Behavior Questionnaire (SSBQ).24

The demographic questionnaire included items about age, number of years of education, country of birth, length of time in the United States if foreign-born, income, language preference, sexual orientation, and relationship status. Participants were also asked to report their HIV testing history, HIV status, the number of hours of exercise per week, and height and weight, which were used to calculate body mass index (BMI).25

These 6 instruments and the demographic questionnaire were translated into Spanish using a professional translation service as required by the University's Institutional Review Board, and then back-translated into English. Comparison of the back-translated survey to the original English versions is an appropriate method of ensuring accurate translation.26

CAGE Questionnaire

The CAGE Questionnaire was used to measure alcohol abuse. This instrument asks participants to respond "yes" or "no" to each of the 4 items. Each "yes" response is scored as 1. Total scores on the CAGE Questionnaire range from 0 to 4. A score of 2 or higher is considered clinically

Table 1. Demographic characteristics of the sample (n = 100)

Variable	*M*	SD	Range
Age	32.47	7.29	18–51
Years of education	14.96	2.4	5–20
Income	$40,550.50	$20,932.47	$0–100,000
Years in the United States (if foreign-born)	13.35	9.21	<1–49
Body mass index[a]	25.25	3.44	18.20–37.00
Number of hours of exercise/week	2.68	2.99	0-13
			n and %
Relationship Status			
Single			72
Single			28
Birth			
Foreign-born			83
US-born			17
Language Preference			
English			33
Spanish			25
Either English or Spanish			42
Sexual Orientation			
Homosexual			88
Heterosexual			5
Bisexual			7
Tested for HIV During Lifetime			
Yes			92
No			8
Most Recent HIV Test Results			
Neagtive			84
Positive			6
Unknown			10
Body Satisfaction			
Very dissatisfied			13
Dissatisfied			17
Neutral			20
Satisfied			41
Very Satisfied			9
BMI Category[a]			
Underweight			1
Normal Weight			44
Overweight			43
Obese			8

[a] n = 96 because of missing data.

significant for alcohol-related disorders. Sensitivity and specificity of the CAGE Questionnaire range from 0.52 to 0.96 in the general population.[19] For Hispanic populations, reliability coefficients ranging from 0.73 to 0.91 have been reported, and this instrument was 92% sensitive and 74% specific when used with Hispanic populations.[27] The CAGE Questionnaire demonstrated an internal consistency of 0.73 in this sample of Hispanic MSM. The CAGE Questionnaire has been correlated with the Composite International Diagnostic Interview (CIDI) and biologic markers of alcohol usage such as liver function tests and blood alcohol levels as tests of construct validity.[27]

Adonis Complex Questionnaire

The Adonis Complex Questionnaire (ACQ)[20] was used to measure concerns about body image. This 13-item Likert scale contains scores of 0 (rarely or not at all) to 3 (frequently). The total scores on the ACQ range from 0 to 39. Higher scores on the ACQ indicate greater concerns with body image. Reliability measures have not been published for the ACQ, but this is the only instrument currently available to measure body image concerns among MSM.[20] The ACQ demonstrated an internal consistency of 0.80 in this sample of Hispanic MSM.

Center for Epidemiologic Studies-Depressed Mood Scale

The Center for Epidemiologic Studies-Depressed Mood Scale (CES-D)[21] was used to measure depressive symptoms. Designed for research purposes, this 20-item Likert scale contains scores from 0 (rarely or none of the time or <1 day) to 3 (most or all of the time or 5 to 7 days). Total scores on the CES-D range from 0 to 60. CES-D scores greater than 16 indicate higher levels of depressive symptoms. A reliability coefficient of 0.85 for internal consistency has been reported for the general population.[21] With various Hispanic subgroups, reliability coefficients ranging from 0.78 to 0.99 have been reported.[28] In the Hispanic MSM population, a reliability coefficient of 0.88 has been reported.[7] The reliability coefficient of 0.85 was noted in this sample of Hispanic MSM. Validity of the CES-D has been established by correlating the CES-D with other depression and mood scales.[21]

Eating Attitudes Test-26

The Eating Attitudes Test-26 (EAT-26)[22] was used to measure eating attitudes and behaviors and to assess risk for eating disorders. This 26-item Likert scale contains scores from 0 (sometimes, rarely, or never) to 3 (always). Total scores on the EAT-26 can range from 0 to 78. EAT-26 scores above 20 indicate a high risk for eating disorders. A reliability coefficient of 0.98 for internal consistency has been reported A reliability coefficient of 0.91 was reported with Hispanic women.[29] The EAT-26 demonstrated an internal consistency of 0.93 in this sample of Hispanic MSM. Validity of the EAT-26 has been established by correlating the instrument's subscales with bulimia, weight, body image, and psychological symptoms.[22]

Rosenberg Self-Esteem Scale

The Rosenberg Self-Esteem Scale (RSES)[23] was used to measure self-esteem. This 10-item Likert scale contains scores that range from 0 (agree) to 3 (strongly agree). The total scores on the RSES

range from 0 to 30. Higher scores on the RSES indicate higher levels of self-esteem, and scores less than or equal to 16 indicate lower self-esteem. Reliability coefficients for internal consistency ranging from 0.77 to 0.88 have been reported in the general population, and 0.84 with Hispanic individuals.[30] A reliability coefficient of 0.73 was reported previously with Hispanic MSM.[7] The RSES had an internal consistency of 0.83 in this sample of Hispanic MSM. Validity of the RSES has been established by correlating the RSES with measures of depression, anxiety, and peer relationships.[23]

Safer Sex Behavior Questionnaire

The Safer Sex Behavior Questionnaire (SSBQ)[24] was used to measure sexual behaviors, including condom usage, high-risk sexual behaviors, and sexual communication and negotiation. This 27-items on this Likert scale are each rated on a 4-point scale ranging from 1 (never) to 4 (always). Total scores on the SSBQ range from 27 to 108. The mean score for men on the SSBQ is 69. Higher scores on the SSBQ indicate participation in safer sex behaviors. A reliability coefficient for internal consistency of 0.82 was reported for a sample of college-age men and women. The SSBQ has not been used with the general Hispanic population, but a reliability coefficient of 0.85 and a mean of 78 has been reported in previous research with Hispanic MSM.[7] The SSBQ had an internal consistency of 0.83 in this sample of Hispanic MSM. Validity of the SSBQ has been established by correlating the SSBQ with measures of self-expression, assertiveness, and risk-taking.[24]

PROCEDURE

Participants were recruited from bars, clubs, and beaches and were invited to participate if they met the inclusion criteria: (1) age 18 years or older; (2) self-identified as Hispanic; (3) able to speak and read either English of Spanish; and (4) reported sexual activity with another man at least once during the lifetime, regardless of sexual orientation.

Once participants met inclusion criteria and received a detailed explanation of the study in their preferred language and agreed to participate by signing an informed consent form, they were given the option to complete the study on-site or to travel to the university for increased privacy. For those who opted to complete the study on-site, privacy was enhanced through the use of clipboards and cover sheets. Seventy-one percent of the participants completed the survey in English, and 29% in Spanish. Participants were compensated $10 at completion of the study.

Surveys were checked for completeness before data analysis began. Complete data were noted for all study variables except body mass index (BMI), which was 96% complete. Mean and mode substitution were used to manage missing demographic data.

DATA ANALYSIS

Data were analyzed to test and modify the measurement model, and test and modify the structural model. Descriptive statistics were generated using the Statistical Package for the Social Sciences (SPSS, Version 18.0, Chicago, IL, USA).

Structural equation modeling (SEM) is based on examining the variance-covariance structure among the observed variables and generating a chi-square test of model fit, an evaluation of the null hypothesis that the covariance matrix in the population is equal to that implied by the

model. SEM consists of both measurement equations that relate the observed variables to the latent factors, and latent variable equations that estimate the specified relationships among the latent variables. A number of fit indices are available for assessing structural equation models. One such fit index is the model chi-square. Failure to reject the null hypothesis (ie, P>.05) supports the researcher's model. There are limitations with relying solely on the chi-square statistic and as a result, other fit indices have been used to examine the approximate fit of models. The Comparative Fit Index (CFI) is an incremental fit index that measures improvement in model fit of the hypothesized model relative to a baseline model.31 The CFI has a 0 to 1 range. The standardized root mean square residual (SRMR) and the root mean square error of approximation (RMSEA) are residual-based fit indices that assess how well a model reproduces the sample data by comparing it with a saturated model that exactly reproduces the sample covariance matrix. Hu and Bentler32 recommended using SRMR in combination with one of the other fit indices to evaluate model fit, along with using the cutoff of CFI greater than 0.95, SRMR less than 0.08, and RMSEA less than 0.06.

Mplus statistical software version 5.2133 (Los Angeles, CA, USA) was used for subsequent analyses, including the default setting of full information maximum likelihood (FIML) for the handling of missing data of the study variables. A measurement model of 2 latent variables, mental health and appearance concern, was tested before incorporation of the measurement portion into a structural model for which the outcome variable was the total SSBQ score, a measure of sexual behaviors.

RESULTS

Demographic Variables

A complete description of the study's participants is provided in Table 1. Participants were asked to self-report actual body weight and to provide their ideal body weight. The mean actual weight for the sample was 80.20 kg (SD ± 15.86), whereas the reported mean ideal weight was 76.32 kg (SD ± 14.87). The difference between the actual weight and ideal weight was statistically significant (t = 3.98, df = 91, P = .000).

Study Variables

Total scores on each of the measures of alcohol abuse, eating attitudes and behaviors, body image, depression, self-esteem, and sexual behaviors are illustrated with descriptive statistics. Results are presented in Table 2. A variance-covariance matrix of the study variables is shown in Table 3.

Using the criteria established for each of the measures of alcohol abuse, body image, depression, eating attitudes and behaviors, and self-esteem, a number of the participants were at risk for these health conditions. The results indicated that 18% were at risk for alcohol abuse; 29% had body image concerns; 25% had high levels of depressive symptoms; 13% of the study participants were at risk for an eating disorder; and 12% reported low levels of self-esteem.

The measure of sexual behaviors (the SSBQ) does not have "cut-off" values to determine low versus high levels of safer sex behaviors. The original study reported means for males of 68.0 to 69.2. Standard deviations were not reported.24 A study with a sample of Hispanic MSM (n = 155) that used the SSBQ reported a mean of 79.3 (SD ± 12.6, range = 46–104).34 This study's mean 75.14 (SD ± 11.96, range = 48–103) is slightly lower, indicating that the men in this current

study are engaging in slightly lower levels of safer sex behavior compared with the sample studied by De Santis and colleagues.34

Table 2. Alcohol abuse, body image, depression, eating attitudes and behaviors, self-esteem, and sexual behaviors of the sample (n =100)

Variable	Measure	Scale Range	Percent
Alcohol abuse	CAGE	0–2	90
		3–4	10
Variable	Measure	Scale Range	Mean (SD)
Body image	ACQ	0–39	7.11 (± 5.94)
Depression	CES-D	0–31	12.23 (± 8.35)
Eating attitudes and behaviors	EAT-26	0–75	11.20 (± 13.66)
Self-esteem	RSE	8–30	22.81 (± 5.58)
Sexual behaviors	SSBQ	48–103	75.14 (± 11.96)

Abbreviations: ACQ, Adonis Complex Questionnaire; CES-D, Center for Epidemiologic Studies Depressed Mood Scale; EAT, Eating Attitudes Test; RSES, Rosenberg Self-Esteem Scale; SSBQ, Safer Sex Behavior Questionnaire.

Table 3. Variance-covariance matrix of the study variables

	RSES	CES-D	CAGE	EAT-26	ACQ	BMI	SSBQ
RSES	30.874	—	—	—	—	—	—
CES-D	−32.774	74.148	—	—	—	—	—
CAGE	−0.717	2.742	1.167	—	—	—	—
EAT-26	−27.768	35.023	5.557	186.362	—	—	—
ACQ	−4.949	10.892	1.269	32.535	34.958	—	—
BMI	4.300	-8.061	−0.859	−9.456	−3.791	11.825	—
SSBQ	26.017	−35.589	−3.011	−41.883	−8.835	4.952	141.540

Abbreviations: ACQ, Adonis Complex Questionnaire; BMI, Body Mass Index; CES-D, Center for Epidemiologic Studies Depressed Mood Scale; EAT, Eating Attitudes Test; RSES, Rosenberg Self-Esteem Scale; SSBQ, Safer Sex Behavior Questionnaire.

Measurement Model Testing

The first step in structural equation modeling is testing the measurement model. If the measurement model does not fit the data, structural modeling testing cannot be performed.

Total scores from the CES-D, a measure of depression, and total RSES scores, a measure of self-esteem, were specified as indicators of a latent variable labeled mental health. Positive mental health was defined by high self-esteem scores and low depression scores. Mental health had a strong negative correlation (B = –0.533, P<.001) with a latent variable labeled appearance concern. Mental health was associated with higher RSES scores (B = 0.861, P<.001) and lower CES-D scores (B = –0.795, P<.001).

The indicators of appearance concern were specified as total EAT-26 scores (eating attitudes and behaviors), total ACQ scores (body image), and BMI scores. High levels of concern over appearance were associated with increased EAT-26 (B = 0.753, P<.001), ACQ scores (B = 0.514, P<.001), and decreased BMI (B = –0.315, P<.05). The metric for both latent variables was set by fixing their respective variances to 1, thereby allowing a loading to be generated for each

indicator. The measurement model (Fig. 2) had good fit to the data ($\chi2[4] = 5.120$, P = .275; CFI = 0.998; RMSEA = 0.053; SRMR = 0.042).
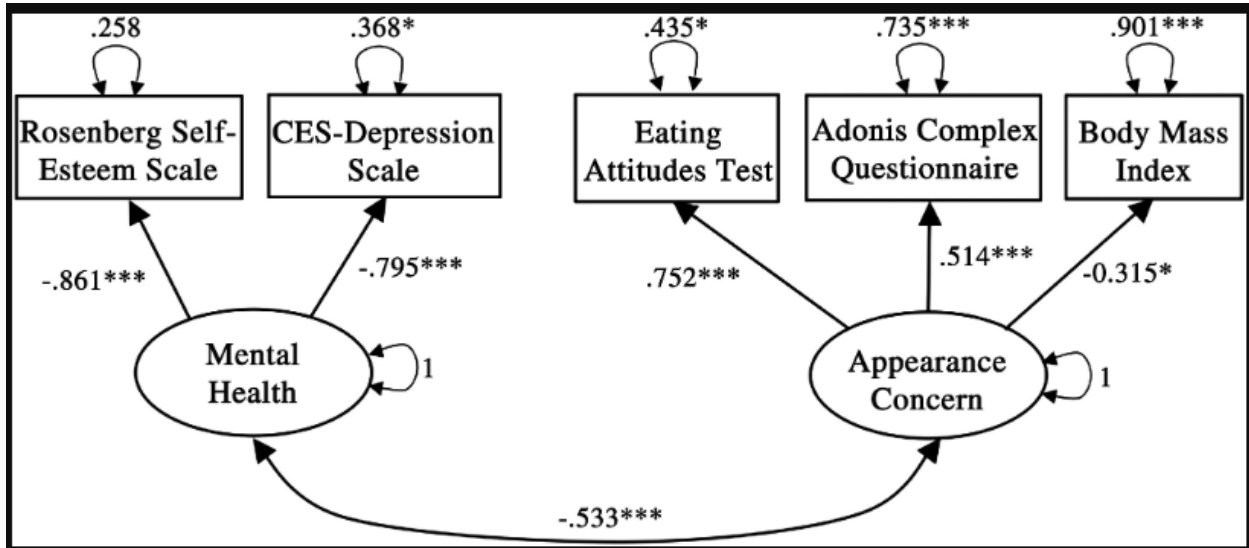

Fig. 2. Measurement model with standardized coefficients. Rectangles represent indicators of latent variables, which are shown in ovals. *P<.05. ***P<.001.

Eating attitudes and behaviors are at the conceptual crossroads between concern over appearance and mental illness. Therefore, total EAT-26 scores justifiably could have been used as indicators for either appearance concern or mental health. The authors chose to specify total EAT scores as indicators of appearance concern because although the instrument taps aspects of mental health and illness, the content of the items is conceptually closer to appearance concern. Furthermore, specifying total EAT-26 scores as indicators of mental health led to a model with significantly poorer fit with the data, based on the result of a chi-square difference test, than the model that was retained.

Several alternative measurement models were attempted and rejected. Total CAGE scores, a measure of alcohol abuse, failed to fit the data as indicators of mental health. Two potential indicators of appearance concern were rejected because of poor model fit: hours of exercise per week and the absolute value of the difference between actual and ideal body weight. A single-item measure of body satisfaction ("How satisfied are you with your body?") achieved model fit as an indicator of appearance concern. However, the loading on the indicator was not significant and it was replaced with BMI, which led to both a significant loading and equally good model fit.

Structural Model Testing

A structural model in which sexual behaviors, as measured by the total SSBQ scores, was predicted by CAGE scores, mental health, and appearance concern fit the data well ($\chi2[10] = 14.498$, P = .152; CFI = 0.966; RMSEA = 0.067; SRMR = 0.043). The model, with standardized coefficients, is shown in Fig. 3. Of the 3 possible direct paths to sexual behaviors (mental health, CAGE scores [alcohol abuse], and appearance concern), only the direct path from mental health to sexual behaviors was significant (B = 0.392, P<.01). Covariances between mental health and CAGE scores (B = –0.216, P = .08); mental health and appearance concern (B = –0.530, P<.001); and CAGE scores and appearance concern (B = .488, P<.001) were also noted. Although the only

significant direct path to sexual behaviors was mental health, there is shared variance among the variables of mental health, alcohol abuse, and appearance concern that is not being captured by the measures that were used in this study to define these variables.
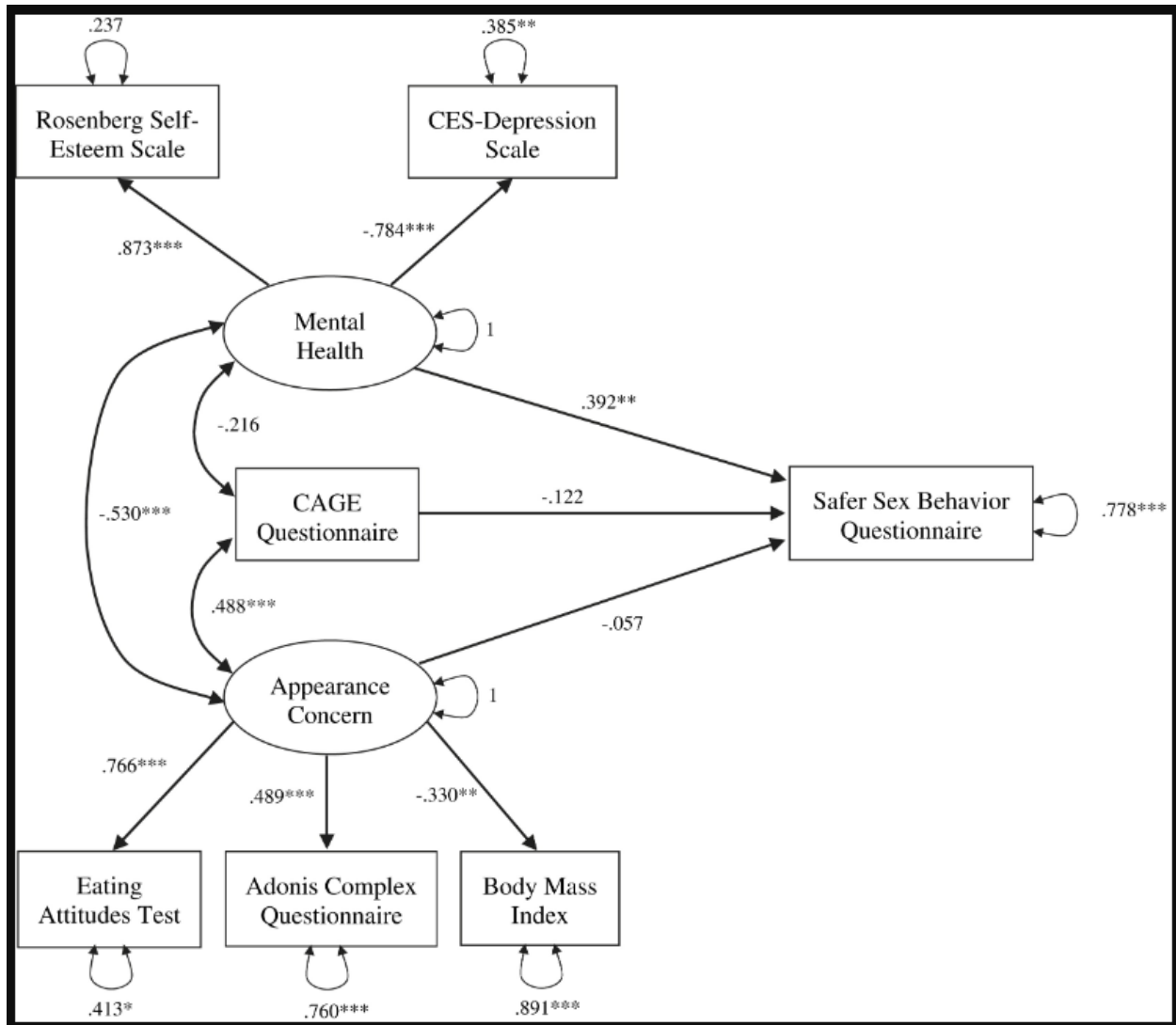

Fig. 3. Structural model with standardized coefficients. Rectangles represent indicators of latent variables, which are shown in ovals. *P<.05. **P<.01. ***P<.001.

Table 4 contains the unstandardized path coefficients, standard errors and z values for the structural model. Because the sample size is somewhat small for this type of analysis, the authors assigned the indicator loadings from the measurement model and specified them as starting values for the structural model. This strategy led to model convergence that did not occur without the specification of starting values.

Owing to the scarcity of literature regarding Hispanic MSM, a partially exploratory approach to model specification was taken. Models were tested in which the respondents' relationship status (partnered or not) and HIV testing history (ever had an HIV test) were specified as predictors of sexual behaviors (total SSBQ scores), but rejected because relationship status and HIV testing history failed to fit the data. Similarly, neither age, education, income, nor number of

years in the United States generated good model fit when specified as predictors of sexual behaviors (total SSBQ scores). Furthermore, age was not a good predictor of appearance concern.

Table 4. Unstandardized path coefficients, standard errors and z values for indicator loadings, direct effects, and covariances

	Coefficient	SE	z
Latent variable loadings			
Appearance concern to			
EAT	10.46	1.78	5.89[c]
ACQ	2.89	0.67	4.32[c]
BMI	−1.13	0.44	−2.56[a]
Mental health to			
CES-D	−6.75	0.95	−7.11[c]
RSES	4.85	0.63	7.75[c]
Direct paths			
Mental health to SSBQ	4.66	1.59	2.94[b]
Appearance concern to SSBQ	−0.68	2.01	−0.34
CAGE to SSBQ	−1.34	1.28	−1.05
Covariances			
Mental health with CAGE	−0.23	0.13	−1.77
Mental health with appearance concern	−0.53	0.13	−4.23[c]
CAGE with appearance concern	0.53	0.12	4.58[c]

Abbreviations: ACQ, Adonis Complex Questionnaire; BMI, Body Mass Index; CES-D, Center for Epidemiologic Studies Depressed Mood Scale; EAT, Eating Attitudes Test; RSES, Rosenberg Self-Esteem Scale; SSBQ, Safer Sex Behavior Questionnaire.
[a] P<.05. [b] P<.01. [c] P<.001.

DISCUSSION

This study was designed to test a model that could predict the sexual behaviors of Hispanic MSM that was based on the conceptual framework of the Web of Causation.17, 18 It was hypothesized that certain specified factors could predict the sexual behaviors of Hispanic MSM. Measurement and structural models were tested to develop a model that predicts the sexual behaviors of this subpopulation of MSM.

The results of this study support the existing body of research that reports that mental health, expressed in terms of depression and self-esteem, are strong predictors of sexual behaviors among Hispanic MSM.7 One possible reason that mental health has such a large impact on sexual behaviors of the men in this study may lie in Hispanic culture. In general, Hispanic culture values strong family relationships. Sexual orientation may affect these family relationships. Decreased familial support could have an impact on mental health, expressed in terms of depression and self-esteem.35 Resulting depression and low self-esteem may contribute to high-risk sexual behaviors.7

Alcohol abuse was not a direct predictor of sexual behaviors in this sample. Previous research, however, has reported that alcohol use contributed to high-risk sexual behaviors among Hispanic MSM.4 This was an unexpected finding based on previous research. There are possible explanations for this finding. First, once mental health is controlled, perhaps alcohol abuse is no

longer a significant predictor of sexual behaviors. Second, because the participants were recruited in sites where alcohol was readily available, the results regarding alcohol abuse may have been influenced by the study sites, and are not truly representative of alcohol abuse among Hispanic MSM.

A third possible explanation for alcohol abuse not being a predictor of sexual behaviors in this study could be rooted in the measure of sexual behaviors, the SSBQ. The SSBQ contains an item that asks participants if alcohol is used before and during sexual behavior.24 Variability of the responses within this sample on this particular item on the SSBQ could have captured outcome-specific information, and rendered alcohol abuse, as reflected by the CAGE scores, as insignificant. More research with this population is needed to explore the complex relationship of alcohol use/abuse, mental health, and sexual behaviors of Hispanic MSM.

Body image and eating attitudes and behaviors, other mental health indicators, were not significant predictors of sexual behaviors. However, the latent variable of appearance concern was significantly correlated with mental health. Previous studies to document the influence of appearance concern expressed in body image on the sexual behaviors of Hispanic MSM are lacking, but with the correlation between the latent variables of appearance concern and mental health that was noted in this study, future studies should consider including these correlates of mental health as a cluster. Because the influence of body image or eating attitudes and behaviors on the sexual behaviors of Hispanic MSM has not been previously explored, this study adds some important information to the knowledge base of the health behaviors of these men.

An alternate explanation for the study's findings is that the other predictors that could possibly be used to predict sexual behaviors were not included in this study.36 The significant correlation between the predictors provides evidence that there is something else within these variables that was not captured by those 3 predictors. Previous research has shown that other factors, such as abuse of substances other than alcohol,37 childhood sexual abuse,38 power and control in intimate partner relationships,39 and a lack of family support40 have been linked to high-risk sexual behaviors among Hispanic MSM. Because none of these variables were included in this study, further research is needed that tests the influence of these variables on sexual behaviors.

An important strength of this study is that the structural model fit well within the data without regard to demographic variables. Although previous research on Hispanic MSM found that certain demographic variables such as age, education,12 language preference, foreign birth,7 limited English proficiency, and recent immigration16 were related to sexual behaviors among Hispanic MSM, these demographic variables were not significant predictors in this study. Attempts to include these demographic variables (age, income, education, years living in the United States, relationship status, and HIV testing history) all worsened model fit. The parsimony of this model translates into stronger generalizability than a model in which demographic variables were influential on sexual behaviors.

Overall, the results of this study indicate that Hispanic MSM are at risk for a number of physical and psychological health conditions. These include alcohol abuse (18%), body image concerns (29%), depression (25%), risk for eating disorders (13%), and low self-esteem (12%). These results indicate that screening for alcohol abuse, body image disturbance, depression, eating disorders, and low self-esteem in combination with addressing high-risk sexual behaviors is important in providing care to this population. One implication of this study is that health care providers and researchers can use the results to gain a better understanding of the complexity of risk behaviors in this population. Health care providers working with members of this population

can use these results as evidence for the need to be aware that clients who are depressed or who report low self-esteem may be at risk for engaging in high-risk sexual behaviors. Researchers can use this model as a starting point from which to explore further the interrelationships of health risk behaviors among Hispanic MSM. Whether through clinical practice or research, more emphasis needs to be placed on reducing participation in high-risk sexual behaviors, which would decrease the rates of HIV infection and other STIs among this population.

NURSING IMPLICATIONS

To provide culturally appropriate care to Hispanic MSM, nurses and other health care providers must appreciate the unique cultural factors that influence high-risk behaviors in this population of MSM. One of the most fundamental factors is familial relationships.[40] To decrease high-risk behaviors, Hispanic MSM need psychosocial support. If this support is not available from the family, nurses should be aware of community-based agencies that can offer services, such as support groups that may serve as a source of psychosocial support.

To cope with the lack of psychosocial support, some Hispanic MSM may use drugs and alcohol.[4] For men with drug and alcohol problems, prompt referrals to mental health providers who can address the use of drugs and alcohol in a culturally sensitive manner is necessary.

In addition to drug and alcohol use, mental health conditions such as altered body image, depression, altered eating attitudes and behaviors, and low self-esteem must be addressed in a culturally appropriate manner. As Hispanic MSM acculturate to US society, the risk for body image disturbance, depression, eating disorders, and low self-esteem increases. Screening for these conditions during health care encounters is necessary. Clients reporting concerns with any of these mental health conditions require prompt referral to mental health professionals who are culturally competent to provide care to this population of men.

Last, nurses and other health care providers must be comfortable assessing for and addressing high-risk sexual behaviors. Some Hispanic MSM may lack basic information about safer sex behaviors, or may not have an accurate perception of risk for HIV and other STIs. As these men acculturate to US society, participation in high-risk sexual behaviors increases.[34] Educating these men in a culturally appropriate manner about HIV/STIs, high-risk versus lower-risk sexual behaviors, and other risk factors may decrease overall risk.

LIMITATIONS

The results of this study provide some important information on predictors of sexual behaviors of Hispanic MSM. Certain limitations of this study are evident. Because the data were collected at one point in time in a cross-sectional design, measurement of change in the variables over time was not possible.[41] The participants were drawn from a convenience sample recruited at selected sites frequented by MSM, so the participants in this study may not be truly representative of the population of Hispanic MSM. The use of convenience sampling is necessary, however, as this sampling method is one of the most effective means of surveying hard-to-reach populations such as Hispanic MSM.[42]

SUMMARY

The results of this study provide some important new information regarding the predictors of sexual behaviors among Hispanic MSM. The final model suggests that mental health is a significant predictor of sexual behaviors in this sample. Major implications for the development of interventions to address high-risk sexual behaviors highlight the need for health care providers and researchers to be cognizant of the influence of mental health issues on sexual behaviors.

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