



Published in final edited form as:

J Behav Med. 2018 June ; 41(3): 364–373. doi:10.1007/s10865-017-9907-2.

Pathways Linking Racial/Ethnic Discrimination and Sleep among U.S.-Born and Foreign-Born Latinxs

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Abstract

This study examined the association between racial/ethnic discrimination and sleep through psychological distress and Body Mass Index (BMI), and determined whether the aforementioned associations vary between U.S. and foreign-born Latinxs. Participants were 1, 332 Latinx adults enrolled in the Texas City Stress and Health Study. Multistage sampling methods were used to select participants. A model linking racial/ethnic discrimination with sleep disturbances through direct and indirect (i.e., psychological distress and BMI) paths demonstrated good fit. Greater racial/ethnic discrimination was associated with greater psychological distress and higher BMI. Psychological distress and BMI were also significant predictors of sleep disturbances. The indirect path from racial/ethnic discrimination to sleep disturbances via psychological distress was significant. A model with parameters constrained to be equal between U.S.-born and foreign-born Latinxs suggested associations were comparable between these groups. Our study demonstrated the relevance of racial/ethnic discrimination to sleep disturbances, particularly its association via psychological distress among Latinxs.

Keywords

Sleep; Discrimination; Depression; Latinxs; structural equation modeling

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Conflict of Interest

The authors of this manuscript have no conflict of interests to disclose

Introduction

Racial/ethnic discrimination, the unfair treatment individuals receive or perceive to receive due to their race or ethnicity (Carter & Forsyth, 2010), continues to be of a salient stressor. Conflicting political views and growing animosity among people of different backgrounds have recently brought racial/ethnic discrimination to the forefront of the U.S. political, economic, and social landscape (Pew Research Center, 2016a). Racial/ethnic discrimination is more prevalent among people from disadvantaged backgrounds, that is individuals with limited access to social and/or environmental resources, including immigrant populations (Carter & Forsyth, 2010). For instance, among Latinxs, who make up the largest and fastest growing ethnic/racial minority group in the U.S. (Bureau, 2015) approximately half (52%) have experienced racial/ethnic discrimination, with immigration status being identified as a primary reason for unfair treatment (Center, 2016). In this study and consistent with linguistic trends, we used the term Latinxs as a gender-inclusive alternative to refer to men and women of Latin American descent (Ramirez & Zeba, 2016).

The negative effects of racial/ethnic discrimination on health have been documented, with racial/ethnic discrimination being consistently associated with poor health status and harmful health behaviors (Pascoe & Smart Richman, 2009). An important health behavior commonly affected by racial/ethnic discrimination is sleep (Slopen, Lewis, & Williams, 2016). The benefits of good sleep on physical and mental health are well-known (Buxton & Marcelli, 2010; Cappuccio, D'Elia, Strazzullo, & Miller, 2010; Ford & Cooper-Patrick, 2001); however, existing disparities in sleep characteristics across race/ethnicity, immigration history, and socioeconomic status have been found (Slopen et al., 2016). For instance, among Latinxs, greater sleep disturbances have been identified among the U.S.-born when compared to the foreign-born, including shorter sleep duration and greater risk for insomnia (Loredo et al., 2010). Unfortunately, knowledge on sleep among Latinxs continues to be scant, and only a few studies have explored the influence of contextual stressors (e.g., discrimination) on the sleep habits of U.S.-born versus foreign-born Latinxs, including those of Mexican-origin (Dudley et al., 2016; Loredo et al., 2010; Slopen et al., 2016). Developing a better understanding of the process by which contextual stressors (i.e., racial/ethnic discrimination) may influence sleep among Latinxs and identifying relevant within group differences, is important to inform the development of interventions and protective factors aimed to promote better sleep among at-risk Latinxs (Slopen et al., 2016).

Research have proposed different pathways to explain the potential association between racial/ethnic discrimination and sleep. One such pathway includes emphasizing psychological distress as a key explanatory process (Pascoe & Smart Richman, 2009; Slopen et al., 2016). Stress and coping frameworks have conceptualized discrimination as a social stressor that is often experienced as uncontrollable and unpredictable, and which has the ability to trigger undesirable psychological distress (e.g., negative affect, emotional distress) (Pascoe & Smart Richman, 2009; Slopen et al., 2016). Also, it has been suggested that over time, repeated exposure to discrimination may cause the body to become more psychologically and physically reactive to stressful situations, which in turn, may lead to chronic poor sleep outcomes such as insomnia, irregular sleep patterns, and/or less restful sleep (Pascoe & Smart Richman, 2009; Slopen et al., 2016). Further research is needed to

understand specific modifiable pathways by which racial/ethnic discrimination may influence sleep (Slopen et al., 2016), particularly among Latinxs (Loredo et al., 2010).

Another potentially modifiable pathway to explain the association between racial/ethnic discrimination and sleep is obesity. Exposure to chronic stressors (e.g., racial/ethnic discrimination) influences obesity risk and increases BMI via multiple behavioral pathways (e.g., increasing fat intake, decreasing physical activity) (Herva, Laitinen, et al., 2006; Herva, Rasanen, et al., 2006; Raikonen, Matthews, & Kuller, 2007), as well as physiological mechanisms such as altered metabolic responses to high-fat meals (Kiecolt-Glaser, Habash, et al., 2015; Kiecolt-Glaser, Jaremka, et al., 2015). In fact, greater exposure to daily stressors has been associated with decreased post-meal energy expenditure, lower fat oxidation, and higher insulin production (Kiecolt-Glaser, Habash, et al., 2015), which may promote weight gain. In turn, extensive research shows that obesity is associated with sleep disturbances (Patel & Hu, 2008), which are ameliorated by weight loss in longitudinal studies (Pi-Sunyer, 1996). Given the high prevalence of obesity among Latinxs (Wang & Beydoun, 2007), research is needed to better understand how obesity may be a mediating pathway linking contextual stressors such as racial/ethnic discrimination to important health promoting behaviors such as sleep.

No study to date has simultaneously assessed multiple modifiable pathways by which racial/ethnic discrimination may be associated with sleep among Latinxs, including identifying potential differences in the aforementioned pathways between Latinxs that are U.S.-born and those of foreign-born origin. Disparities in racial/ethnic discrimination between U.S. and foreign-born Latinxs have been recently documented, with racial/ethnic discrimination being more prevalent among the U.S.-born when compared to the foreign-born (Pew Research Center, 2016b). Also, given differences in socioeconomic status, acculturation, exposure to contextual stressors, and health profiles of U.S. versus foreign-born Latinxs (Gonzales-Barrera & Lopez, 2013; Loredo et al., 2010), it is possible that the associations among the pathways of interest would vary between U.S.-born and foreign-born Latinxs. Therefore, this study aimed to: (1) examine the association between perceived racial/ethnic discrimination and sleep disturbances; (2) establish whether perceived racial/ethnic discrimination is associated with sleep disturbances through psychological distress and Body Mass Index (BMI); and (3) determine if there are differences in the aforementioned associations between U.S.-born and foreign-born Latinxs, primarily of Mexican origin.

Methods

Study Sample

This cross-sectional study used data from the Texas City Stress and Health Study (TCSHS), a social epidemiological study undertaken in a mid-sized city in the gulf coast of Texas. The goal of the TCSHS was to investigate how contextual, environmental, psychological, and biological risk factors are associated with different health outcomes among minority populations, especially Latinxs of Mexican origin. Multistage sampling methods were used to select participants. Forty-eight contiguous neighborhoods were included in the study, and an exhaustive list of housing units in these neighborhoods was created. From this listing, housing units were classified as Latinx or other, with Latinx households defined as having at

least one member in the household being Latinx. Households were sampled in the following proportions: (a) one in eight non-Latinx households were selected; (b) one adult age 25 or older was randomly selected from all Latinx households with no older adults (65+); and (c) all households with a Latinx older adult ages 65 or older were selected for participation. Selected participants were interviewed in their homes. Additional details on data collection have been described in prior work (Cutchin, Eschbach, Mair, Ju, & Goodwin, 2011). The interview response rate was 80% and participants in the final sample included 2,706 diverse adults ages 25 and older. However, only Latinx participants were included in this study (N=1438). Due to missing data, 106 participants were excluded from this study. Therefore, the final sample for analysis included 1,332 Latinx respondents, most of Mexican origin. Data from the 106 participants that were excluded from the analyses did not differ from the overall Latinx TCSHS sample on the primary outcomes of interest. The study protocol was approved by the University of Texas Medical Branch (UTMB) Institutional Review Board, and informed consent was obtained from all participants.

Measures

Sleep Disturbances—This was assessed using a modified version of a sleep scale consisting of four items that assess for sleep disturbances within the past month along four domains including sleep onset (“have trouble falling sleep”), awakenings (“wake up several times in the night”), maintenance (“have trouble staying sleep”), and quality (“wake up feeling tired or worn out after usual amount of sleep”) (Jenkins, Stanton, Niemcryk, & Rose, 1988). Responses to the questions were provided using a 5-point Likert scale ranging from 1 = not at all to 5=all of the time, with higher scores denoting higher sleep disturbances. This scale has been previously used to study sleep disturbances among Latinxs, and the scale has been shown to have good psychometric properties (Howrey, Peek, Raji, Ray, & Ottenbacher, 2012). In our study, the reliability of this scale was high (Cronbach alpha= 0.89).

Perceived Racial/Ethnic Discrimination—This was assessed using the Perceived Discrimination subscale from the Mexican American Prevalence and Population Survey (MAPPS) (Finch, Hummer, Kol, & Vega, 2001). Specifically, three items assessing feeling unaccepted, been treated unfairly, and observing others being treated unfairly due to being Latinx were used to create a composite variable for perceived racial/ethnic discrimination. The item assessing feeling unaccepted due to being Latinx was dichotomous (0=no; 1=yes), whereas the other two items assessing frequency of unfair treatment of self and others were categorical with responses ranging from 0= Never to 3=always. For each of the items, higher scores reflect higher perceived ethnic/racial Discrimination. The full three-item scale has good reliability in this sample (Cronbach alpha= 0.69).

Psychological Distress—Total scores for three mental health measures, the Center for Epidemiologic Studies Depression Scale-Revised (CESD-R) (Eaton, Smith, Ybarra, Muntaner, & Tien, 2004), the Perceived Stress Scale (PSS) (Cohen, 1988), and the mental component summary measure of the Short Form Health Survey (MCS SF-36) (Ware Jr & Sherbourne, 1992) were used as indicators of psychological distress. The CESD-R is a widely used 20-item measure of symptoms of depression during the prior two weeks based on Diagnostic and Statistical Manual (DSM) diagnosis. Responses are provided on a scale

ranging from 0 (rarely) to 3 (most or all of the time), so that higher scores denote higher depressive symptoms. In our study, the reliability of the CESD-R was high (Cronbach alpha= 0.94). The PSS is a 10-item scale used to measure perceived life stress in which higher scores denote higher levels of perceived stress. The PSS has been previously used with diverse populations (Cohen, 1988) and is known to have good validity and reliability. In our study, the reliability of the PSS was high (Cronbach alpha= 0.83). The MCS SF-36 is an aggregated summary measure of mental health based on a scoring algorithm that gives positive weights to four subscales of the SF-36 (vitality, social functioning, role-emotional, and emotional well-being) and negative weights to the other four subscales (physical functioning, role-physical, bodily pain, and general health). Thus, higher scores denote better mental health. In our study, the reliability of the SF-36 MCS was high (Cronbach alpha= 0.85).

BMI—Participants' height and weight were measured to calculate a body mass index (BMI), which was utilized as an indicator of obesity.

Covariates—Participants provided self-reports of age, gender, education, marital status, employment, and country of birth. These variables were included in regression models as covariates. Age and education were used as continuous variable, whereas categorical variables included gender, marital status, employment, and country of birth. Gender, marital status (married vs. others), employment (employed vs. non-employed), and country of birth (U.S.-born versus foreign born) were dichotomized for regression analysis.

Statistical Analysis

Preliminary statistical analyses included descriptive statistics and assessment of normality distributions. Data for continuous variables are presented as means and standard deviations and were compared between groups using independent *t*-tests. Categorical variables are presented as percentages and were compared with the chi-squared test. The Statistical Package for the Social Sciences (SPSS) version 23.0 (SPSS, Chicago, IL, U.S.) was used for all preliminary analyses.

Structural equation modeling (SEM) was used to examine associations among variables and pathways of interest (MPLUS, Version 6.11, Los Angeles, CA). Measurement models were fitted first to examine fit with the data. Several indicators including as the comparative fit index (CFI), root mean squared error of approximation (RMSEA), and the weighted root mean square residual (WRMR) were used to evaluate model fit. The chi-square tests was not used as it has been shown to be sensitive to sample size (Rex B Kline, 2015). Structural regression models, which included both direct and indirect paths, were fitted next and assessed for model fit. Confidence intervals for indirect effects were generated using 5000 bootstrap samples. Once a final model was established, it was re-assessed using multiple group comparisons to examine differences between U.S-born and foreign-born Latinxs. Within this approach, the model was estimated for U.S.-born and foreign-born Latinxs separately, but simultaneously. Factor loadings, factor covariances and regression paths were constrained to be equal across the groups and model fit was once again assessed.

Results

Descriptive Statistics

Participant's characteristics are described in Table 1. Most of the sample was primarily of Mexican-descent (90%), with 30% of these being foreign-born. Participants ranged in age from 25 to 70 years, with the majority being middle age (44%). The average age was 46 years ($SD = 14.9$), with the foreign-born being significantly younger than the U.S.-born ($p < .001$). The majority of the sample was female, not married, had less than a high-school education, and was employed. Pertaining to racial/ethnic discrimination, a greater proportion of foreign-born Latinxs felt unaccepted when compared to those that were U.S.-born (22% versus 16%) ($p = .013$).

Moreover, on average, participants reported low depressive symptoms, with the foreign-born reporting significantly fewer symptoms of depression when compared to the U.S.-born ($p = .009$). Also, participants reported a moderate level of perceived stress and mental health related symptoms, with no significant differences found between the U.S.-born and the foreign-born. Regardless, results indicated that there were significant differences in the mean of the Psychological Distress variable between U.S. and foreign-born Latinxs (χ^2 difference = 6.275, $df = 1$, $p = 0.012$). Further, mean BMI was 30.5 ($SD = 6.7$), with the foreign-born having significantly lower BMI than the U.S.-born ($p < .001$). Of note, 34% were overweight and 45.4% were obese. Also, U.S.-born Latinxs reported greater sleep disturbances when compared to the foreign-born ($p = .001$).

Measurement Model

Measurement models were first fit separately for the Sleep Disturbances, Perceived Racial/Ethnic Discrimination and Psychological Distress latent factors. The Sleep Disturbances measurement model showed excellent fit with the data, as evidenced by the following indexes: CFI=1.000, RMSEA=0.000, SRMR=0.003. Factor loadings were significant ($p < 0.001$) for all four indicators: Sleep 1 (unstandardized=1.000; standardized=0.810), Sleep 2 (1.016; 0.798), Sleep 3 (1.061; 0.879), and Sleep 4 (0.906; 0.762). In the case of both the Perceived Racial/Ethnic Discrimination and the Psychological Distress factors, model fit was not assessed given the model was *just identified* due to having only three indicators each. However, factors loadings for all indicators were significant for both the Perceived Racial/Ethnic Discrimination: Feeling Unaccepted (unstandardized=1.000; standardized=0.546), Unfair Treatment of Self (2.544; 0.811), Witness Unfair Treatment of Others (2.218; 0.659), and the Psychological Distress factors: CES-D (1.000; 0.826), PSS (0.581; 0.736) SF36-MH (-0.398; -0.886).

Structural Models

An initial structural model looking at the association between the Perceived Racial/Ethnic Discrimination and Sleep Disturbances was first examined for model fit. The model controlled for age, gender, education, employment and marital status. The model showed good fit with the data: CFI=0.958, RMSEA=0.051, WRMR=0.950. The Perceived Racial/Ethnic Discrimination factor was significantly associated with Sleep Disturbances ($B = -0.422$, $\beta = -0.258$, $p < 0.001$).

Next, the structural model depicted in Figure 1 was evaluated for model fit. In addition to a direct path from Perceived Racial/Ethnic Discrimination to Sleep Disturbances, paths were also specified from Perceived Racial/Ethnic Discrimination to Psychological Distress and BMI, as well as from Psychological Distress and BMI to Sleep Disturbances. Further, an indirect path was specified from Perceived Racial/Ethnic Discrimination to Sleep Disturbances through Psychological Distress and BMI. The structural model demonstrated good fit with the data evidenced by the following fit indexes: CFI=0.955, RMSEA=0.037, WRMR=0.888. The Perceived Racial/Ethnic Discrimination factor was significantly associated with Psychological Distress ($B=4.193$, $\beta=-0.303$, $p<0.001$) and BMI ($B=0.839$, $\beta=-0.090$, $p=0.006$). Psychological Distress and BMI were also significantly associated with Sleep Disturbances ($B_{\text{distress}}=-0.080$, $\beta=-0.716$, $p<0.001$; $B_{\text{BMI}}=-0.012$, $\beta=-0.075$, $p=0.007$). After the inclusion of potential indirect pathways, the direct path from Perceived Racial/Ethnic Discrimination to BMI was no longer significant. Assessment of indirect paths demonstrated that the indirect path from Perceived Racial/Ethnic Discrimination to Sleep Disturbances via Psychological distress was significant ($B=-0.334$, $\beta=-0.217$, $p<0.001$). The indirect path from Perceived Racial/Ethnic Discrimination to Sleep Disturbances via BMI was not significant ($B=-.010$, $\beta=-0.007$, $p=0.068$). A detailed description of parameter estimates in the model are presented in Table 2.

Differences between U.S.-born and foreign-born

Multiple group analyses were performed to compare the structural model between U.S.-born and foreign-born Latinxs. The model with parameters (loadings and regression paths) constrained equally across the groups showed adequate fit to the data: CFI= 0.963, RMSEA=0.030, WRMR=1.377 suggesting the presence of comparable associations across US-born and foreign-born Latinxs.

Discussion

Our study used a community sample of Latinx adults, most of Mexican origin, to examine two modifiable pathways (i.e., psychological distress and BMI) linking racial/ethnic discrimination and sleep disturbances. Our results indicated that racial/ethnic discrimination is associated with greater sleep disturbances via psychological distress. In addition, our study provides novel data by demonstrating that the aforementioned associations are comparable across U.S. and foreign-born Latinxs.

Most research to date has focused on examining the association between perceived racial/ethnic discrimination and sleep without much attention given to identifying modifiable pathways to the aforementioned association (Chen & Yang, 2014; Slopen et al., 2016). Consistent with previous studies, our results provide supporting evidence that greater perceived racial/ethnic discrimination is associated with greater sleep disturbances (Slopen et al., 2016), and extend previous findings by identifying psychological distress as a modifiable pathway to the discrimination-sleep relationship. Although most research has focused on how diminished sleep quality may lead to distress, it is important to remember the bidirectional nature of this association in that distress may also contribute to sleep disturbances. In fact, stress accumulated during the day affects sleep at night (Koehl,

Bouyer, Darnaudery, Le Moal, & Mayo, 2002). Given that stress and sleep are intimately connected, future research should aim to identify the association of distress from racial/ethnic discrimination with specific objective indicators of sleep quality.

The pathway linking racial/ethnic discrimination to greater sleep disturbances via psychological distress has important clinical and research implications. For instance, our findings support the need to incorporate the assessment of racial/ethnic discrimination as a salient contextual stressor to be addressed in the treatment and study of sleep problems among at-risk racial/ethnic minorities, as well as the need to identify specific emotional (e.g., anger), cognitive (e.g., self-blame), and behavioral (e.g., rumination, helplessness) responses to racial/ethnic discrimination that may increase psychological distress and interfere with sleep. Also, facilitating the development of protective factors to ameliorate the negative effects of racial/ethnic discrimination on psychological wellbeing (e.g., building adequate social support, promoting the internalization of culturally-related values) (Berkel et al., 2010), may be helpful to improve sleep outcomes among at-risk Latinxs. Research is needed to document the effectiveness and incremental value of incorporating the aforementioned strategies and protective factors in the development of sleep interventions for Latinxs with salient experiences of racial/ethnic discrimination.

In addition to psychological distress, our study examined the role of obesity as an explanatory pathway linking discrimination to sleep disturbances. While there were significant associations among these three variables, racial/ethnic discrimination did not contribute to sleep disturbances through BMI. Future reports should aim to examine the role of BMI in the association between discrimination and sleep disturbances using prospective designs as well as a more comprehensive assessment of sleep disturbances. It should be noted that our study used items measuring sleep duration and efficiency. Sleep disorder breathing, a sleep disturbance that has been more strongly associated with obesity (Peppard, Young, Palta, Dempsey, & Skatrud, 2000; Young et al., 2002), was not assessed in our study and should be the focus of future inquiry. Moreover, although our results did not support the hypothesized effect of BMI on sleep, future studies should consider testing alternative indirect pathways, including exploring the possible effect of BMI on sleep through psychological distress.

The third aim of our study was to identify differences between U.S.-born and foreign-born Latinxs in the association between racial/ethnic discrimination and sleep disturbances via psychological distress and BMI. Although existing disparities in perceived racial/ethnic discrimination, psychological distress, BMI, and sleep quality were observed between U.S.-born and foreign-born Latinxs, our study showed that the strength of the associations and the pathways linking racial/ethnic discrimination to sleep disturbances via psychological distress and BMI were similar across the two groups. Thus, despite existing disparities in sleep disturbances and some subscales measuring psychological distress between U.S. and foreign-born Latinxs, our study showed that the indirect effects from racial/ethnic discrimination via psychological distress are comparable among Latinxs born in the U.S. and those who are foreign born.

Although not a specific focus of this study, an interesting finding worth highlighting is the differences found in perceived discrimination between U.S. and foreign-born Latinxs. For instance, our study showed that a higher number of foreign-born participants (22%) reported feeling unaccepted due to their ethnicity/race when compared to those born in the U.S. (16%). Although disparities in perceived racial/ethnic discrimination between U.S. and foreign-born Latinxs have been widely documented, our findings are in contrast to recent estimates showing that racial/ethnic discrimination is becoming more prevalent among Latinxs born in the U.S. (Pew Research Center, 2016b). Although not supported by findings in our study, it is possible to hypothesize that the aforementioned disparity may hint as to how, when compared to a decade ago, changes in the current U.S. sociopolitical context may be bringing perceived ethnic/racial discrimination to the forefront of the daily life experiences of even those Latinxs that are U.S.-born. This possibility highlights the need for assessing and addressing the negative effects of perceived ethnic/racial discrimination on the health and health behaviors, including sleep, of all Latinxs regardless of their immigration background.

Limitations

Our results should be interpreted in light of the strengths and limitations of the study. An important strength of this study is the large sample size, which facilitates comparisons between U.S.-born and foreign-born Latinxs. Also, this allowed for simultaneous examination of two pathways linking perceived racial/ethnic discrimination to sleep. Similarly, this study recruited a community sample of Latinxs, which although slightly older than national and state averages, it resembles the general U.S. Latinx population based on nativity status and relevant socio-demographic characteristics (Bureau, 2015), as well as the Texas Latinx population in terms of country of origin (Center, 2016). Thus, this supports the generalizability of our results. Further, the statistical modeling of variables of interest as latent variables (perceived racial/ethnic discrimination, psychological distress, and sleep quality) increase the validity of the theoretical concepts that we intended to measure (R.B Kline, 2015). Latent variables represent the shared variance of their indicators, and therefore measure constructs of interest without error (Rex B Kline, 2015).

Some additional considerations should be kept in mind when interpreting the results. First, sleep was measured by self-report, which may lead to information biases, such as underreporting of sleep disturbances. Future studies should reproduce the present study and incorporate the use of objective measures of sleep to assess how perceived racial/ethnic discrimination is associated with sleep difficulties via psychological distress. Second, we assessed for the effect of racial/ethnic discrimination as primary risk factor independent of other stressors relevant to this population (e.g., acculturative stress). Given that the effects of discrimination on sleep may not occur independently from other relevant stressors, future studies should consider exploring the synergistic effect of multiple sources of stress on sleep among the target population. Third, for ease of administration this study used well-known and widely used brief measures of discrimination and sleep. To further expand our understanding as to how discrimination is associated with sleep, future studies should consider the use of more comprehensive measures. Also, this study used proxy measures of SES (i.e., education, employment) as covariates on the association between perceived

discrimination and sleep. Given that there were significant differences in education between the U.S. and foreign-born Latinxs, future studies should consider assessing education as a moderator of the association between perceived discrimination and sleep in the target population. Finally, this study was cross-sectional; thus, causality and temporal inferences cannot be made, and the bidirectional nature of the associations of interest must be emphasized. Indirect pathways and mediation analyses are best studied with the use of a longitudinal design. Future studies should prospectively examine whether psychological distress and obesity serve as longitudinal mediators of the association between perceived racial/ethnic discrimination and sleep quality. However, until prospective data are available, our work provides important insights on the association between perceived racial/ethnic discrimination and sleep disturbances, and raises awareness about modifiable pathways that are important to address in order to improve sleep among a considerably proportion of the U.S. population.

Conclusions

In summary, our findings from a community sample of Latinxs demonstrated the relevance of racial/ethnic discrimination and its association with sleep disturbances, and they extend the literature by identifying psychological distress a relevant modifiable pathway to consider in the development of sleep interventions among Latinxs. In addition, we determined that, among Latinxs, racial/ethnic discrimination is associated with sleep via the same pathways regardless of nativity status. Future work should replicate and extend our findings with the use of prospective designs, and identify interventions that reduce psychosocial distress in ways that may ameliorate the negative effect of racial/ethnic discrimination on sleep disturbances.

Acknowledgments

Sources of Funding

Data collection for the present study was funded by the National Cancer Institute (P50 CA105631). Preparation of the manuscript was supported by a grant from the National Heart, Lung and Blood Institute (1R01HL127260-01).

Glossary

BMI Body Mass Index

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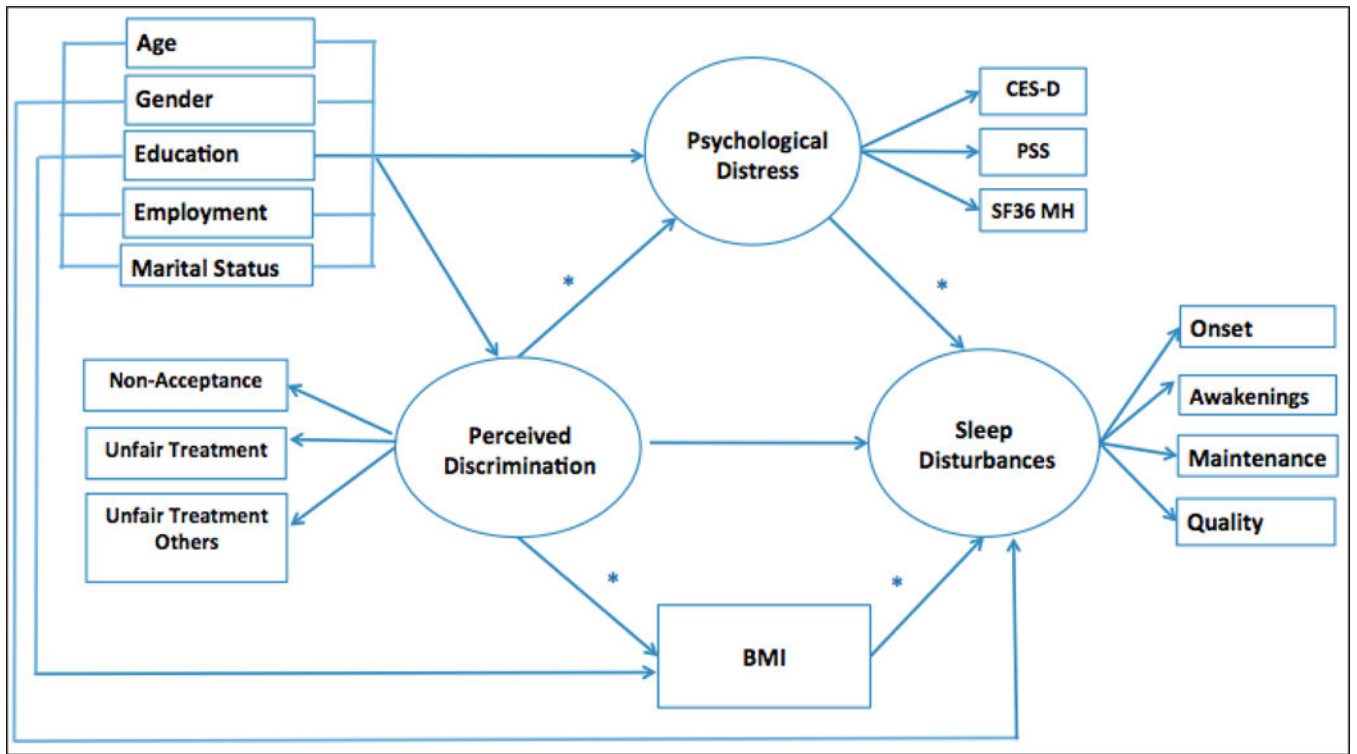


Figure 1. Structural regression model linking Perceived Racial/Ethnic Discrimination to Sleep Disturbances

Table 1

Descriptive characteristics of the study sample

	Overall (N= 1332) M (SD) / %	U.S. Born Latinxs (n=937) M (SD) / %	Foreign-Born Latinxs (n=395) M (SD) / %	<i>p</i>
Demographic Characteristics				
Age, years	46.0 (14.9)	47.1 (15.3)	43.4 (13.6)	
Gender, female	56.8	57.5	55.2	.430
Education, years	10.7 (3.5)	11.5 (3.0)	8.8 (3.9)	
Employed, yes	61.5	61.7	61.0	.820
Marital Status, married	6.2	6.9	4.3	.068
Perceived Racial/Ethnic Discrimination				
Feeling Unaccepted, yes	18.0	16.3	22.0	
Unfair Treatment	1.5 (0.7)	1.5 (0.7)	1.5 (0.6)	.450
Unfair Treatment Others	1.6 (0.7)	1.6 (0.7)	1.5 (0.7)	
Psychological Distress				
CES-D Total Score	7.9 (10.9)	8.3 (11.3)	6.6 (9.7)	
PSS Total Score	13.0 (7.0)	13.1 (7.4)	12.7 (6.3)	.340
SF36 Mental Component Score	51.3 (11.1)	51.0 (11.4)	51.9 (10.2)	.170
Body Mass Index (BMI)				
BMI, Total	30.5 (6.7)	31.0 (7.0)	29.1 (6.0)	
Sleep Disturbances				
Sleep Onset	3.8 (1.4)	3.7 (1.4)	4.0 (1.3)	
Awakenings	3.6 (1.4)	3.4 (1.4)	3.8 (1.3)	
Maintenance	3.9 (1.3)	3.8 (1.4)	4.1 (1.2)	
Quality/Tiredness	3.8 (1.3)	3.7 (1.4)	4.1 (1.1)	

M=Mean, SD=Standard deviation.

Table 2

Unstandardized, standardized, and significance level for paths in structural model

Parameter Estimate	B	β	95% CI
Direct Effects			
Racial/Ethnic Discrimination on			
Age	-0.003	-0.064	-0.128 to -0.003
Gender	-0.060	-0.041	-0.097 to 0.013
Education	0.014	0.068	0.009 to 0.129
Employment Status	0.048	0.016	-0.039 to 0.069
Marital Status	0.093	0.063	0.002 to 0.123
Psychological Distress on			
Racial/Ethnic Discrimination	4.193	0.303	0.247 to 0.361
Age	-0.080	-0.121	-0.173 to -0.069*
Gender	3.733	0.187	0.142 to 0.232*
Education	-0.240	-0.086	-0.133 to -0.039*
Employment Status	1.102	0.027	-0.019 to 0.075
Marital Status	-3.280	-0.161	-0.216 to -0.109*
BMI on			
Racial/Ethnic Discrimination	0.839	0.090	0.036 to 0.143*
Age	-0.009	-0.020	-0.07 to 0.031
Gender	0.971	0.072	0.025 to 0.117*
Education	0.011	0.006	-0.037 to 0.049
Employment Status	-0.663	-0.024	-0.064 to 0.018
Marital Status	-0.060	-0.004	-0.057 to 0.051
Sleep Disturbances on			
Racial/Ethnic Discrimination	-0.066	-0.043	-0.093 to 0.008
Psychological Distress	-0.080	-0.716	-0.755 to -0.678*
BMI	-0.012	-0.075	-0.122 to -0.030*
Age	-0.003	-0.040	-0.084 to 0.002
Gender	0.020	0.009	-0.033 to 0.050
Education	-0.031	-0.101	-0.138 to -0.062*
Employment Status	0.071	0.015	-0.027 to 0.059
Marital Status	-0.084	-0.037	-0.079 to 0.006
Indirect Effects			
Discrimination → Stress → Sleep Disturbances	-0.334	-0.217	-0.261 to -0.176*
Discrimination → BMI → Sleep Disturbances	-0.010	-0.007	-0.014 to -0.002

* $p < 0.05$,

CI=Confidence intervals, BMI=Body mass index.