

# SLEEP DISTURBANCE MEDIATES THE RELATIONSHIP BETWEEN PERCEIVED RACISM AND DEPRESSIVE SYMPTOMS

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**Objectives:** To examine the effects of racism on sleep disturbance and depression and to examine whether sleep disturbance mediates the effects of racism on depression.

**Design:** Cross-sectional questionnaire study.

**Setting:** Community.

**Participants:** 168 Hispanic-American immigrants, 45% female, average age 33 years, average length of time living in the United States was 5 years.

**Measures:** The Perceived Racism Scale for Latinos, the Pittsburgh Sleep Quality Index, and the Center for Epidemiologic Studies-Depression (CES-D) Scale.

**Results:** Using hierarchical linear regression analyses, perceived racism was related to increased sleep disturbance ( $b=.21, P<.01$ ) and higher levels of depressive symptoms ( $b=.24, P<.01$ ). When sleep disturbance was included in the regression equation, perceived racism was no longer a significant predictor of depressive symptoms ( $b=.10$ , nonsignificant), indicating that sleep disturbance mediated the relationship between perceived racism and depressive symptoms.

**Conclusions:** This study adds to the research literature by identifying sleep disturbance as a potential pathway through which perceived racism may affect health. (*Ethn Dis.* 2006;16:16–21)

**Key Words:** Depression, Discrimination, Hispanic, Immigrants, Racism, Sleep

## INTRODUCTION

Racism remains a significant problem in the United States, despite improvements that have occurred over the last several decades.<sup>1</sup> Although European Americans tend to view relationships with minority groups as being friendly and good-natured, minority groups report experiencing significant discrimination.<sup>2</sup> In a large study examining the prevalence of perceived discrimination,  $\approx 90\%$  of African Americans and 77% of other minorities reported having been discriminated against because of race or ethnicity.<sup>3</sup> This finding compares with 21% of European Americans who reported experience with racial discrimination.

The American population is becoming more diverse, which may increase the number of people affected by racism. Hispanic immigration plays a large role in these shifting demographics. Hispanics are now the largest minority group in the United States, making up 13.3% of the population, or 37.4 million people.<sup>4</sup> Forty percent of all Hispanic Americans are foreign born, and the current Hispanic growth rate is 10% per year, which is four times higher than the American population as a whole. Recent research indicates that racism is a significant stressor for Hispanic immigrants to the United States, particularly as they attempt to adapt to a foreign culture.<sup>5</sup> Finch et al found that as Hispanic-American immigrants become more acculturated to American society, they are more likely to report problems with racism and discrimination.<sup>5</sup>

The study of racism and health is a relatively new and growing area of research.<sup>6</sup> Research conducted to date has found that as perceptions of racism

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increase, problems with mental health also increase. Perhaps this finding is not surprising, given that racism can be a chronic stressor with far reaching effects, affecting many different areas of a person's life. Minorities may encounter racism when seeking employment, with respect to receiving equal pay, in obtaining educational opportunities, and in everyday interpersonal interactions.<sup>7</sup> Lack of educational and employment opportunities contribute to lower socioeconomic status, which is a stressor in and of itself. Discrimination can also negatively affect self-esteem and self-worth, leading to feelings of depression, and repeated exposure to racist messages can create doubt about one's personal worth and identity. In fact, depression has been the mental health problem that has been most commonly associated with perceived racism.<sup>6</sup> The negative effects of racism on depression have been found in studies conducted among a variety of ethnic groups.<sup>5–6,8–11</sup>

Sleep disturbance is related to depressive symptoms and may represent a pathway through which racism affects depression. Sleep disturbance has been found to be a significant predictor of

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depression over time. In a long-term, prospective study involving >1,000 participants with a median follow-up of 34 years, sleep disturbance at baseline was found to be related to increased risk for developing clinical depression.<sup>12</sup> Depression has been related to both laboratory-assessed<sup>13-14</sup> and self-reported<sup>15</sup> sleep disturbance, and both experimental and diary studies of sleep and mood have shown that sleep disturbance is related to increased negative mood the following day.<sup>16-17</sup>

Sleep disturbance has been shown to act as a mediator between stress and health. In a large study examining the effects of socioeconomic status (SES) on well-being lower income was related to worse psychological and physical health outcomes, and these relationships were mediated by sleep quality.<sup>18</sup> Similarly, in a study examining police officers and stress, sleep disturbance was related to increased stress and somatic symptoms, and when the effects of sleep disturbance were controlled, the relationship between traumatic stress and somatic symptoms was significantly reduced.<sup>19</sup> In studies on the effects of stress on immune function, intrusive thoughts and avoidant behaviors related to stress predict lower immune function, with sleep disturbance mediating these relationships.<sup>15,20</sup>

Although sleep disturbance mediates the effects of stress on health in general, no studies to date have examined whether perceived racism contributes to sleep disturbance and if sleep disturbance mediates the effects of perceived racism on depression symptoms. Also, while Hispanic Americans now constitute the largest minority group in the United States and 40% of all Hispanic Americans are immigrants, few studies have examined the effects of racism on health in Hispanic-American immigrants. Therefore, the purpose of the present study is to investigate if perceived racism plays a significant role in the sleep of Hispanic-American immigrants and whether sleep disturbance

mediates the relationship between perceived racism and depressive symptoms. Specifically, the following hypotheses will be studied: 1) higher levels of perceived racism will be related to higher levels of sleep disturbance and depressive symptoms; and 2) sleep disturbance will mediate the relationship between perceived racism and depressive symptoms.

## METHOD

### Participants

One hundred sixty-eight Hispanic immigrants were recruited through local community agencies that serve the Hispanic community and through English as a second language classes. Participants signed an informed consent before participating and were paid \$10 for their time and effort in completing the questionnaire packet.

### Measures and Procedure

The questionnaire packet consisted of a demographic page and questionnaires about perceived racism, sleep disturbance, and depression. All questionnaires were in Spanish and were administered by Spanish-speaking research assistants. The research assistants answered any questions the participants had about the questionnaires when needed.

#### *Demographics*

Participants filled out a basic demographic questionnaire that assessed age, gender, country of origin, education, and income.

#### *Perceived Racism*

The English version of the Perceived Racism Scale<sup>21</sup> is a 51-question measure that assesses experiences with racism in three categories (frequency of exposure, emotional responses, and coping responses) across four different areas: racism on the job, racism in academic settings, racism in public settings, and

exposure to racist statements. Participants rate their frequency of exposure in each of these areas in the past year as well as during the course of their lives. They also rate their emotional and coping responses. This measure has been shown to have good internal reliability (.87 to .96) and adequate test-retest reliability (.71 to .80). A Spanish version of this scale was created and shown to have good reliability (Chronbach  $\alpha$  = .93).<sup>22</sup> For this study, an overall score, summed across the four domains representing frequency of exposure to racism over the course of one's life, was employed. The emotional and coping responses were not examined.

#### *Sleep Disturbance*

The Pittsburgh Sleep Quality Index (PSQI)<sup>23</sup> was used to assess sleep disturbance. The PSQI asks respondents to rate the sleep quality and quantity over the last month. This scale has good validity (differentiates between those with and without sleep problems) and reliability (Chronbach  $\alpha$  = .83). A Spanish version of this instrument was not available; therefore, a translation was performed by using native Spanish-speaking bilinguals with the translation/back translation method and comparison review. Previous research has demonstrated that sleep quality is more strongly related to mental and physical health outcomes;<sup>18,24</sup> therefore questions related to sleep quality were used to create an overall sleep disturbance score.

#### *Depressive Symptoms*

The Center for Epidemiological Studies-Depression (CES-D) scale<sup>25</sup> was used to assess depressive symptoms. This scale has been used frequently in community and population studies and has validated versions in both Spanish and English.<sup>26</sup> Internal consistency of the Spanish version is good and matches that of the English version (Chronbach  $\alpha$  = .89). The CES-D is a 20-item scale that asks questions about how the participant has been feeling during the

**Table 1. Sample characteristics**

Variable	Mean (± SD) or %
Demographics/SES	
Age	33 ± 10
Gender (% female)	45%
Income (% >20,000)	40%
Education (% >high school)	62%
Number of years in United States	5 ± 6
Nativity (% from Mexico)	53%
Psychosocial variables	
Perceived racism	27 ± 20
Depressive symptoms (CES-D)	15 ± 10
Sleep quality	
PSQI sleep quality score	3.44 ± 2.35
PSQI total score	5.45 ± 3.78
Subjective sleep	.85 ± .86
Sleep latency	.82 ± .87
Sleep duration	.92 ± .91
Sleep efficiency	.94 ± 1.24
Sleep disturbances	1.08 ± .57
Sleep medications	.16 ± .59
Daytime dysfunction	.79 ± .76

past week. Questions deal with depressed mood, feelings of guilt and restlessness, feelings of hopelessness and failure, loneliness, psychomotor retardation, and loss of appetite. Response scores to each item are 0–3, and the summed scale can be 0–60.

**Data Analysis**

The purpose of this study was to investigate whether sleep disturbance was a mediator between perceived racism and depressive symptoms. Therefore, hierarchical linear regression analyses were used. For mediation to be established, the predictor variable must be significantly related to the outcome variable, the mediator must be related to both the predictor and the outcome variables, and when the mediator is controlled for, the relationship between the predictor and the outcome variable is no longer significant.<sup>27</sup> All statistical analyses were conducted using the SAS system (SAS Institute, Cary, NC, USA) and an alpha level of .05.

**Table 2. Hierarchical linear regression analyses of perceived racism predicting depressive symptoms controlling for covariates**

Variable	β	F	Adj R <sup>2</sup>	Δ Adj R <sup>2</sup>
Step 1				
Gender	.161*	4.74†	.06	
Education	-.066			
Income	-.180*			
Step 2				
Perceived racism	.214†	5.77†	.10	.04

\* *P*<.05.  
† *P*<.01.

**RESULTS**

**Sample Characteristics**

Sample characteristics are presented in Table 1. The sample was 18–59 years of age and was 45% female. Most of the sample earned <\$20,000, with a third of respondents reporting earning \$10,000–\$19,999. Approximately 60% of the sample reported education past the high school level, and most of these reported a few years of university study. Age was negatively correlated with perceived racism (*r*=-.16, *P*<.05) but was not related to sleep disturbance or depressive symptoms. Gender was related to depressive symptoms, with women reporting higher levels (*r*=-3.02, *P*<.01); gender was not related to perceived racism or sleep disturbance. Education was negatively related to perceived racism (*r*=-.18, *P*<.05) and depressive symptoms (*r*=-.18, *P*<.05) but not sleep disturbance. Income was negatively related to depressive symptoms (*r*=-.18, *P*<.05) but not to perceived racism or sleep disturbance.

Participants had lived in the United States for an average of five years; time lived in the United States was not related to levels of perceived racism or depressive symptoms but was positively related to sleep disturbance (*r*=.16, *P*<.05). More than half of the sample was born in Mexico, and most of the remaining participants were from South America. Nativity was not related to levels of perceived racism, sleep distur-

bance, or depressive symptoms. Participants were also asked to rate how dark they perceived their skin tone to be; this variable was unrelated to levels of perceived racism, sleep disturbance, or depressive symptoms. Sleep disturbance and depressive symptoms were positively correlated with each other (*r*=.40, *P*<.0001).

**The Effects of Perceived Racism on Depressive Symptoms and Sleep Disturbance**

To study the effects of perceived racism on depressive symptoms and sleep disturbance, hierarchical linear regression was used. Gender, education, and income were used as covariates because they were correlated with the variables of interest. The gender variable was coded so that female =1 and male =0. These analyses were conducted in two steps; covariates were entered in step 1, and perceived racism was entered in step 2. Table 2 presents the results on perceived racism and depressive symptoms. On step 1, gender significantly predicted depressive symptoms; women had higher levels of depression. Higher levels of income predicted lower levels of depression. On step 2, perceived racism was found to be a significant predictor of depressive symptoms after controlling for the covariates; increased levels of perceived racism were related to increased depressive symptoms. Perceived racism accounted for 4% of the variance in the prediction of depressive symptoms.

**Table 3. Hierarchical linear regression analyses of perceived racism predicting sleep disturbance controlling for covariates**

Variable	$\beta$	F	Adj R <sup>2</sup>	$\Delta$ Adj R <sup>2</sup>
Step 1		.92	.00	
Gender	.066			
Education	.119			
Income	-.028			
Step 2		3.11*	.05	
Perceived racism	.237†			.05

\*  $P < .05$ ; †  $P < .01$ .

For sleep disturbance, the covariates were not significant predictors (Table 3). Perceived racism was a significant predictor of sleep disturbance. Perceived racism accounted for 5% of the variance in the prediction of sleep disturbance.

### Sleep Disturbance as a Mediator Between Perceived Racism and Depressive Symptoms

Mediator regression analyses were conducted to examine whether sleep disturbance mediated the relationships between perceived racism and depressive symptoms. For mediation to be established, three criteria must be met: 1) perceived racism must be related to the outcome variables (depressive symptoms) and to the proposed mediator variable (sleep disturbance); 2) sleep disturbance must be related to the outcome variables; and 3) when sleep disturbance is included in the model with perceived racism and the outcome variable, the effects of perceived racism

are no longer significant. In predicting depressive symptoms, including sleep disturbance in the model caused perceived racism to no longer be a significant predictor (Table 4). Sleep disturbance accounted for 26% of the variance in depressive symptoms after controlling for covariates. These results show that sleep disturbance does mediate the relationship between perceived racism and depressive symptoms (Figure 1).

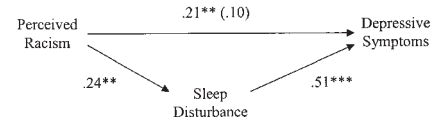
### Secondary Analyses

Secondary analyses were conducted to assess whether a significant difference existed between sleep quality and sleep quantity in mediating the relationship between perceived racism and somatic symptoms. Three of the seven subscales of the PSQI accounted for most of the effects seen in the mediational analyses. These were daytime dysfunction (sleepiness and lack of energy during the day), sleep disturbances (not being able to

**Table 4. Hierarchical linear regression analyses of sleep disturbance as a mediator of perceived racism and depressive symptoms controlling for covariates**

Variable	$\beta$	F	Adj R <sup>2</sup>	$\Delta$ Adj R <sup>2</sup>
Step 1		4.74†	.06	
Gender	.161*			
Education	-.066			
Income	-.180*			
Step 2		20.76‡	.32	
Sleep Disturbance	.511‡			.26
Step 3		17.16‡	.32	
Perceived racism	.098			.00

\*  $P < .05$ ; †  $P < .01$ ; ‡  $P < .001$ .



**Fig 1. Analysis of the effects of perceived racism on sleep disturbance and depressive symptoms and the mediating effects of sleep disturbance. The number in parentheses indicates the effect of perceived racism on depressive symptoms after controlling for sleep disturbance \*\* $P < .01$ ; \*\*\* $P < .001$ .**

sleep well because of disturbances or discomfort, such as pain, bad dreams, etc), and sleep latency (taking a long time to fall asleep after going to bed). Sleep duration and efficiency were not significant factors. Therefore the quality, rather than quantity, of sleep has appears to have a negative effect on well-being in these analyses.

### DISCUSSION

The present study examined the effects of perceived racism on sleep disturbance and depressive symptoms and assessed whether sleep disturbance mediated the relationships between perceived racism and depressive symptoms in Hispanic American immigrants. Increased levels of perceived racism predicted increased sleep disturbance and depressive symptoms. Sleep disturbance also mediated the relationship between perceived racism and depressive symptoms. This study is the first to examine sleep disturbance as a mediator of the effects of perceived racism and adds to the research literature by identifying a potential pathway through which racism may affect mood and well-being.

The results of this study are consistent with current research on stress and health. Across a variety of studies, sleep disturbance has been found to mediate the effects of stress on health. The stresses of bereavement,<sup>13,28</sup> low SES,<sup>18</sup> exposure to a natural disaster,<sup>15</sup> and

*Increased levels of perceived racism predicted increased sleep disturbance and depressive symptoms.*

copied with life-threatening illnesses<sup>29</sup> have all been related to negative health outcomes, and these effects are mediated by sleep disturbance. Given that sleep disturbance is a significant factor in health and well-being and has been related to increased morbidity and mortality,<sup>30-32</sup> the effect of racism on sleep may have health consequences.

Racism is a significant stressor and may contribute to stress related disorders. Several researchers have argued that racism and discrimination can result in symptoms similar to those of post-traumatic stress disorder (PTSD).<sup>33-35</sup> For a diagnosis of PTSD to be given, the person exposed to trauma must believe that death or injury could result from the experience and "the person's responses to the event must involve intense fear, helplessness, or horror."<sup>35</sup> Loo et al note that being threatened with death or injury because of one's racial background meets criteria for a traumatic event, and that exposure to racism could have cumulative effects over time in the development of PTSD.<sup>33</sup> In their research on Asian Vietnam veterans, they found that exposure to racism was related to increased PTSD symptoms, and that those veterans who scored higher on a measure of exposure to racism were more likely to meet criteria for a diagnosis of PTSD, even after controlling for combat exposure.<sup>33</sup> In fact, they found that exposure to racism was a stronger predictor of PTSD symptoms than was exposure to combat. They lament the fact that few models of stress and health include racism as a stressful life event, thereby missing a source of stress for minorities.

Many cases of racism, however, are not directly life threatening and do not meet criteria for PTSD. Rather, people are treated as inferior and denied opportunities because of a physical characteristic. Butts argues that the symptoms experienced after a racist encounter are similar to the symptoms of PTSD.<sup>34</sup> From his own clinical practice working with minorities he has noted that many individuals exposed to racist events will show problems with intrusive thoughts, avoidant behaviors, and sleep problems. Therefore, someone exposed to chronic racism may not technically meet the definition of PTSD but still show many related symptoms.

Sleep disturbance is a significant symptom in PTSD<sup>35</sup> and may represent a pathway through which racism contributes to the development of PTSD-like symptoms. Thoughts surrounding racist experiences may cause significant distress, particularly if they lead people to question their own worth, doubt their ability to succeed in life while living in an atmosphere of discrimination, or fear for their own safety.<sup>33-34</sup> As experiences with racism increase, these thoughts can become intrusive and contribute to heightened stress levels and thereby disrupt sleep. Given that perceived racism is a significant predictor of sleep disturbance, perceived racism may contribute to the development of PTSD-like symptoms by disrupting normal sleep patterns.

This study also contributes to our understanding of how perceived racism may affect well-being in Hispanic immigrants. Hispanic immigrants typically come to the United States looking for a better quality of life and more opportunity. Encounters with racism may diminish their hopes for achieving the "American dream." Being judged according to one's ethnic group rather than talents or abilities can be disheartening. Adjusting to life in the United States can be a stressor in and of itself; the addition of stress

from racism can make life even more difficult.

Several considerations should be kept in mind when interpreting the results of this study. First, this study was cross-sectional; therefore statements of causality cannot be made. Second, the measure of racism employed was self-report, and no attempts were made to objectively measure this variable. Third, only Hispanic-American immigrants were examined in this study; how these variables will be related in US-born Hispanic Americans or other minority groups such as African Americans is unknown. Fourth, the measures of sleep disturbance and depressive symptoms were strongly correlated, and sleep disturbance may not be independent of depression, which may have affected the statistical analyses. Strengths of the study include using nationally standardized measures of depression and sleep quality with proven reliability and validity, and the demographics of the sample itself were well balanced in terms of gender, age, and country of origin.

In summary, perceived racism was related to sleep disturbance and depressive symptoms, and sleep disturbance mediated the relationship between perceived racism and depression. This study adds to the existing research literature by identifying a potential pathway through which perceived racism may affect health and well-being. Future studies can build on these findings by examining the longitudinal effects of perceived racism on sleep disturbance and depressive symptoms.

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**AUTHOR CONTRIBUTIONS**

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*Data analysis and interpretation:* Steffen; Bowden  
*Manuscript draft:* Steffen; Bowden  
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