

# SPIRITUALITY AND PHYSICAL ACTIVITY AND SEDENTARY BEHAVIOR AMONG LATINO MEN AND WOMEN IN MASSACHUSETTS

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**Objective:** To examine the relationships between spirituality and physical activity and sedentary behavior in a sample of Latino adults in Massachusetts.

**Design:** This is a cross-sectional analysis of the Lawrence Health and Well Being Study; a study that was conducted among patients at the Greater Lawrence Family Health Center (GLFHC) in Lawrence, Massachusetts.

**Participants:** 602 Latino or Hispanic adults aged 21 to 85 years completed the study.

**Results:** There was a significant negative relationship between spirituality and sedentary behavior ( $\beta = -.12$ ,  $p = .004$ ). Although not statistically significant, higher spirituality was associated with increased odds of engaging in physical activity. There were no significant associations between spirituality and physical activity among men or women. Men with greater spirituality were significantly less sedentary ( $\beta = -.17$ ,  $P = .005$ ). There was no relationship between sedentary behavior and spirituality among women.

**Conclusions:** This study found that individuals who are more spiritual are also less sedentary, and this association was stronger in men than women. Findings provide insight for developing future interventions to promote activity in this high-risk population, which has been greatly understudied. Future research endeavors should consider investigating the impact of spirituality-based messages to reduce sedentary behavior among Latinos. *Ethn Dis.* 2017;27(1):3-10; doi:10.18865/ed.27.1.3.

**Keywords:** Physical Activity; Sedentary Lifestyle; Spirituality; Hispanic, Ethnic Groups

## INTRODUCTION

The consequences associated with obesity have been widely documented. Obesity is associated with an increased risk of a variety of chronic diseases, including cardiovascular disease, type 2 diabetes, stroke, dyslipidemia, sleep apnea, osteoarthritis, and certain types of cancers.<sup>1,2</sup> Obesity is more prevalent among Latinos in the United States, with more than three-quarters (77%) of Latino adults considered overweight or obese compared with 67% of non-Latino Whites.<sup>3,4</sup> Latinos are also 66% more likely than Whites to develop type 2 diabetes, have increased mortality from coronary heart disease, and have higher rates of some cancers.<sup>3,5,6</sup>

Regular physical activity has repeatedly been shown to reduce the risk of obesity and associated chronic

diseases.<sup>7</sup> Regular activity is defined by the American College of Sports Medicine (ACSM) to be at least 150 minutes of moderate aerobic physical activity per week.<sup>7,8</sup> In 2013, only 14.4% of Latino adults met these guidelines, compared with 17.3% of non-Latino Blacks and 22.8% of non-Latino Whites.<sup>9</sup> In addition to physical activity, increased sedentary behavior has emerged as an independent risk factor for obesity, CVD, and type 2 diabetes.<sup>10-12</sup> Although the research on rates of sedentary behavior is limited compared with physical activity and no guidelines currently exist for levels of sedentary behavior, evidence suggests that Latinos may be spending up to 74% of their waking hours engaged in sedentary behaviors, slightly higher than 70% of waking hours among the general population.<sup>12,13</sup> Furthermore, little is known about the different factors that may influence physical activity and sedentary behavior in Latino populations.

Spirituality has been defined by the National Institute of Healthcare Research (NIHR) as “the feelings, thoughts, experiences, and behaviors that arise from the search for the sacred.”<sup>14</sup> Spirituality has also traditionally involved a belief in something greater than oneself, and

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can be expressed independent of religious affiliation or religious service attendance.<sup>15</sup> Previous studies have observed high levels of spirituality among Latinos, with more than half (57%) believing that individuals can be influenced by spirits, and generally expressing they have experienced spirit-filled occurrences such as divine healing and revelations from a Supreme Being, such as God.<sup>15,16</sup> Latinos are also more likely to pray daily

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and express higher levels of religious devotion in their daily lives compared with the general US population.<sup>16,17</sup>

In the general population, spirituality has been consistently associated with factors such as increased life satisfaction and health-promoting attitudes, and decreased blood pressure, depression and mortality.<sup>14,15,18</sup> A mixed methods study of older Latinos (aged 50-84 years) (n=60) linked spirituality to increased well-being, evaluated via self-acceptance, positive relationships, autonomy, environmental mastery, purpose in life, and personal growth.<sup>19</sup> Catholic Latinos

in a qualitative study also perceived a connection between spirituality and health, emphasizing that their spiritual beliefs are associated with increased health behaviors such as health care utilization and cancer screenings.<sup>20</sup> Finally, spirituality has been linked to healthy living (ie, stress reduction, avoiding tobacco) as well as an enhanced ability to cope with adverse health outcomes among Latina women.<sup>15,21,22</sup> While the relationship between spirituality and health appears to be robust in the general population, less is known about this relationship among Latinos, and in particular Latino men. Additionally, the relationship between spirituality and specific health behaviors, such as physical activity and sedentary behavior, has not been studied.

Given the link between spirituality and general health, health behaviors may be one of the mechanisms by which spirituality improves health and well-being.<sup>14</sup> Spirituality is often associated with the belief that the body is to be considered a temple, with both spiritual and material worth,<sup>14</sup> which could influence individuals to seek to engage in healthy behaviors and a few emerging studies provide evidence that this might be the case. In a qualitative study of Methodist Episcopal African Americans (N=44), participants reported feeling a strong connection between their religiousness and physical activity. However, religious attendance was not separated from spirituality in this study. Higher spirituality has been associated with higher physical activity levels among college students (N=364),<sup>23</sup> as well as adolescents (N=493).<sup>24</sup>

To our knowledge, no study has

specifically examined the association between spirituality and physical activity levels in Latinos, nor have any previous studies examined the relationship between spirituality and sedentary behavior among Latinos or other groups. Given the well-known health disparities in chronic diseases among Latinos, understanding the extent to which spirituality is associated with health-promoting behaviors among this group may provide insights for the development of tailored behavior change interventions to reduce the existing disparities. Therefore, the purpose of this study was to examine the relationships between spirituality and physical activity and sedentary behavior in a sample of Latino adults in Massachusetts. The study also examined differences between the sexes in these relationships.

## METHODS

### Design

This is a cross-sectional analysis of the Lawrence Health and Well Being Study; a study that was conducted among patients at the Greater Lawrence Family Health Center (GLFHC) in Lawrence, Massachusetts. The primary purpose of this study was to understand the factors associated with the behavioral health of low-income Latinos.

Inclusion criteria included: being of Latino or Hispanic ethnicity; Spanish- or English-speaking; and between 21 and 85 years of age. Patients who met study eligibility criteria were randomly selected from electronic patient records using predetermined age and sex strata and were included

in the study. Patients who met the initial study criteria were mailed letters from the chief medical officer; the letters described the study and a toll-free number to call if patients did not wish to participate. Within two weeks of the mailing, bilingual/bicultural coordinators recruited from the community contacted patients by phone to conduct additional screening. Individuals were excluded if they were unable or unwilling to give informed consent, planned to move out of the area within the study period, or had cognitive impairments that precluded participation (ie, answering verbally administered questions). Interested and eligible individuals were invited to participate in the study and scheduled for a study visit, which was held at a central, community-friendly location for ease of access to participants. All participants gave written consent for their participation prior to completion of study assessments. Assessments were administered verbally by trained study staff. All procedures for this study were approved by the Institutional Review Board (IRB) at the University of Massachusetts Medical School.

## Measures

### *Spirituality*

Spirituality was assessed by The Daily Spirituality Experience Scale (DSES).<sup>25</sup> This 16-item survey asked individuals to rate how often they experienced general spirituality (eg, feel God's presence, find strength in religion, feel guided by God, etc.) on a 6-point scale ranging from "Never to almost never" to "Many times a day." The score was created by cal-

culating the mean of the 16 items, with higher scores indicating more spirituality. This survey has been tested for reliability using intraclass correlations ( $r = .73$ ), high internal consistency ( $r = .91$ ), and adequate interrater reliability ranging from .64 to .78.<sup>25</sup> The DSES has also been psychometrically validated among Spanish speakers and used in a variety of cultural and religious settings.<sup>26,27</sup>

### *Physical Activity*

The Women's Health Initiative Brief Physical Activity Questionnaire measured weekly minutes of physical activity.<sup>28</sup> This 9-item survey measured walking and leisure-time physical activity by asking individuals how many days per week they walked as well as engaged in mild, moderate, and vigorous intensity activity. Individuals were then asked to report the average duration for each level of activity. Responses to the nine items were combined into a single score of minutes per week. Given the high number of participants engaging in "0" minutes of physical activity per week, the final variable coded the data into three categories: 0 minutes of physical activity per week (inactive), 0-150 minutes of physical activity per week (not meeting guidelines), or more than 150 minutes per week (meeting guidelines). This questionnaire has been validated and demonstrated a correlation of .73 with an accelerometer and .88 with a 7 day physical activity questionnaire.<sup>28</sup>

### *Sedentary Behavior*

Sedentary behavior was assessed using The Sedentary Behavior Questionnaire.<sup>29</sup> This was a 22-item questionnaire that asked individuals to report

the amount of time per day they spent engaging in a series of sedentary behaviors on a scale ranging from "None" to "6 or more hours." Sedentary behaviors included sitting while watching television, playing computer/video games, listening to music, talking on the phone, doing paperwork or office work, reading, playing a musical instrument, doing arts and crafts, and driving or riding in a car, bus, or train. This study added two additional sedentary behaviors: sitting while texting and sitting while using the computer or Internet. Participants reported sedentary time for both weekends and week days, which were then combined to calculate average sedentary time per day (in hours). Weekday hours were multiplied by 5, weekend hours were multiplied by 2, and then sums for total hours per week were averaged across 7 days. This questionnaire demonstrated a moderate to high intraclass correlation via test-retest reliability for both weekdays (range = .64-.90) and weekend days (range = .51-.93).<sup>29</sup>

### *Confounders*

Participants self-reported their age, sex, education level, employment, and marital status. BMI was calculated from objectively measured height and weight. Religious service attendance was assessed by a single question, "How often have you gone to a religious service or to church during the past month?" Responses were given on a 6-point scale from "Not at all in the past month" to "Every day."

### **Analysis**

Descriptive statistics were calculated for demographic variables. Mean spirituality score (SD) was

calculated within each demographic variable strata; ANOVA models assessed statistical significance. Means and standard deviations were calculated for sedentary behavior and physical activity for the entire sample, as well as within each sex strata.

Multinomial and linear regression models evaluated the extent to which spirituality was associated with physical activity and sedentary behavior, respectively, for the entire sample. Because health behaviors have historically differed between sexes, an interaction term for spirituality and sex was created.<sup>30</sup> A series of models first evaluated the interaction between sex and spirituality for physical activity and sedentary behavior for the entire sample; additional stratified models then evaluated the extent to which spirituality was associated with physical activity and sedentary behavior for males and females separately. Unadjusted models were first computed. Potential confounders were then examined in multivariable models by evaluating changes in effect estimates of the independent and dependent variables. These models ultimately adjusted for age, sex (for non-stratified analysis), marital status, religious service attendance, and education. SPSS IBM Statistics version 23 was used for data analysis.

## RESULTS

In all, 3,067 patients were sampled, of which 284 (9.3%) were ineligible. Among the remaining 2,783 potentially eligible individuals, 1,236 (44.4%) could be contacted. Of these, 602 were eligible and agreed to

**Table 1. Demographic characteristics by spirituality**

	Total Sample	
	N (%)	Spirituality <sup>a</sup> (M[SD])
Total N (%)	602	4.36 (.977)
Sex		
Male	294 (48.8)	4.25 (1.08)
Female	308 (51.2)	4.47 (0.86)
Age		
21-34	183 (30.4)	3.98 (1.14)
35-54	207 (34.4)	4.47 (0.82)
≥55	212 (35.2)	4.58 (0.86)
Employment		
Employed	304 (50.5)	4.39 (0.97)
Unemployed	296 (49.2)	4.33 (0.99)
Education		
<High school	308 (51.2)	4.48 (0.89)
High school graduate	120 (19.9)	4.25 (0.97)
Some college	107 (17.8)	4.10 (1.14)
College degree or post-graduate	67 (11.1)	4.41 (1.01)
Marital status		
Single (never married)	119 (19.8)	4.07 (1.16)
Married or living with partner	344 (57.1)	4.42 (0.92)
Separated, divorced, or widowed	139 (23.1)	4.47 (0.9)
BMI		
Normal weight	117 (19.4)	4.32 (0.87)
Overweight	235 (39)	4.44 (0.94)
Obese	248 (41.2)	4.30 (1.06)
Religious service attendance		
Not at all in the past month	311 (51.7)	4.02 (1.09)
At least once per month	202 (33.6)	4.61 (0.71)
At least once per week	87 (14.5)	4.99 (0.55)

a. Spirituality values are on a scale from 1-6 with 6 representing higher spirituality.

participate (Table 1). A majority of the individuals were female (51.2%), aged >35 years old (69.6%), married or living with their partner (57.1%), and either overweight (39%) or obese (41.2%). A third of the sample attended a religious service at least once per month (33.6%), with 14.5%

attending at least once per week. Females, individuals older than 35 years, individuals with some college education, individuals married or living with partner and individuals previously married (divorced, separated, widowed) had higher spirituality scores than their younger, male, less

**Table 2. Means and frequencies for physical activity and sedentary behavior by sex**

	Total sample	Males	Females
Physical activity level, N (%)			
No activity	240 (39.9)	105 (43.8)	135 (56.3)
>0 and <150 minutes per week	111 (18.4)	49 (44.1)	62 (55.9)
>150 minutes per week	251 (41.7)	140 (55.8)	111 (44.2)
Sedentary behavior- M (SD)	7.3 (4.8)	7.9 (4.92)	6.73 (4.61)

educated, and single counterparts. There were no differences in spirituality by employment or BMI.

### Spirituality and Health Behaviors

Table 2 presents means and frequencies for physical activity and sedentary behaviors for the entire sample and by sex. First, 39.9% of individuals participated in no activity, and the sample engaged in an average of 7.3 hours (SD = 4.8) of sedentary behavior per day. More males (55.8%) than females (44.2%) engaged in the recommended 150 minutes of physical activity per week, and males (M = 7.9) engaged in more hours of sedentary behavior per day than females (M = 6.73).

Table 3 presents the results of the multivariable multinomial logistic and linear regression models evaluating the associations between spirituality and sedentary behavior and physical activity, respectively, for the entire sample. Although not statistically significant, higher spirituality was associated with increased odds of engaging in the recommended 150 minutes of physical activity per week. There was a significant negative relationship between spirituality and sed-

**Table 3. Multivariable multinomial and linear regression models examining the association between spirituality and physical activity and sedentary behavior**

	Spirituality		
	OR	95% CI	
Physical activity level			
> 0 and < 150 minutes per week	1.06	.81	1.38
> 150 minutes per week	1.12	.91	1.38
Sedentary behavior	$\beta$	SE	P
	-.12	.2	.004

Model is adjusted for age, sex, education, marital status, and religious service attendance

entary behavior ( $\beta = -.12, P = .004$ ).

Table 4 presents the results of the interaction between sex and spirituality and sex-stratified models examining the associations between spirituality and physical activity and sedentary behavior. There was no significant interaction effect for physical activity, as levels of spirituality did not differ by sex for >0 and <150 minutes of physical activity per week (OR = 1.004 (.92- 1.1) P = .933) or >150 minutes of physical activity per week (OR = .937 (.87-1.0), P = .065). There were no significant associations between spirituality and physical activity among men or women. There was however a significant interaction between sexes and spirituality on sedentary behavior ( $\beta = -.16, P < .001$ ). Men with greater spirituality were significantly less sedentary ( $\beta = -.17, P = .005$ ), but there was no re-

lationship between sedentary behavior and spirituality among women.

### DISCUSSION

Prior studies have found associations between spirituality and mortality and quality of life, and it has been proposed that these associations may be mediated by health behaviors.<sup>14-16,31</sup> To our knowledge, this study is the first exploration of the relationships between spirituality and physical activity and sedentary behaviors among a Latino sample, and the first to examine the association between spirituality and sedentary behavior in any sample. We observed no association between spirituality and physical activity, but did find a relationship between spirituality and sedentary behavior, which was particularly robust in men compared with women.

**Table 4. Adjusted multinomial and linear sex-stratified regression models examining the association between spirituality and physical activity and sedentary behavior**

	Spirituality								
	Sex*Spirituality			Males			Females		
	OR	95% CI		OR	95% CI		OR	95% CI	
Physical activity level									
> 0 and < 150 minutes per week	1.004	.92	1.1	.995	.698	1.42	1.22	.8	1.86
> 150 minutes per week	.937	.873	1	1	0.76	1.31	1.33	.95	1.87
Sedentary behavior	$\beta$	SE	P	$\beta$	SE	P	$\beta$	SE	P
	-.16	.068	<.001	-.17	.26	.005	-.07	.32	.236

The reference category is: No Activity.

Model is adjusted for age, education, marital status, and religious service attendance.

There is some evidence that spirituality positively influences physical activity in other population subgroups such as African Americans adults and college students.<sup>23,24</sup> However, we did not find such an association in this sample of Latino adults. Other factors may have a stronger influence on Latino's physical activity. Previous research has found that Latinos tend to prioritize family obligations over physical activity, citing a lack of time

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to be active.<sup>32,34</sup> Latinas in a qualitative study also perceived themselves to be healthy and not in need of physical activity; referring to exercise as a "waste of time."<sup>34</sup> Latinos have also been shown to view exercise as prescriptive and only willing to engage in exercise if prescribed by a doctor in order to reduce the risk or incidence of disease.<sup>32,34</sup> In addition, Latinos may believe that high spirituality may be sufficient to improve overall health. Such beliefs may negatively influence participation in health behaviors such as physical activity. More research is needed to better understand these re-

lationships, and how physical activity may be an important mediator between Latinos' spirituality and health.

To our knowledge, this is the first study to examine and find an inverse association between spirituality and sedentary behavior, specifically among men. Spirituality has been linked to other health-related factors such as depression, and quality of life.<sup>14-16,31</sup> Additionally, a review of the literature among adults found increased sedentary behavior associated with depressive symptoms and lower quality of life.<sup>35</sup> The link between spirituality and sedentariness in this study may be via similar mechanisms as the connection between spirituality and other health-related factors. However, it is unclear why this relationship was more robust in men than women. Also, given that no previous studies have examined spirituality and sedentary behavior, further research and insight into this association is needed.

Future research may consider incorporating or tapping into spirituality in interventions to reduce sedentary behavior, particularly in populations such as Latinos who are considered more spiritual than the general population.<sup>16,17</sup> Spirituality has been defined as distinct from religiosity or religious attendance, for individuals can express spirituality without attending religious services or being associated with a religious affiliation.<sup>14,18</sup> However, to our knowledge, there are no behavior change programs that have included spirituality outside of religious settings such as churches, and such intervention strategies need to be developed and tested for feasibility and acceptability, and efficacy. For example, interventions could encourage

reduced sedentariness in the context of enhancing spiritual health, or as a way of aligning with a higher power.

Despite limited information about spirituality-based interventions outside of a church, previous research has found that health promotion programs set in churches or faith-based organizations have considerable potential given that they can leverage existing support networks and easily accessible and cost-effective resources and services, and enhance cultural sensitivity.<sup>36-39</sup> Successful faith-based physical activity interventions have included group-based programs with spiritual messages from church leaders in order to establish a deep connection with participants' culture and values to improve retention and behavior change.<sup>36,40-45</sup> However, to our knowledge, there are no faith-based interventions that focus on reducing sedentary behavior among Latinos. Because spirituality plays such a vital role in the lives of Latino adults, considerably more research is needed in order to understand the extent to which using spiritual messages both in and out of faith-based organizations may serve to influence the behavior change process.<sup>40,42</sup>

There are several limitations to this study. First, study findings are from a cross-sectional survey, thus causal relationships could not be tested. Second, this study was conducted among Latino adults in Lawrence, Massachusetts, a sample that was largely of Caribbean Latino origin. As a result, findings may not be generalizable to other Latino subgroups or those residing in other regions of the United States. Third, the study used self-reported physical activity and sedentary

behavior. Self-report measures have been shown to either under- or over-estimate levels of activity, and thus future studies should prioritize objective measures of these behaviors.<sup>46</sup>

This study also had several strengths. First, we included a representative sample of Latino adults in the Northeastern region of the United States and included equal representation of men and women. The study embraced a community-based participatory research approach to improve our efforts of recruiting a representative community sample. Also, to our knowledge, this was the first study that examined the relationships between spirituality and health behaviors among Latino adults, and the first study that examined the relationship between spirituality and sedentary behavior in any population subgroup. Having a better understanding of the factors that are associated with health behaviors in Latinos can allow for the development of tailored interventions for this at-risk population.

## CONCLUSION

The factors that are associated with physical activity and sedentary behavior among Latinos remain under-studied. Our study sought to examine spirituality and health behaviors and found that individuals who are more spiritual are also less sedentary. We also found this association to be stronger in men than women. Findings provide insight for developing future interventions to promote activity in this high-risk population, which has been greatly understud-

ied. Future research endeavors should consider investigating the impact of spirituality-based messages to reduce sedentary behavior among Latinos.

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### CONFLICT OF INTEREST

No conflicts of interest to report.

### AUTHOR CONTRIBUTIONS

Research concept and design: Lemon, Lora; Rosal; Acquisition of data: Lemon, Lora; Rosal; Data analysis and interpretation: Silfee, Haughton, Lemon, Lora; Rosal; Manuscript draft: Silfee, Haughton, Lemon, Lora; Rosal; Statistical expertise: Lemon, Lora; Rosal; Acquisition of funding: Lemon, Rosal; Supervision: Lemon, Rosal

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