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Elisa R. Torres

University of Wisconsin - Madison

Carolyn M. Sampsel

University of Michigan

David L. Ronis

University of Michigan

Harold W. Neighbors

University of Michigan

Kimberlee A. Gretebeck

Marquette University, kimberlee.gretebeck@marquette.edu

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Leisure-Time Physical Activity in Relation to Depressive Symptoms in African-Americans: Results From The National Survey Of American Life

Elisa R. Torres

College of Nursing, University of Iowa, 456 Nursing Building, Iowa City, IA 52242-1121, USA

Carolyn M. Sampselle

School of Nursing, University of Michigan, Director, Community Engagement Program, Michigan Institute for Clinical and Health Research, Ann Arbor, MI

David L. Ronis

School of Nursing, University of Michigan, Director of Statistical Consulting Team, Ann Arbor, MI

Harold W. Neighbors

School of Public Health, University of Michigan, Associate Director, Center for Research on Ethnicity, Culture and Health, Ann Arbor, MI

Kimberlee A. Gretebeck

School of Nursing, University of Wisconsin, Madison, WI

Abstract

Objective

To examine the frequency of leisure-time physical activity (LTPA) in relation to depressive symptoms in a nationally representative sample of African American (AA) women and AA men with guidance by Stokols' Social Ecological Framework.

Method

A secondary analysis of AA women ($n = 1811$) and AA men ($n = 1038$) was performed on the National Survey of American Life, where a four stage national area probability sampling was conducted. Interviews were conducted 2001–2003. Clinically depressed AA were excluded from the current study. LTPA was measured by self-report frequency (never, rarely, sometimes, often) of participation in sports/exercise. Depressive symptoms were measured with the Center for Epidemiologic Studies Depression scale. Logistic regression for complex samples was used to examine the relationship between LTPA and depressive symptoms, adjusting for biopsychobehavioral and sociophysical environmental factors.

Results

Compared with AA women and AA men who reported never participating in LTPA, the multivariate OR for depressive symptoms in AA women and AA men who reported participating in LTPA often was 0.42 (95% CI = 0.24–0.72) and 0.41 (95% CI = 0.25–0.69) respectively.

Conclusion

Increased frequency of LTPA was associated with fewer depressive symptoms in a nationally representative sample of non-clinically depressed AAs.

Highlights

► More AA men reported participating in LTPA often than AA women. ► More AA women reported never participating in LTPA than AA men. ► Increased frequency of LTPA associated with fewer depressive symptoms in AAs.

Keywords

Exercise, Sport, Depression, Preventive medicine

Introduction

Leisure-time physical activity (LTPA) is an exercise, sports or recreation that is not associated with occupation, household, or transportation. Higher frequencies of LTPA are associated with less depressive symptoms in African-Americans (AAs) (Farmer et al., 1988, Wise et al., 2006). Farmer et al. examined recreational physical activity in the U.S. population as a whole, and stratified results by race and sex. Due to the small number of AAs in the sample, sample weights were not used (Farmer et al., 1988). Wise et al. examined exercise in exclusively AA women across the U.S. with convenience sampling. Neither study provided nationally representative estimates nor reported guidance by theory. Since LTPA is hypothesized to relieve depressive symptoms through biological, psychological and social mechanisms (Paluska and Schwenk, 2000), theories that consider multiple levels of influence are recommended (Torres et al., 2010).

The Social Ecology of Health Promotion offers a broad understanding of how biological, psychological, sociocultural and physical environmental factors affect well-being (Stokols, 1992) and is applied to LTPA (Linde et al., 2012) and depressive symptoms (Katz et al., 2008) in AAs to describe biopsychobehavioral (age, body mass index [BMI], disability, family history of depression, discrimination) and sociophysical environmental (household income, national region and neighborhood safety) factors (Torres et al., 2010). LTPA (Wise et al., 2006) and depression (Williams et al., 2007) both decrease with age. LTPA is inversely associated with depressive symptoms among the obese but not non-obese (Wise et al., 2006). Disability is associated with less LTPA (National Center for Health Statistics [NCHS], 2011) and more depression (Williams et al., 2007). Family history of depression is a proxy for genetics, which modifies the relation between physical activity and depressive symptoms (Mata et al., 2010). Perceived discrimination is predictive of depressive symptoms (Banks et al., 2006). Higher household income is associated with higher LTPA (NCHS, 2011) and lower depressive symptoms (Banks et al., 2006). LTPA is associated with living in the West (Wise et al., 2006), while living in the South and West has a lower prevalence of depression than the Northeast and Midwest (Williams et al., 2007). The purpose of this study was to examine the frequency of LTPA in relation to depressive symptoms in a nationally representative sample of AAs while controlling for biopsychobehavioral and sociophysical environmental factors.

Method

A secondary analysis was performed on the National Survey of American Life (NSAL). Heeringa et al. (2004) described a four stage national area probability sampling. Primary stage comprised a stratified probability sample of 1990 census block households reported to be < 10% or \geq 10% AA (Heeringa et al., 2004). Second stage included area segments formed by linking geographically continuous census blocks (Heeringa et al., 2004). Third stage included a systematic random sample of housing units which were contacted in person by an interviewer (Heeringa et al., 2004). If the interviewer reported that one or more eligible adults lived at the sample housing unit address, the interviewer prepared a complete list of household members and randomly selected a respondent for the study interview, comprising the fourth stage (Heeringa et al., 2004). Pretesting of questionnaires and training of interviewers were described by Jackson et al. (2004). Oral consent was obtained prior to initiating the interview. There was racial matching of interviewers and respondents, with face-to-face interviews lasting on average 2 h and 20 min (Jackson et al., 2004). The response rate was 70.7% (Jackson et al., 2004). Of the 3570 AAs in the NSAL, individuals who met the DSM-IV-TR criteria for MDD ($n = 75$), dysthymia ($n = 23$) or bipolar disorder ($n = 13$) were excluded since clinical depression may influence frequency of LTPA (Wise et al., 2006). Cases missing data on depressive symptoms, LTPA or covariates were excluded, resulting in a sample size of 2849. The Institutional Review Board at the University of Michigan granted approval for the NSAL (Jackson et al., 2004) and the current study.

Depressive symptoms were measured with the Center for Epidemiologic Studies Depression (CESD) Scale (Radloff, 1977). The original 20-item CESD was reduced to 12-items in the NSAL. Eleven items in AA women ($\alpha = 0.80$) and 10 items in AA men ($\alpha = 0.73$) demonstrated validity and reliability (Torres, 2012). A cutoff score of nine for the 11-item CESD and eight for the 10-item CESD was used, with higher scores indicating more symptoms (Torres, 2012).

LTPA was measured with one question asking how often the respondent engaged in sports/exercise; never, rarely, sometimes, and often. Scores were coded with higher scores indicating more LTPA. The question came from the Americans' Changing Lives questionnaire (Lantz et al., 1998).

BMI was calculated by self-reported weight (lbs)(703) / height (in²), which approximates BMI in kg/m²(U.S. Department of Health and Human Services, 2000). Disability was measured with three items from the WHO's Disability Assessment Schedule II mobility domain (Rehm et al., 2006), $\alpha = 0.68$ – 0.76 . Respondents reported whether they had a family history of depression. The Everyday Discrimination Scale measures chronic, routine, and relatively minor experiences of unfair treatment (Williams et al., 1997), consisting of ten items, the averaged higher scores indicating more discrimination, $\alpha = 0.88$ – 0.89 . National region was based on the four Census regions. Neighborhood safety was measured by two questions from the National Survey of Black Americans, with averaged higher scores indicating a safer neighborhood, $\alpha = 0.72$ – 0.73 .

Analyses were performed in STATA 10.0. Weights constructed specifically for the study design and methodology were used (Heeringa et al., 2013). T-tests and Chi-square for complex samples determined whether the sex difference for each descriptive characteristic was statistically significant. Logistic regression for complex samples was used to compute odds ratios (ORs) and 95% confidence intervals.

Results

Compared to AA men, AA women reported higher BMIs, discrimination, disability, family histories of depression, and lower household incomes (Table 1). There were statistically significant sex differences in LTPA. More AA women reported never participating in LTPA than AA men ($\chi^2 = 14.8$, $p = .0005$) and more AA men reported participating in LTPA often than AA women ($\chi^2 = 35.0$, $p < .0001$).

Table 1. Sample characteristics of African-Americans: The National Survey of American Life, 2001–2003.

	Mean (confidence interval)			
	African-American		t	p
	Women (n = 1811)	Men (n = 1038)		
Age	42 (41–43)	41 (40–43)	0.2	.67
Body mass index	29 (29–30)	28 (28–29)	28.5	< .0001
Disability	4.7 (4.0–5.4)	3.6 (2.8–4.3)	5.7	.0229
Discrimination	78 (78–79)	76 (75–77)	17.0	.0004
Household income ^a	32,540 (30,261–34,819)	42,612 (38,739–46,485)	39.5	< .0001
Neighborhood safety	3.1 (3.0–3.2)	3.1 (3.0–3.2)	1.3	.26
	No. (%)			
	Women (n = 1811)	Men (n = 1038)	χ^2	p
Family history of depression	544 (61.5)	243 (38.5)	8.3	.0067
National region			1.4	.26
West	112 (4.7)	86 (5.1)		
Northeast	204 (8.7)	122 (6.9)		
Midwest	288 (10.2)	156 (7.4)		
South	1207 (31.0)	674 (26.0)		
Leisure-time physical activity			14.4	< .0001
Never	447 (13)	180 (7)		
Rarely	331 (10)	146 (7)		
Sometimes	524 (16)	276 (12)		
Often	509 (16)	436 (19)		

^aTop coded at \$200,000.

Compared with AA women who reported never participating in LTPA, the OR for depressive symptoms in AA women who reported participating in LTPA rarely and often was 0.59 and 0.42, respectively (Table 2). AA women had higher OR for depressive symptoms when they reported more disability, a family history of depression, and lower household incomes and discrimination.

Table 2. Odds ratios for depressive symptoms in relation to leisure-time physical activity in African-Americans: The National Survey of American Life, 2001–2003.

Variable	African-American women (n = 1811)				African-American men (n = 1038)			
	No.	CESD11 ≥ 9(%)	OR	95% CI	No.	CESD10 ≥ 8(%)	OR	95% CI
<i>LTPA</i>								
Never	447	32	1.00		180	25	1.00	
Rarely	331	16	0.59*	0.40–0.86	146	18	0.80	0.45–1.42
Sometimes	524	32	0.76	0.50–1.14	276	24	0.49*	0.28–0.88
Often	509	20	0.42*	0.24–0.72	436	33	0.41*	0.25–0.69
<i>Biopsychobehavioral factors</i>								
Age			0.99	0.98–1.00			0.99	0.98–1.00
BMI			1.01	0.98–1.03			1.01	0.97–1.04
Disability			1.02	1.01–1.03			1.02	1.00–1.03
Family history of depression			1.69	1.12–2.56			1.40	0.93–2.11
Perceived discrimination			0.93*	0.91–0.95			0.96*	0.94–0.98
<i>Sociophysical environmental factors</i>								
Household income			a*	b			c*	d
National region								
Northeast			1.00	1.00			1.00	
Midwest			1.67	0.69–4.04			1.95	0.78–4.89
South			1.43	0.61–3.36			1.76	0.74–4.18
West			1.33	0.55–3.27			0.99	0.32–3.11
Neighborhood safety			0.87	0.75–1.01			0.85	0.69–1.04
			p < .0001				p < .0001	

Note: CESD11 = Center for Epidemiologic Studies Depression Scale, 11 items in National Survey of American Life; CESD10 = Center for Epidemiologic Studies Depression Scale, 10 items in National Survey of American Life; OR = odds ratio; CI = 95% confidence interval; ^a = .9999771 OR, ^b = .9999697–.9999845 CI, ^c = .9999889 OR, ^d = .9999804–.9999975 CI. OR greater than 1 indicates greater odds of more depressive symptoms, while OR less than 1 indicates lesser odds of less depressive symptoms.

* p < .05.

Compared with AA men who reported never participating in LTPA, the OR for depressive symptoms in AA men who reported participating in LTPA sometimes and often was 0.49 and 0.41, respectively (Table 2). AA men had higher OR for depressive symptoms when they reported more disability and less discrimination.

Discussion

The biggest decrease in the odds of depressive symptoms was observed among AAs who reported participating in LTPA often compared to never. These results are consistent with the idea that LTPA may prevent depressive symptoms in AAs. It is important to stratify results by sex since AA women report more depressive symptoms (Torres, 2012) and less frequency in LTPA than AA men. AA women also reported more family histories of depression and lower household incomes, which were associated with higher OR for depressive symptoms in AA women but not men. The Social Ecology of Health Promotion was beneficial in selecting potential confounders a priori.

Generalization of results is limited to non-clinically depressed AAs. It is not possible to determine whether LTPA was an antecedent to, or a consequence of, depressive symptoms. However, by excluding clinically-depressed individuals, the possibility that depressive symptoms influenced LTPA was minimized. The association between LTPA and depressive symptoms may have been confounded by unmeasured factors. Effort was made to include the most relevant factors by the use of a theory. All measures were self-report. LTPA in the NSAL was measured with only one question without 1) established psychometrics; 2) definition of never, rarely, sometimes, and often; 3) reference to a time frame; 4) or differentiation between sports and exercise.

Increased frequency of LTPA was associated with fewer depressive symptoms in a nationally representative sample of non-depressed AAs. Future research should include valid and reliable measures of LTPA, validation of self-report measures, and address intensity, duration, and types of LTPA.

Conflict of interest statement

The authors declare that there are no conflicts of interest.

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