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Original article

Sufficiently and Insufficiently Active Lesbian, Bisexual, and Questioning Female College Students: Sociodemographic Factors Among Two Age Cohorts

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A B S T R A C T

Background: As rates of inactivity in the United States increase, the proportion of adults who are overweight in the United States continues to grow with concurrent increases in risk of weight-related morbidity and mortality. Sparse data are available on physical activity and weight in college-age sexual minority females, and none examine this relationship by age. To address this gap, we examined two age cohorts of female college students who self-identified as lesbian, bisexual, and questioning (LBQ), to 1) explore the relationship between physical activity, weight, and sociodemographic factors and 2) identify characteristics associated with sufficient physical activity in college females.

Methods: Data were from the 2010 American College Health Association National College Health Assessment survey. Descriptive statistics and chi-square tests were used to describe LBQ college women by age cohort ($\leq$23 years, typical age vs. $\geq$24 years, mature age) and physical activity level (sufficiently active vs. insufficiently active). Odds ratio and 95% confidence intervals from logistic regression were used to estimate the likelihood of meeting the physical activity guidelines.

Findings: Only one out of three LBQ college women report meeting the national physical activity guidelines. Characteristics of typical age and mature age LBQ college women varied by physical activity level. In a logistic regression model of LBQ college women, two characteristics increased the likelihood of being sufficiently activity: Reporting very good/excellent health and self-describing as "about the right weight." Three characteristics decreased the likelihood: Self-describing as "very overweight," reporting action taken toward weight as "do nothing," and current smoking.

Conclusions: With only one out of three LBQ college women meeting the national physical activity guidelines, interventions to increase physical activity, improve fitness, and potentially reduce unhealthy weight gain must start early to prevent the morbidity and mortality associated with inactivity.

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Adults who achieve sufficient physical activity ($\geq$150 minutes of moderate intensity or $\geq$75 minutes of vigorous intensity activity per week) are healthier and less likely to develop chronic diseases (Penedo & Dahn, 2005; Physical Activity Guidelines for Americans, 2008; Centers for Disease Control and Prevention, 2011). As rates of inactivity in the United States increase, the proportion of adults who are overweight or obese in the United States continues to grow (Finkelstein et al., 2012) with concurrent increases in risk of weight-related morbidity and mortality (Jia & Lubetkin, 2010; Ul-Haq, Mackay, Fenwick, & Pell, 2013). As a result, much of the existing research regarding moderate or vigorous physical activity focuses on overweight and obesity and their associated risks. However, research finds that sufficient physical activity reduces the risk of poor physical health independently of "ability to achieve ideal body weight and other confounders (e.g., age, race, sex, socioeconomic status, smoking, alcohol use)" (Penedo & Dahn, 2005). Patterns of physical activity and weight change vary across the lifespan as well as during college years (Caspersen, Pereira, & Curran, 2000; Nelson, Story, Larson, Neumark-Sztainer, & Lytle, 2008). Differences in risk for insufficient physical activity are widely recognized in female population segment by education (Wilcox, Castro, King, Housemann, & Brownson, 2000), race/ethnicity (Moore, Harris, Carlson, Kruger, & Fulton, 2012), socioeconomic status (Gordon-Larsen, McMurray, & Popkin, 2000), self-efficacy (Sassen, Kok,

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Schaalma, Kiers, & Vanhees, 2010), and built environment (Brownson, Baker, Housemann, Brennan, & Bacak, 2001). However, sexual orientation is rarely considered as a determinant of physical activity.

Few data are available on physical activity and weight changes in college-age sexual minority females (Struble, Lindley, Montgomery, Hardin, & Burcin, 2011). Besides Struble and colleagues, other studies have also found that sexual minority women are overweight and obese at a far higher prevalence than heterosexual women (Boehmer, Bowen, & Bauer, 2007; Bowen, Balsam, & Ender, 2008). One of these studies also found that sexual orientation independently contributed to the risk of obesity among sexual minority women after controlling for other health factors (Boehmer et al., 2007). Moreover, a longitudinal study found that lesbian and bisexual women were more likely to experience moderate or rapid weight gain over time, but were also more likely to lose weight compared with heterosexual women over time (Jun et al., 2012). These findings suggest that sexual minority women are at greater risk for morbidity and mortality linked with overweight status and that physical activity interventions have the potential to be successful in this population. Although some studies of reported physical activity by sexual orientation find no differences in activity levels by sexual orientation (Boehmer et al., 2007; Boehmer, Miao, & Ozonoff, 2012; Everett & Mollborn, 2013; Hatzenbuehler, McLaughlin, & Slopen, 2013), others find lesbians to be less active than heterosexual women (Valanis et al., 2000; Zaritsky & Dibble, 2010). Most of the studies did not control for age. As a result, identifying risk indicators for insufficient activity levels among sexual minority college women assumes public health significance.

Although evidence shows declines in physical activity level as one ages (Finne, Bucksch, Lampert, & Kolip, 2011; Jago, 2011), no data could be found examining physical activity in college sexual minority females by age span or across the college experience. Past research on physical activity in college women has focused mainly on typical age ($\leq$23 years old), full-time students. However, National Center for Education Statistics data indicate that 38% of college students are a mature age ($\geq$24 years; Hussar & Bailey, 2009), and the number of mature students is expected to remain stable or increase during the current decade (Hussar & Bailey, 2009). A recent study of college students found that typical and mature students significantly differed in their reported barriers to physical activity (Kulavic, Hultquist, & McLester, 2013). With more mature students enrolling in colleges, it is important to understand the factors associated with achieving and not achieving sufficient physical activity levels for this understudied population. To address this gap, we examined two age cohorts of female college students who self-identified as lesbian, bisexual, and questioning (LBQ) to 1) explore the relationship between sufficient and insufficient physical activity, weight and sociodemographic factors and 2) identify characteristics associated with sufficient physical activity among college women.

Methods

Data were from the fall 2010 American College Health Association (ACHA) National College Health Assessment (NCHA) survey. The ACHA-NCHA examines both short- and long-term health behaviors among college students, as well as demographic information. Each participating institute obtained institutional review board approval before administering the survey. ACHA institutions that used a random sampling technique to collect self-administered survey data (web based and/or paper based) were included in the NCHA dataset. The ACHA website contains details regarding their history of data collection and the sampling plan (ACHA-NCHA II, 2011a).

In this survey, because three options were given for gender ("female," "male," "transgender"), we were unable to determine whether transgender students were male-to-female or female-to-male and therefore excluded self-identified transgender college students (n = 57) from analyses of the female population. Additionally, to be included in the analysis, women had to have self-reported their sexual orientation as "lesbian," bisexual," or "unsure" (referred to as questioning in this paper). Additional inclusion criteria included providing responses to questions about age, height, weight, and physical activity level; further, participants with a body mass index (BMI) below 18.5 lb/in^2 were considered underweight and were excluded from the analysis. BMI was calculated from self-reported weight and height (lb/in^2) $\times$ 703) and was categorized into standard groups: 18.5 lb/in^2 or greater to less than 25.0 lb/in^2 (healthy weight), 25.0 lb/in^2 or greater to less than 30.0 lb/in^2 (overweight), and 30.0 lb/in^2 or greater (obese). Physical activity status, as determined by the NCHA, as a dichotomous variable (sufficiently or insufficiently active) was calculated from questions about physical activity intensity, duration, and frequency during a typical week. Sufficiently active participants reported moderate physical activity at least 30 minutes a day for at least 5 days/week or at least 20 minutes of vigorous physical activity for at least 3 days/week. These physical activity standards were determined by the NCHA and align with the adult guidelines set by the American College of Sports Medicine (ACSM, 2011). Analyses found no difference among lesbian, bisexual, or questioning (LBQ) women in overweight status (BMI $\geq$ 25.0 lb/in^2) or being sufficiently active; therefore, LBQ women were combined into one category allowing for greater statistical power in later analyses.

Descriptive statistics and chi-square tests were used for the LBQ college women by age cohort ($\leq$23 years, typical age vs. $\geq$ 24 years, mature age) and physical activity level (sufficiently active vs. insufficiently active) on the following variables available in the ACHA survey and known or suspected to be associated with physical activity and/or weight: BMI (healthy, overweight, obese), general health status (4 categories: excellent/very good, good, fair, poor), experienced sexual assault/rape in last 12 months (yes, no), tobacco use (never use, former use, current use), action taken toward weight (4 categories: nothing, trying to gain, trying to lose, stay the same), self-described weight (4 categories: very/slightly underweight, about right, slightly overweight, very overweight), consumption of five servings of fruit and vegetable per day (yes, no), any reported suicide attempt (yes, no), ever being diagnosed with depression (yes, no), past year stress (3 categories: tremendous/more than average, average, less than average/none), race (6 categories: non-Hispanic White, non-Hispanic Black, Asian/Pacific Islander, American Indian/Alaskan Native/Native Hawaiian, Biracial/Multiracial, other), ethnicity (Hispanic, non-Hispanic), and relationship status (3 categories: not in a relationship, in a relationship but not living together, in a relationship and living together; Gow, Trace, & Mazzeo, 2010; Hwang & Kim, 2013; Provencher et al., 2009; Vella-Zarb & Elgar, 2010).

Of the variables examined, there were 21 patterns of missing values, with the number of missing values ranging from one to seven observations (0.10%–0.68%) with the exception of general health status, which was missing in 27 observations (2.65%). As a

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