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Original article

Examining the relationship between sport and health among USA women: An analysis of the Behavioral Risk Factor Surveillance System

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Abstract

Background: Research has been conducted linking sports participation and health in childhood and adolescence; however, little is known about the contribution of sport to women's health. The purpose of this study was to examine the relationship between sport and women's health in the USA by analyzing data from the Behavioral Risk Factor Surveillance System (BRFSS).

Methods: This study was a secondary data analysis of the 2013 national BRFSS survey. Unlike the BRFSS core component from previous years, in 2013, participants were questioned extensively about their physical activity behaviors. Seventy-six different activities were identified by the participants. Two researchers categorized the 76 activities as sport, conditioning exercise, recreation, or household tasks based on previously identified categories. Logistic regression was utilized to calculate odds ratios and adjusted odds ratios for chronic diseases based on physical activity category.

Results: Women who participated in sport had better health outcomes with significantly lower odds for all chronic diseases except asthma and better general health than women who participated in conditioning exercise, household tasks, or recreation, and many of the significant differences remained after controlling for demographic characteristics.

Conclusion: Sport participation was associated with more positive health outcomes among women in the USA compared with the other categories. As a means to improve health of women, the USA could focus on efforts to increase sport participation among women.

Keywords: Chronic diseases; Conditioning exercise; Leisure-time physical activity; Recreation; Sport participation; Women's health

1. Introduction

Regular physical activity (PA) reduces the risk for chronic disease and improves overall health.[1–5] Aerobic exercise helps reduce the incidence of cardiovascular disease (heart disease and stroke) and reduces risk factors for cardiovascular disease such as obesity, diabetes, high blood pressure, and high cholesterol in adults.[1–3,6,7] It has also been shown to improve pulmonary function, bone density, body image, and self-esteem.[1,2,7–10] Specific to women, examples of positive outcomes from engaging in regular PA include improved survival after diagnosis of breast cancer and possible reduced risk of breast cancer and colon cancer, reduced risk of osteoporosis and cardiovascular disease, improved perceived health status and feelings of vitality, and reduced risk of metabolic syndrome.[4,11–17] For example, Manson and colleagues[17] found that women who walked briskly for 3 or more hours per week were significantly less likely to have a nonfatal or fatal myocardial infarction when compared with women who exercised infrequently.

Leisure-time PA can be divided into 4 categories, including sport, conditioning exercise, household tasks, and other (recreation).[18] Sport can be further defined as "a human activity of achieving a result requiring physical exertion and/or physical skill which, by its nature and organization, is competitive and is generally accepted as being a sport".[19] Research examining the health benefits of sport for children and adolescents is quite extensive.[20–24] However, in adults, most research compares people who are physically active with people who are not physically active. Additionally, some research has examined the health benefits of leisure-time PA based on its intensity, which

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can be measured as metabolic equivalents (METs).[25–29] PA that has a higher intensity produces a greater MET value, and a MET value of 6 or greater is associated with vigorous PA.[30,31] People who engage in vigorous PA (e.g., sport) are more likely to reap the health benefits associated with being physically active than those who engage in PA associated with a lower MET value.[25–29] The majority of previous research has not attempted to parse out the health benefits of sport from other forms of leisure-time PA, nor has it focused on women.[19]

Research has been conducted to understand the difference in motivational factors for participation in sport compared with conditioning exercise in adults. People who participate in sport are more likely to be intrinsically motivated, whereas people who participate in exercise are more likely to be extrinsically motivated.[32–36] Intrinsic motivators of improved health, enjoyment, challenge, and competence are highly associated with sport participation, whereas the extrinsic motivators of physical appearance and weight loss are highly associated with exercise. Because the primary motivators for sport participation are intrinsic, researchers have concluded that sport participation might be a more sustainable form of PA, with a greater likelihood that those involved will meet the PA recommendations for improved health from Centers for Disease Control and Prevention (CDC).[32]

Increasingly, many countries including the UK and Australia are focused on growing women's sport as a strategy to improve health among women.[37,38] Despite an emerging understanding of the importance of PA for women's health, little is known about the contribution that *sport* makes to women's health in the USA. Lamb and colleagues[39] examined the health outcomes of sport participation in Britain and found that women who participated in sport had lower blood pressure, lower resting heart rate, lower body mass index, and better perceived health. Liechty and colleagues[40] found that participating in tackle football improved body image among the women who participated. Interestingly, no large-scale studies on the impact of sport on women's health have been conducted in the USA.

The Behavioral Risk Factor Surveillance System (BRFSS) survey conducted in 2013 provided a large, national dataset for the analysis of this relationship. By analyzing BRFSS data, this study examined the relationship between sport and women's health in the USA. We wanted to see whether women who participate in sport reported fewer chronic conditions and better health than women who participated in other forms of PA. Our hypotheses were the following:

(1) Women who report participating in sport will be significantly less likely to report chronic diseases than women who report participating in conditioning exercise, household tasks, or recreation, and differences will remain after adjusting for demographic characteristics including age, income, education, and race/ethnicity.
(2) Women who report sports participation will be significantly more likely to meet the recommended amount of exercise per week and achieve a higher MET value compared with women who participate in conditioning exercise, household tasks, or recreation.

2. Methods

2.1. Ethics approval

This study was deemed as excluded by the University of Nevada, Las Vegas, Institutional Review Board because it was a secondary data analysis of de-identified data.

2.2. BRFSS

This study was a secondary data analysis of the 2013 BRFSS, which is the largest survey of adults in the USA. The survey is a collaborative effort between the CDC and each state and territory of the USA (Guam, Puerto Rico, and the Virgin Islands).[41] It began in 1984 and was conducted every year. The BRFSS is a random digit dial telephone survey that includes noninstitutionalized adults who are 18 years or older. Disproportionate stratified sampling is employed to provide an adequate sample size for smaller demographic areas.[41] Data are weighted for population attributes and nonresponse.[41] Beginning in 2011, cellular telephones were added to landlines in the survey to maintain generalizability, coverage, and validity in data collection. The BRFSS has been found to have high reliability (test–retest comparisons) and validity (compared with other surveys, participant logs, accelerometers, or other PA measures) for the PA questions, especially for those who report high levels of PA.[42]

The core component of the BRFSS questionnaire includes questions that are asked of all respondents about their demographics, preventative health practices, chronic diseases, and health risk behaviors. Unlike the BRFSS core component from previous years, in 2013 participants were questioned extensively about their exercise behaviors.[43] The initial exercise question was, "During the past month, other than your regular job, did you participate in any physical activities such as running, calisthenics, golf, gardening, or walking for exercise?"[43] Participants who answered "yes" to this question were then asked more specific questions about their exercise. The next question was, "What type of physical activity or exercise did you spend the most time doing the past month?"[43] This was an open-ended question, and participants could only identify 1 activity or exercise for this question. Seventy-six different activities were identified by the participants. Next the participants were asked, "How many times per week or per month did you take part in this activity during the past month?" followed by "and when you took part in this activity, for how many minutes or hours did you usually keep at it?"[43]

Based on the answers to the exercise questions (activity, duration, and frequency), the CDC calculated variables for each participant regarding their PA category (highly active, active, insufficiently active, or inactive) and whether they met the recommendations for the amount of aerobic exercise. PA levels set by the CDC for the BRFSS were determined as follows: highly active—respondents who reported doing enough PA to meet the recommended 300 min of aerobic activity or 150 min of vigorous aerobic exercise; active—respondents who reported doing 150–300 min of aerobic activity (or the vigorous equivalent); insufficiently active—respondents who reported doing insufficient PA (11–149 min of aerobic activity); and inactive—respondents who reported doing no PA.[43] The recommended amount of aerobic exercise was defined by the CDC for the BRFSS as "meeting