



# The effect of the 2016 Rio de Janeiro Olympics on spectators' physical activity

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## ABSTRACT

**Objectives:** This study aimed to explore the influence of the 2016 Rio de Janeiro Olympics on physical activity motivation and behaviour among spectators.

**Methods:** The sample comprised 1851 spectators (mean age 36.6±12.7 years). Participants were asked via intercept surveys whether the Olympics changed or will change their desire to engage in regular physical activity, and whether they had increased their physical activity.

**Findings:** 60.2% reported changes in their desire to engage in regular physical activity and 51.6% increased their physical activity. Those under 55 years of age were significantly more likely to change their desire to engage in regular physical activity (OR 1.54, 95% CI 1.14 to 2.08). Non-Brazilians (versus Brazilians) were significantly more likely to report a change in their desire to engage in regular physical activity, and to have increased their physical activity (OR 1.28, 95% CI 1.05 to 1.57; OR 1.40, 1.15 to 1.71, respectively).

**Conclusions:** While previous studies have found no relationship between Olympics and population physical activity, our findings suggest that the Olympics may provide a unique opportunity to improve levels of physical activity.

## KEYWORDS

Sport; Public Health; Epidemiology.

## 1. INTRODUCTION

Regular participation in physical activity is beneficial for all facets of health [1,2]. However, population levels of physical activity are low [3,4]. A key challenge for modern society is to develop strategies to increase population levels of physical activity [5-7]. Research suggests that big sporting events, such as the Olympic and Paralympic Games, can be used as an opportunity to promote physical activity and the benefits of participation [6]. The Olympic Games have previously been considered to be a public health intervention by potentially encouraging increased participation in physical activity [8]. However, there is limited empirical support for such effects.

To date, studies of the impact of the Olympics on population levels of physical activity have been carried out using data pertaining to Sydney 2000 [9], Vancouver 2010 [10,11], and London 2012 [6,8,12,13,14,15,16]. These studies found no effects of the Olympics on physical activity participation. Although the legacy of the Olympic Games may be apparent through new infrastructure and other urban improvements, evidence of their influence on physical activity levels remains elusive [9].

To our knowledge, no studies have examined the influence of 2016 Rio de Janeiro Olympics on physical activity of those who visited and observed Olympic events. The importance of this is justified due to the cultural (including attitudes towards sports and hosting the games) and political (promoting physical activity per se versus promoting only elite sport) differences among the countries hosting the Olympics. The primary aim of the present study was to explore the influence of the 2016 Rio de Janeiro Olympics on the spectators' desire and engagement in physical activity.

## 2. METHODS

### 2.1. Procedure

Adults attending the August 2016 Summer Olympics in Rio de Janeiro (Brazil), were recruited into the study. Trained research assistants collected data via intercept surveys within the Olympic grounds. Informed consent was provided at the time of data collection.

### 2.2. Exposure Variables: demographic and behavioural

Participants reported their sex, age, nationality, marital status, level of education, occupational activity, leisure activity, perceived health status, and time per day spent in TV, computer or smartphone use.

### **2.3. Outcome variables: influence of the Olympic on activity**

Participants were asked (i) Do you think that the Olympic Games Rio 2016 changed or will change your desire to engage in regular physical activity? Response options were “Very Much / Some / Not at all” (ii) Did the Olympic Games Rio 2016 effectively increase your level of practice of physical activity? Response options were “Very Much / Some / Not at all”. (*Complete survey in Supplementary Materials*). Ethical approval was granted by the Anglia Ruskin University Sport and Exercise Science Departmental Research Ethics Panel.

### **2.4. Data Analysis**

Characteristics of the study population were summarised using descriptive statistics. Logistic regression analyses were carried out to examine associations between exposure and outcome variables (described above). Models were mutually adjusted for all exposure variables. Statistical significance was set at  $p \leq 0.05$ . All analyses were conducted in SPSS V.23.

## **3. RESULTS**

The sample comprised 1851 spectators (1000 women and 851 men) attending the 2016 Summer Olympics in Rio de Janeiro (Brazil) with a mean age of 36.6 years (SD12.7). Of the total sample 66.4% were Brazilian, 60.7% were not married, and 86.3% had a College/University level of education. 38.9% considered their health to be very good. 35.7% of the sample never or only rarely did physical activity at work, 18% never or rarely did physical activity at leisure, and the mean time spent watching TV, using the computer or smart phone was 5.5 hours per day (Table 1). 60.2% of the spectators analysed in this study reported changing their desire to engage in regular physical activity and 51.6% reported having changed their level of physical activity. In adjusted logistic regression models (Table 2), those under 55 years of age were significantly more likely to change their desire to engage in regular physical activity than those over 55 years (OR 1.54, 95% CI 1.14 to 2.08). Non-Brazilians were significantly more likely to report a change in their desire to engage in regular physical activity and reported an increase in their level of physical activity when compared to Brazilians (OR 1.28, 95% CI 1.05 to 1.57; OR 1.40, 1.15 to 1.71, respectively). There was no association between desire or level of physical activity and sex, marital status or level of education.

**Table 1.** Descriptive characteristics of sample (n = 1851)

	<b>n (%)</b>	<b>Mean (SD)</b>
<b>Age (years)</b>		36.64 (12.70)
<b>Sex</b>		
Women	1000 (54.0)	
Men	851 (46.0)	
<b>Nationality</b>		
Brazilian	1229 (66.4)	
Others	622 (33.6)	
<b>Marital status</b>		
Married	728 (39.3)	
Not married	1123 (60.7)	
<b>Level of education</b>		
College/University	1597 (86.3)	
No College/University	254 (13.7)	
<b>PA at work per week</b>		
Always/Often	654 (35.5)	
Sometimes	529 (28.7)	
Never/Rarely	657 (35.7)	
<b>PA at leisure per week</b>		
Always/Often	827 (45.1)	
Sometimes	678 (36.9)	
Never/Rarely	330 (18.0)	
<b>TV, computer &amp; smart phone per day (hours)</b>		5.50 (4.17)
<b>Perceived health status</b>		
Excellent	471 (25.5)	
Very good	718 (38.9)	
Good	555 (30.1)	
Fair	91 (4.9)	
Poor	9 (0.5)	

**Table 2.** Logistic regression analyses to examine the associations between the descriptive characteristics of those attending the Olympics and their desire and level of physical activity (n=1851)

<b>Variable</b>	The Olympic Games Rio 2016 changed or will change your <b>desire</b> to engage in regular PA. OR* (95% CI)	The Olympic Games Rio 2016 effectively increased your <b>level</b> of practice of PA. OR* (95% CI)
<b>Age</b>		
>55	1.0 (Ref)	1.0 (Ref)
<55	1.54 (1.14 to 2.08)	1.11 (0.83 to 1.50)
<b>Sex, n (%)</b>		
Men	1.0 (Ref)	1.0 (Ref)
Women	1.04 (0.86 to 1.25)	0.93 (0.78 to 1.12)
<b>Nationality</b>		
Brazilian	1.0 (Ref)	1.0 (Ref)
Others	1.28 (1.05 to 1.57)	1.40 (1.15 to 1.71)
<b>Marital status</b>		
Married	1.0 (Ref)	1.0 (Ref)
Not married	1.21 (0.99 to 1.47)	1.17 (0.96 to 1.41)
<b>Level of education</b>		
College/University	1.0 (Ref)	1.0 (Ref)
No College/University	1.10 (0.84 to 1.46)	0.90 (0.69 to 1.18)

\*Mutually adjusted for all exposure variables

#### 4. DISCUSSION

This is the first study to investigate the influence of the 2016 Rio de Janeiro Olympic Games on spectator's desire to engage in physical activity and engagement of physical activity. Results showed that 60.2% of those attending the Olympics reported a change in their desire to engage in physical activity, while 51.6% of the spectators reported increasing their level of physical activity.

Results from the present study contribute positive findings to a mixed evidence base relating to the impact of the Olympics on physical activity motivation and behaviour. While Sandercock *et al.* [14] found that 53% of children reported being inspired to try new sports or activities after London 2012, Müther *et al.* [6] found that only 7% of adults had increased their amount of exercise in response to the London 2012 Olympic and Paralympic Games. Other studies in previous Olympic Games also showed no significant increases in levels of physical activity [8-10]. Differences in findings may be owing to the social and political context of the countries studied, the different age groups (children/adults) studied, and the potential differing influences between the Summer- and Winter-Olympics.

Potwarka & Leatherdale [11] suggested that the Olympics has the potential to influence levels of physical activity. However, such influences are likely to be population specific. In the present study, it was found that those spectators under 55 years of age were significantly more likely to change their desire to engage in regular physical activity, as were non-Brazilians. It is likely that the Olympics had a greater influence on those under 55 years as such a population may have greater physical capability, and more opportunities, to take up sports that feature in the Olympics [17]. However, this hypothesis remains untested and more research to understand this association is warranted. The later finding (non-Brazilians more likely to change desire to engage in physical activity) may be owing to the reluctance of the Brazil population to host the Olympics owing to the country's recession at the time of the Olympics [18].

A clear strength of the present study is the large sample of those spectating and observing the 2016 Rio de Janeiro Olympics. However, the study is not without limitations. The questionnaire used to collect data has not been validated and the data are self-reported. Future studies on this topic should measure physical activity using objective monitors such as Actigraph accelerometers. In addition, our findings on desire must be approached with caution as our desire item used did not specify the direction of change (i.e. less desire or more desire).

## 5. CONCLUSIONS

Data from the present study suggests that the Olympics provides a unique opportunity to improve levels of physical activity, but improvements are likely to be dependent on the social and political context of the hosting country and limited to those under the age of 55 years.

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#### **AUTHOR CONTRIBUTIONS**

All authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.

#### **CONFLICTS OF INTEREST**

The authors declare no conflict of interest.

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#### **SUPPLEMENTARY MATERIAL**

##### **SURVEY:**

1. Gender:

Female       Male

2. How old are you? \_\_\_\_\_

3. Nationality

Brazilian       Others: \_\_\_\_\_

4. Marital status?

Single       Married       Widow       Divorced       Others

5. What is your highest level of education?

No Education

Junior High School/GSCE

- Senior High School/A-Level
- Technical training
- College/University
- NS/NR

6. During a typical 7-Day period (a week), moving to/from work or working time, how often do you engage in any regular physical activity long enough to work up a sweat (heart beats rapidly)

- Always/Often     Sometimes     Never/Rarely

7. And how about your leisure time?

- Always/Often     Sometimes     Never/Rarely

8. How many hours during a typical day do you spend watching TV, using the computer and smartphone, altogether? \_\_\_\_\_

9. Now I would like to ask you some questions about your health. Would you say your health is:

- Excellent     Very good     Good     Fair     Poor

10. Do you think that the Olympic Games Rio 2016 changed or will change your desire to engage in regular physical activity?

- Very Much     Some     Not at all

11. Did the Olympic Games Rio 2016 effectively increased your level of practice of physical activity?

- Very much     Some     Not at all

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