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Aquino |

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\*Corresponding author: Ana Luísa Patrão, Institute of Collective Health, Federal University of Bahia, Salvador, Bahia 40110-040, Brazil  
Email: [lispatrao@gmail.com](mailto:lispatrao@gmail.com)

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## SOCIOLOGY | RESEARCH ARTICLE

# Gender, sexual orientation and health behaviors in the ELSA-Brasil cohort

Ana Luísa Patrão<sup>1\*</sup>, Maria da Conceição Almeida<sup>2</sup>, Sheila M. Alvim Matos<sup>2</sup>, Rosane H. Griep<sup>3</sup>, Conceição Nogueira<sup>4</sup>, Liliana Rodrigues<sup>5</sup> and Estela M. L. Aquino<sup>2</sup>

**Abstract:** This study aimed to investigate differences in health behaviors as a function of gender and sexual orientation in the ELSA-Brasil cohort. Data were collected using a multidimensional questionnaire on health-related behaviors. The sample consisted of 10,314 participants, each of whom was in a stable relationship. Individuals in same-sex relationships were more likely to smoke, to spend more of their leisure-time in front of a screen and to sleep longer. When the behaviors were analyzed as a function of sexual orientation and gender, women in heterosexual relationships were less likely to smoke or to drink in excess, got more hours of sleep and spent less leisure time in front of a screen. On the other hand, they were less likely to exercise. These findings should contribute towards preventing chronic diseases and promoting health in people with different sexual orientations in Brazil and in other similar settings.

**Subjects:** Social Sciences; Behavioral Sciences; Health and Social Care

**Keywords:** gender; sexual orientation; health behavior; health promotion; ELSA-Brasil

### ABOUT THE AUTHOR

Ana Luísa Patrão is a visiting professor at the Institute of Collective Health, Federal University of Bahia. She studies the effects of psychosocial factors, particularly gender, on health behaviors and health promotion.

Maria da Conceição Almeida is an investigator at FIOCRUZ-Bahia and deputy coordinator of ELSA-Brasil.

Sheila M. Alvim Matos is associate professor at the Institute of Collective Health, Federal University of Bahia, and coordinator of ELSA-Brasil in Bahia.

Rosane H. Griep is an investigator at Laboratory of Health and Environment Education, FIOCRUZ-Rio de Janeiro and coordinator of ELSA-Brasil in Rio de Janeiro.

Conceição Nogueira is a professor at the Center for Psychology at University of Porto. She studies gender issues in social psychology.

Liliana Rodrigues is an investigator at the Center for Psychology at University of Porto. She studies gender and LGBT issues in psychology.

Estela M. L. Aquino is a full professor at the Institute of Collective Health, Federal University of Bahia and studies gender and health issues.

### PUBLIC INTEREST STATEMENT

The results of this study, developed within ELSA-Brasil, the largest longitudinal study of adult health in Latin America, showed that health risk behaviors in the population differ according to sexual orientation and gender. People in same-sex relationships were more likely to smoke and to spend more leisure-time in front of a screen. Prejudice, discrimination, the need to hide one's sexual orientation, expectations of rejection and internalized stigma are added to general life stress, leading to health-related risk behavior responses. Furthermore, homosexuals are less likely to attend healthcare services, even preventively, because, in their perception, services fail to provide for their specific needs. In addition, women in heterosexual relationships were less likely to exercise. While men are socialized to be muscular, women are not to the same extent. Such stereotypes may generate expectations regarding health behaviors and outline the roles of men and women regarding the practice of physical activity.

## 1. Introduction

The role played by conjugal relationships in health behaviors such as those involving alcohol consumption, smoking and physical activity, as well as in health promotion, has become an increasing focus of interest in research (Burke et al., 1999; Cho et al., 2008; Nystedt, 2006). Nevertheless, there are few studies evaluating health behaviors as a function of gender differences, and particularly of sexual orientation, in settings other than North America and Europe.

Differences in health-related risk behaviors as a function of gender and sexual orientation have been reported in North American studies (Boehmer et al., 2012; Drabble et al., 2005; Reczek, 2012; Reczek & Umberson, 2012; Tang et al., 2004). Lesbian women were found to be more likely to smoke and drink compared to heterosexual women (Boehmer et al., 2012; Cochran et al., 2015; Corliss et al., 2013; Garland-Forshee et al., 2014; Hughes et al., 2008; Jackson et al., 2016; Rosario et al., 2014). A greater likelihood of smoking in homosexual males compared to heterosexual males has also been reported, although the difference between these groups was not as marked as that referring to the comparison between homosexual and heterosexual women (Cochran et al., 2015; Yoon & So, 2013). Overall, a greater likelihood of alcohol consumption and smoking has been found in the homosexual population (Lee et al., 2009). Differences have also been found with respect to the influence of partners on health-related risk behaviors as a function of gender and sexual orientation. In a male sample population in a North American study, living with a smoker was more strongly associated with becoming a smoker in gays and bisexuals compared to heterosexuals. Conversely, heterosexual women living with a smoker were more likely to smoke than lesbians and bisexual women (Gamarel et al., 2016). Homosexual women were more likely to be obese and less likely to seek medical care according to the large study conducted by Jackson et al. (2016). That same study found that men with partners of the same sex or of both sexes (non-heterosexuals) were at a lower risk of heavy drinking. With respect to behaviors considered health enhancing, homosexual and bisexual males, particularly older males, were found to be more likely to practice physical activity compared to heterosexuals in the same age group (Boehmer et al., 2012). Lesbian and bisexual women also tended to practice more physical activity (Boehmer et al., 2012) compared to heterosexual women.

More recently, in different social contexts, the influence of gender on other health-related risk behaviors has been investigated, including sleep duration (Burgard & Ailshire, 2013; Burgard et al., 2010; Chen et al., 2005; Dzaja et al., 2005) and leisure screen time (Hosseinzadeh & Ahmadabad, 2015; Husárová et al., 2015). A rare study, conducted in the United Kingdom and dealing with sleep and sexual orientation (Rahman & Silber, 2000), found that homosexual men and women sleep less than heterosexuals and that heterosexual women sleep more than homosexual women. Leisure screen time, a very recent subject within the realm of health behaviors, was found to be greater in males in widely varying cultural settings such as Iraq and Slovakia (Hosseinzadeh & Ahmadabad, 2015; Husárová et al., 2015).

Differences in health behaviors between individuals in same-sex relationships and those in heterosexual relationships have been mostly explained by the minority stress theory. Prejudice, discrimination, the need to hide one's sexual orientation, expectations of rejection and internalized stigma (Meyer, 2003; Meyer et al., 2008), added to general life stress, (Bränström et al., 2016) lead to health behavior responses (Bränström et al., 2016; Lick et al., 2013; Meyer, 2003; Meyer et al., 2008). Furthermore, homosexuals are less likely to attend healthcare services, even preventively, because, in their perception, services fail to provide for their specific needs (Cochran & Mays, 2007). The health belief model/theory, particularly insofar as the self-efficacy construct is concerned, may also explain this situation. Defined as the individual's belief that he/she will be able to carry out his/her plans and intentions successfully or to perform certain behaviors, self-efficacy is one of the key factors in the exercise of personal control, including control over the state of one's own health (Bandura, 1977; Hevey et al., 1998). Several studies have shown that self-efficacy is a direct predictor of intention and different health behaviors (Brouwer-Goossensen et al., 2018; Hevey et al., 1998; Patrão & McIntyre, 2017). We believe that gender stereotypes and the adversity resulting from prejudice can affect confidence levels and health behavior adoption.

In Brazil, several studies have been conducted on conjugality, gender and sexual identity (Carrara & Simões, 2007; Facchini et al., 2014; Heilborn, 2004; Lopes, 2011). Health studies have focused on sexuality and questions related to the risk of HIV/AIDS (Puccinelli et al., 2014), as well as mental health and psychological distress (Cardoso & Ferro, 2012; Goto et al., 2013). However, there is a lack of studies on health behaviors and lifestyle in the homosexual population. In one of the few health-related studies conducted with women who have sex with women that does not deal with questions related to HIV or mental health, Barbosa and Facchini (2009) reported that while comprehension of the health of the homosexual population in Brazil has to be sectionalized according to race, class and gender so as not to foster the idea that this is a homogenous group, investment also has to be made in understanding the health-related needs of this specific population. Challenges remain in conducting studies on homosexuality. The difficulties involve sample sizes (Barbosa & Koyama, 2006), access to this population for large-scale studies and, principally, investigators' resistance to including questions on sexual orientation in health-related studies. Evaluating behavior and health-related data from the homosexual population in major Brazilian studies such as the Brazilian Longitudinal Study of Adult Health (ELSA-Brasil), the largest study on adult health in Brazil and in South America (Aquino et al., 2012), is of the utmost importance. The objective of the present study was to identify differences in health behaviors as a function of gender and sexual orientation in the ELSA-Brasil cohort.

## 2. Materials and methods

### 2.1. Study population

The ELSA-Brasil is a cohort study consisting of 15,105 public employees (8,218 women and 6,887 men), either in active service or retired, from six public teaching and research institutions in the northeast, south and southeast of Brazil. The participants were aged 35 to 74 years at recruitment. Their health status has been followed up since baseline through annual telephone calls to monitor endpoints of interest to the study. Every four years, participants are invited to attend the institution in person for a further interview, measurements and tests. Full details regarding the methodology of the ELSA-Brasil have been published previously (Aquino et al., 2012; Schmidt et al., 2015). All the individuals who agreed to participate in the study signed an informed consent form. The protocol of the ELSA-Brasil was approved by the internal review boards of the six participating institutions. Further information on the ethical issues involved in the ELSA-Brasil is provided in the paper published by Aquino et al. (2013).

The present study used data from wave 2 (2012–2014) of the ELSA-Brasil. In wave 2, the participants reported whether they were in a stable union, either marital or otherwise, and direct information was obtained on the sex of their partners, thus providing sufficient data to enable the subject of interest to be evaluated.

### 2.2. Measures

A structured multidimensional questionnaire, applied by interviewers trained and certified for this specific task, was used to obtain the data for the present study (Chor et al., 2013; Schmidt et al., 2015). The study variables are described below.

*Age:* Based on the participant's date of birth.

*Ethnicity/skin color:* Self-reported according to the categories used in the Brazilian census: white, black, brown, yellow (of Asian origin) or indigenous.

*Education:* According to the participant's answer to the question: "What is your education level?"

*Social class:* Classified as lower, middle or upper class. This is a compound indicator, the construction of which is based on the type of work performed by the individual (classified according to the Brazilian Classification of Occupations), whether he/she occupies a supervisory or management position and his/her schooling.

*Cohabitation:* Evaluated from answers to the question “Who do you live with?” and then from the response “Spouse or partner”.

*Children of 14 years of age or less:* Variable constructed from two other variables: whether the individual has children and the age of these children.

*Gender:* Gender identity is known to consist of more than the individual’s biological sex; however, this study is limited to institutional data that precede the data collection procedures; therefore, the categories are limited to “female” and “male”.

*Sexual orientation:* Sexual orientation encompasses desire, behavior and identity, translated into sexual practices and partners. In this study, this variable was based on responses to two questions, one regarding the existence of a conjugal union (marriage or cohabitation) or of a stable relationship without cohabitation, and the other regarding the sex of the individual’s partner (Is your spouse/partner female or male?).

*Cigarette smoking:* This variable was classified into three categories: never-smoker, former smoker and current smoker.

*Alcohol consumption:* Alcohol consumption was categorized into no consumption, moderate consumption or excessive consumption based on detailed questions on the individual’s weekly ingestion of alcoholic drinks (red/white wine, beer or draft beer and distilled spirits) and then classified with regard to whether or not consumption was excessive, with non-excessive drinking being defined as: men <210 grams/week and women <140 grams/week and excessive drinking as: men  $\geq$ 210 grams/week and women  $\geq$ 140 grams/week (Duncan et al., 2004). An example of the questions asked is: “How many glasses of red wine do you consume weekly?”

*Leisure-time physical activity:* This variable was based on responses to the International Physical Activity Questionnaire (IPAQ) (Haskell et al., 2007), with participants being classified as active ( $\geq$ 150 minutes of walking or moderate activity or  $\geq$ 60 minutes of strenuous activity per week) or inactive (<150 minutes of walking or moderate activity or <60 minutes of strenuous activity per week). Moderate activity included swimming or pedaling moderately, practicing sports as a leisure activity, etc. Strenuous activity consisted of activities such as running, working out at a gym, pedaling rapidly, practicing sports competitively, etc. An example of the questions used is: “On how many days a week do you walk in your leisure time?”

*Hours of sleep:* This variable was evaluated from the question: “How many hours on average do you normally sleep at night?” The answers were then dichotomized into <7 hours/day or  $\geq$ 7 hours/day in accordance with the recommendations for adults (Hirshkowitz et al., 2015).

*Leisure screen time:* This was evaluated from the question: “How much time per day do you normally spend, on average, watching television, videos or at any other type of screen including computers and video games at weekends and during the week when you are not working?” The answers were then dichotomized into <2 hours/day or  $\geq$ 2 hours/day in accordance with the classification established by Dunstan et al. (2010), based on previously identified associations with cardiometabolic risk biomarkers.

### **2.3. Statistical analysis**

The perspective of intersectionality guided the construction of groups, taking into consideration whether the individual was in a stable relationship and whether he/she was cohabiting or not. The analysis was conducted according to gender and sexual orientation: man/woman; woman/man; woman/woman; man/man.

The frequency distribution of the independent variables (demographic and family characteristics and health-related behaviors) was then calculated according to sexual orientation. The measures of association were calculated using simple and multinomial logistic regression analysis. Statistical significance was established at  $p < 0.05$ . Odds ratios and 95% confidence intervals (95%CI) were calculated. The software used was the STATA statistical software package, version 13.

### 3. Results

#### 3.1. Description of the participants

The present study analyzed data from 10,314 participants. Of these, 5,660 (54.9%) are men and 4,654 (45.1%) are women. Regarding relationships, 188 (1.8%) reported being in a stable same-sex relationship and 10,126 (98.2%) in a stable heterosexual relationship.

The women and men in a same-sex union tended to be younger (37.8% of the women and 43.4% of the men belonged to the 38–49-year age group) compared to individuals in a stable heterosexual relationship (Table 1). Individuals reporting to be in a homosexual relationship were more likely to be white. The men and women in a stable same-sex relationship were more likely to be university educated (69.5% and 79.2%, respectively). Men in same-sex relationships were the only group in which the majority (55.3%) was classified as upper social class. Women, either homosexual or heterosexual, were predominantly middle class (51.3% and 49.4%, respectively). The majority of the heterosexual men belonged to the middle (34.5%) or upper classes (36.4%). In terms of cohabitation, heterosexuals (83.8% of the women and 90.3% of the men) were more likely to live with their partners, although the majority of homosexual couples also cohabited (71.9% of the women and 58.5% of the men). Heterosexual women and men were more likely to live with children under 14 years of age (28.3% and 30.9%, respectively).

Concerning health behaviors, the greatest percentage of smokers was found in the group of homosexual women (18.3%), followed by the groups of homosexual men (12.3%), heterosexual men (10.9%) and heterosexual women (8.5%). Excessive alcohol consumption was more common among males (11.3% in the group of homosexual men and 12.6% among heterosexual men). The majority of individuals in all the groups were sedentary, with the highest percentage being in the group of heterosexual women (61.4%). Sleep duration was shortest for the men in heterosexual relationships, with 51.6% of the individuals in this group sleeping for fewer than 7 hours/day. In the other groups, the majority of the individuals slept for at least 7 hours/day. The women in same-sex relationships were the only group whose leisure screen time was found to be less than 2 hours/day for most individuals (50.1%). In all the other groups, most of the individuals spent more than 2 hours/day in front of a screen (Table 2).

#### 3.2. Association between health behavior and sexual orientation

An initial analysis performed to compare the group of homosexual individuals with the group of heterosexuals, irrespective of gender, found that homosexuals are more likely to smoke (OR = 1.69; 95%CI: 1.10–2.58), to spend more leisure time in front of a screen (OR = 1.43; 95%CI: 1.06–1.93) and to sleep more ( $\geq 7$  hours/day) (OR = 0.73; 95%CI: 0.55–0.98). No statistically significant differences were found between the two groups analyzed regarding alcohol consumption or physical activity (Table 3).

#### 3.3. Association between health behaviors, gender and sexual orientation

The analysis of health-related behaviors according to gender and sexual orientation found that women in a stable relationship with a man were protected with respect to smoking (OR = 0.61; 95%CI: 0.57–0.69), excessive drinking (OR = 0.32; 95%CI: 0.27–0.37), hours of sleep (OR = 0.88; 95%CI: 0.85–0.95) and leisure screen time (OR = 0.70; 95%CI: 0.65–0.76) (Table 4). With regards to physical activity, this same group of women was the group that exercised least (OR = 1.44; 95%CI: 1.33–1.56).

**Table 1. Sociodemographic and family characteristics and health behaviors of the population sample**

	Women in a stable same-sex relationship	Men in a stable same-sex relationship	Women in a stable heterosexual relationship	Men in a stable heterosexual relationship	$\chi^2$	df	p-value
	% n = 82*	% n = 106*	% n = 4548*	% n = 5578*			
<i>Sociodemographic characteristics</i>							
• Age					98.43	6	<0.001
38–49 years	37.8	43.4	33.4	28.0			
50–59 years	47.6	37.7	41.1	38.7			
60 years or older	14.6	18.9	25.5	33.3			
• Skin color/ethnicity					49.8	12	<0.001
Black	14.8	11.3	16.3	13.9			
Brown	19.8	23.6	26.4	29.7			
White	64.2	65.1	53.4	53.2			
Yellow	1.2	-	3.0	1.9			
Indigenous	-	-	0.9	1.3			
Schooling					231.69	6	<0.001
Completed elementary school	6.1	2.8	6.3	15.2			
Completed high school	24.4	18.0	32.1	31.1			
Completed university	69.5	79.2	61.6	53.7			
• Social class					298.48	6	<0.001
Lower	12.8	6.8	18.1	29.0			
Middle	51.3	37.9	49.4	34.5			
Upper	35.9	55.3	32.5	36.4			

(Continued)

**Table 1. (Continued)**

	Women in a stable same-sex relationship		Men in a stable same-sex relationship		Women in a stable heterosexual relationship		Men in a stable heterosexual relationship		X <sup>2</sup>	df	p-value
	%	n	%	n	%	n	%	n			
<i>Family-related characteristics</i>											
• Cohabiting									186.96	3	<0.001
Yes	71.9		58.5		83.8		90.3				
No	28.1		41.5		16.2		9.7				
• Family with child ≤ 14 years											
Yes	6.1		4.7		28.3		30.9		61.4	3	<0.001
No	93.9		95.3		71.7		69.1				

\*Totals differ because of missing data for some of the variables. df: degrees of freedom.



**Table 2. Health behaviors according to the sex and sexual orientation of the participants**

Health behaviors	Women in a stable same-sex relationship		Men in a stable same-sex relationship		Women in a stable heterosexual relationship		Men in a stable heterosexual relationship		$\chi^2$	df	p-value
	%	n = 82*	%	n = 106*	%	n = 4548*	%	n = 5578*			
• Smoking									227.50	6	<0.001
Never-smoker	50.0		54.7		66.5		52.1				
Former smoker	31.7		33.0		25.0		37.0				
Smoker	18.3		12.3		8.5		10.9				
• Excessive alcohol consumption									209.68	3	<0.001
No	92.7		88.7		95.6		87.4				
Yes	7.3		11.3		4.4		12.6				
• Physical activity									83.40	3	<0.001
Active	43.9		49.1		38.6		47.6				
Inactive	56.1		50.9		61.4		52.4				
• Sleep									14.18	3	<0.001
≥ 7 hours/day	58.0		57.1		51.6		48.4				
< 7 hours/day	42.0		42.9		48.4		51.6				
• Leisure screen time									83.11	3	<0.001
≤ 2 hours/day	41.5		33.0		50.1		41.4				
> 2 hours/day	58.5		67.0		49.9		58.6				

\*Totals differ because of missing data for some of the variables. df: degrees of freedom.

**Table 3. Association between health behaviors and sexual orientation**

Health behaviors	Sexual Orientation Homosexual *	
	OR	95%CI
• Smoking **		
Never-smoker	1.00	
Former smoker	1.14	0.83–1.57
Smoker	<b>1.69</b>	<b>1.10–2.58</b>
• Excessive alcohol consumption		
No	1.00	
Yes	1.09	0.66–1.77
• Physical activity		
Active	1.00	
Inactive	0.88	0.66–1.17
• Sleep		
≥ 7 hours/day	1.00	
< 7 hours/day	<b>0.73</b>	<b>0.55–0.98</b>
• Leisure screen time		
≤ 2 hours/day	1.00	
> 2 hours/day	<b>1.43</b>	<b>1.06–1.93</b>

\*The reference category is heterosexual.

\*\*For this variable, the multinomial model was used, with calculation of the relative risk reduction (RRR).

#### 4. Discussion

The present study aimed to identify differences in health behaviors as a function of gender and sexual orientation in the ELSA-Brasil cohort. As predicted, and in agreement with the results of other studies (Boehmer et al., 2012; Drabble et al., 2005; Tang et al., 2004), health behaviors varied with gender and sexual orientation in this Brazilian sample. Irrespective of gender, individuals in a same-sex relationship were more likely to smoke and to spend more of their leisure time in front of a screen, whereas individuals with partners of the opposite sex tended to sleep less. When analyzing both sexual orientation and gender, heterosexual women were less likely to smoke and to drink in excess, more likely to sleep more and to spend less time in front of a screen; however, they were less likely to be physically active in their leisure time.

The present results corroborate studies in other cultural settings in that a greater frequency of smoking was found in the homosexual compared to the heterosexual population (Cochran et al., 2015; Corliss et al., 2014, 2013; Fallina et al., 2015; Garland-Forshee et al., 2014; Max et al., 2016; Rosario et al., 2014; Yoon & So, 2013). The higher rates of smoking in homosexual men and women may be due to the higher rates of anxiety, depression, panic attacks and psychological distress resulting from the stigma, discrimination and stress suffered by these individuals, as reported in the literature on the mental health of sexual minorities (Blosnich & Horn, 2011; Cochran et al., 2003; Jackson et al., 2016; Lewis, 2009). Accordingly, the minority stress theory describes sexual minorities as being at a disadvantage with respect to health-related issues, assuming that the social, juridical and institutional contexts promote and reinforce interpersonal discrimination, stigma and access to resources. Risk behaviors such as smoking would emerge as a means of dealing with these problems (Lick et al., 2013; Meyer, 2003). On the other hand, because homosexuals do not feel that their health needs are met at healthcare services, they may tend to distance themselves from

**Table 4. Association between health behaviors, gender and sexual orientation**

Health behaviors	Women in a stable same-sex relationship *		Men in a stable same-sex relationship *		Women in a stable heterosexual relationship *	
	OR	95%CI	OR	95%CI	OR	95%CI
• Smoking **						
Never-smoker	1.00		1.00		1.00	
Former smoker	0.89	0.54–1.46	0.85	0.55–1.29	0.53	0.48–0.58
Smoker	1.75	0.96–3.17	1.07	0.58–1.96	<b>0.61</b>	<b>0.53–0.69</b>
• Excessive alcohol consumption						
No	1.00		1.00		1.00	
Yes	0.55	0.24–1.26	0.89	0.48–1.63	<b>0.32</b>	<b>0.27–0.37</b>
• Physical activity						
Active	1.00		1.00		1.00	
Inactive	1.16	0.75–1.80	0.94	0.64–1.38	<b>1.44</b>	<b>1.33–1.56</b>
• Sleep						
≥ 7 hours/day	1.00		1.00		1.00	
< 7 hours/day	0.68	0.44–1.06	0.71	0.48–1.04	<b>0.88</b>	<b>0.82–0.95</b>
• Leisure screen time						
≤ 2 hours/day	1.00		1.00		1.00	
> 2 hours/day	1.00	0.64–1.55	1.43	0.95–2.16	<b>0.70</b>	<b>0.65–0.76</b>

\*The reference category is men in a stable heterosexual relationship.

\*\*\*For this variable, the multinomial model was used, with calculation of the relative risk reduction (RRR).

these institutions and ignore health-promoting messages such as those regarding smoking (Cochran & Mays, 2007).

Individuals in same-sex relationships were more likely to spend two hours or more in front of a screen (television, videos, computer or video game). To the best of our knowledge, no other studies have evaluated the relationship between this behavior and sexual orientation, which further emphasizes the need for studies such as this one. One possible explanation is that homosexuals, who experience greater levels of discrimination and feel that they are targets of prejudice in society (Blosnich & Horn, 2011; Cochran et al., 2003; Jackson et al., 2016; Lewis, 2009), are more likely to use sites and the Internet in general as spaces for socialization in search of contacts with the same interests and identifications (Miskolci, 2009).

The finding that homosexuals are better protected in terms of sleep is in conflict with the few reports on sleep and sexual orientation (Chen & Shiu, 2017; Rahman & Silber, 2000), which suggest that the stress levels resulting from discrimination and prejudice would negatively affect sleep. Consequently, the present study may contribute by providing a cornerstone for further in-depth investigations into sleep-related issues in Brazilian homosexuals.

Heterosexual women were better protected against a range of behaviors: smoking, excessive alcohol consumption, hours of sleep and screen time. However, they were less protected regarding physical activity.

Overall, irrespective of sexual orientation, women are less likely to smoke or drink compared to men, as found both in Brazil and in other countries (Bennet & Murphy, 1999; Bothmer & Fridlund, 2005; Dean,

1989; Instituto Brasileiro de Geografia e Estatística—IBGE [Brazilian Institute of Geography and Statistics—IBGE], 2014; Patrão et al., 2017; Read & Gorman, 2010; Sánchez-López et al., 2012). This greater tendency of women towards a healthier lifestyle has also been confirmed in other studies nested within the ELSA-Brasil (Faleiro et al.; Patrão et al., 2017). Heterosexual women have been previously shown to be significantly less likely than lesbian and bisexual women to smoke (Fallina et al., 2015; Garland-Forshee et al., 2014) or drink in excess (Aaron et al., 2001; Rosario et al., 2014). Those studies are in agreement with the present study, indicating that women in same-sex relationships are at a greater risk. Drabble et al. (2005) found that alcohol consumption levels were higher in lesbian and bisexual women. Likewise, Boehmer et al. (2012) conducted a longitudinal study in North America and found that lesbians were more likely to smoke and drink than heterosexual women. A possible explanation may be that in Western cultures drinking and smoking are habits associated with affirmations of masculinity and with restraint in women (Leitão, 2015). Lesbian and bisexual women may be less influenced by the social pressures that condemn these habits in women. Furthermore, as previously mentioned, the homosexual population (men and women) tends to live just outside the reach of health-promoting messages and feels poorly represented by them (Cochran & Mays, 2007). In addition, due to the stress induced by discrimination, this population also tends to engage in habits considered less healthy (Bränström et al., 2016; Lick et al., 2013; Meyer, 2003; Meyer et al., 2008).

The logistic regression analysis showed that the heterosexual women tended to get more hours of sleep; however, significance was borderline. Additionally, this finding conflicts with the descriptive analysis in which sleep duration was longer in the group of homosexual women. In other words, caution is recommended in the interpretation, and further investigation is necessary. Moreover, the homosexual women were younger, which may influence sleep patterns. Little is known on questions related to gender and sexual orientation and this specific behavior, and the present study is also inconclusive in this respect. Nevertheless, some studies have shown that irrespective of sexual orientation, women sleep longer than men, depending on the phase of their life cycle (Burgard et al., 2010; Piccinelli & Wilkinson, 2000). Women tend to sleep more than men when they are younger (Natal et al., 2009) or when circumstances are similar; however, this changes throughout life as the result of social situations such as time spent in caring for others (children, elderly or sick dependents) (Burgard et al., 2010). Very few studies have evaluated this behavior as a function of sexual orientation. One of these (Rahman & Silber, 2000), conducted in the United Kingdom, reported that homosexuals sleep less than heterosexuals; however, when comparisons were made as a function of gender, homosexual women were found to sleep more than homosexual men. The differences found in the present study between women in same-sex relationships and women in heterosexual relationships may be due to the older age of the heterosexual women and also to the greater burden of domestic chores, as male partners tend to get less involved with housework.

Few studies have been conducted on leisure screen time (e.g. F. J. G. Pitanga et al., 2016). Men and boys have been shown to spend more time in front of a screen than women and girls (Hosseinzadeh & Ahmadabad, 2015; Husárová et al., 2015), which is partially in agreement with the results of the present study in which heterosexual women were found to be better protected against this health-related risk behavior. Hosseinzadeh and Ahmadabad (2015) reported that, from an early age, parents in Iran tend to reduce girls' access to games compared to the access permitted to boys, which may go towards justifying, at least in part, the lesser exposure of girls to long periods of screen time. There are no studies on this health behavior as a function of sexual orientation, further reinforcing the importance of the present study and justifying the recommendation for future studies on this subject. Nevertheless, some studies, particularly those conducted in Brazil (Miskolci, 2009) within the field of homoerotic sociability, have shown that the Internet represents a recurrent socialization tool at a more intimate level among homosexuals, i.e. network platforms promoting friendship-related, intimate and sexual contacts that allow individualized and discrete access, hidden from discriminating eyes, may define highly individual lifestyles in this specific population insofar as leisure screen time is concerned.

Women in heterosexual relationships were the group least likely to exercise. Although relatively better protected with respect to the other behaviors analyzed, this group was at a greater risk insofar as the practice of leisure-time physical activity is concerned. A major difference between the sexes has been

reported, with women practicing less physical activity than men (Azevedo et al., 2007; Hosseinzadeh & Ahmadabad, 2015; Saffer et al., 2013; Salles-Costa et al., 2003). As in the case of smoking and alcohol consumption, one explanation for these differences may be the association between the practice of physical activity and male norms (De Visser & McDonnell, 2012). In Western societies, social construction of gender is described in opposing terms, i.e. what it is to be a man and what it is to be a woman (Renzetti, 1999). Therefore, while men are socialized to be muscular (Farquhar & Wasykiw, 2007), women are not to the same extent. Such stereotypes may create expectations on health behaviors and outline the roles of men and women with regards to the practice of physical activity. Furthermore, there may also be a link with the availability of leisure time, since women tend to have less free time as a result of gender roles in society, having to take care of the home and family in addition to having a paid job (the so-called “second shift”) (Griep, Toivanen, Santos et al., 2016; Griep, Toivanen, van Diepen et al., 2016; F. J. Pitanga et al., 2016). A rare study on physical activity and sexual orientation conducted in South Korea reported that heterosexual men practice more physical activity than homosexual men (Yoon & So, 2013). In women, however, lesbian and bisexual women tend to practice more physical exercise than heterosexual women (Aaron et al., 2001; Yoon & So, 2013). A possible explanation for this difference may lie in the fact that lesbian and bisexual women are less likely to incorporate models of femininity (Yoon & So, 2013), as previously mentioned.

This study, which is innovative in Brazil, is based on data from a substantial sample of civil servants and is the first to deal with the question of health behaviors as a function of both gender and sexual orientation, analyzed simultaneously. However, any attempt to generalize these results should be made with caution, since this cohort consists of voluntarily recruited civil servants. The study’s strongpoints include the fact that it is a large study conducted in a middle-income country involving a cohort with a wide age range that deals with the primordial question of health promotion and health behaviors. Indeed, the previous scientific scenario encompassed a large body of evidence on the health of the homosexual population; however, most studies were focused on mental health and sexually transmitted diseases.

The number of individuals in same-sex unions is small in the present study (1.8% of the study population), although it is substantially higher than the percentage in the general Brazilian population (0.16% according to the IBGE, 2010) and similar to percentages found in population-based studies on sexuality in Latin America (Bozon et al., 2009). The effect of under-reporting homosexual relationships in cultural settings in which this type of practice is strongly stigmatized cannot be discarded. Underreporting is more common among older individuals and those with poorer education levels. The present study was conducted with an adult population, predominantly over 50 years of age, which may suggest a greater possibility of individuals avoiding disclosure of their homosexual orientation. In addition, this group is considered to possess a certain degree of invisibility, since, on the one hand, studies dealing with homosexuality tend to work only with this group, rendering the studies more circumscribed, while, on the other hand, population-based studies are reluctant to investigate issues related to sexual orientation. The intention of the present study was to contribute towards counterbalancing this tendency. This study refers only to individuals in a stable relationship. In the ELSA-Brasil, women were less likely than men to be in a stable relationship (39% vs 10.3%) and this selection bias probably weighs heavier in this group.

Using an individual’s report that he/she is in a stable relationship with a person of the same sex or with a person of the opposite sex to construct the variable *sexual orientation* has reduced the phenomenon to the minimum, excluding aspects related to identity, desire or casual sexual relationships and bisexuality (Laumann et al., 2000; Michaels & Lhomond, 2006).

## 5. Conclusion

The present results constitute an original contribution that may encourage further studies and the inclusion of gender and sexual orientation in large population-based studies on adult health. In the ELSA-Brasil, future longitudinal analyses over longer follow-up times may contribute towards providing a more in-depth interpretation of the current findings.

Policies and interventions aimed at promoting health need to take the two domains of gender and sexual orientation seriously into consideration in their actions and strategies. In final analysis, the present results are expected to contribute towards preventing chronic non-communicable diseases and promoting the health of men and women of different sexual orientations in Brazil and in other similar settings, while also stimulating further studies to clarify the complex mechanisms behind the adoption of health-related behaviors.

The minority stress theory has contributed significantly to explaining why homosexuals are at a greater risk in terms of lifestyle-associated health behaviors (Meyer, 2003; Meyer et al., 2008), but it remains insufficient. Less explicit forms of discrimination, namely institutional discrimination, which are present in different areas including placement in the job market, access to financial resources and access to and circulation within the healthcare system contribute equally to the inequalities experienced by the homosexual population in health (Daley & MacDonnell, 2011; Gustafsson et al., 2017), particularly with respect to health behaviors. This subtler form of discrimination tends to render the homosexual population invisible in messages aimed at health promotion and at the prevention of risk behaviors, distancing them from healthcare since they consider themselves unrepresented. Therefore, we believe it to be of the utmost importance that future studies deal with certain specificities of the homosexual population in Brazil and in other similar settings, ultimately attracting these distanced groups to attend healthcare institutions and environments that encourage healthy behaviors, as well as sensitizing them to health-promoting messages.

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#### Author details

Ana Luisa Patrão<sup>1</sup>  
E-mail: [lisptrao@gmail.com](mailto:lisptrao@gmail.com)  
ORCID ID: <http://orcid.org/0000-0002-2027-5461>  
Mária da Conceição Almeida<sup>2</sup>  
E-mail: [conceicao@bahia.fiocruz.br](mailto:conceicao@bahia.fiocruz.br)  
Sheila M. Alvim Matos<sup>2</sup>  
E-mail: [salvim@ufba.br](mailto:salvim@ufba.br)  
Rosane H. Griep<sup>3</sup>  
Conceição Nogueira<sup>4</sup>  
E-mail: [cnogueira@fpce.up.pt](mailto:cnogueira@fpce.up.pt)  
Liliana Rodrigues<sup>5</sup>  
E-mail: [frdrigues.liliana@gmail.com](mailto:frdrigues.liliana@gmail.com)  
Estela M. L. Aquino<sup>2</sup>  
E-mail: [estela@ufba.br](mailto:estela@ufba.br)  
<sup>1</sup> Institute of Collective Health, Federal University of Bahia, Salvador, Bahia 40110-040, Brazil.  
<sup>2</sup> Oswaldo Cruz Foundation (FIOCRUZ), Gonçalo Moniz Institute, Salvador, Bahia, Brazil.  
<sup>3</sup> Laboratório de Educação em Ambiente e Saúde (Laboratory of Education in Environment and Health),

Oswaldo Cruz Foundation (FIOCRUZ), Oswaldo Cruz Institute, Rio De Janeiro, RJ, Brazil.

<sup>4</sup> Center of Psychology of the University of Porto, University of Porto, Porto 4200-135, Portugal.

<sup>5</sup> Center of Psychology, University of Porto and ISAVE – Higher, Institute of Health, Porto, 4200-135, Portugal.

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