

Research article

Demographics and self-reported well-being of Brazilian adults as a function of pet ownership: A pilot study

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ABSTRACT

The goals of the present study were to investigate socio-demographic characteristics and well-being indicators associated with pet ownership. The respondents (N = 801, 53.8% females; 56.2% with children) came from the five macro-regions of Brazil (8% North, 28% Northeast, 36% Southeast, 18% South, 10% Central-West). Their ages ranged from 20 to 50 years. Over half of the sample (60%) reported living with a pet. Logistic regression showed that residence type (to be owner versus renter) and parental status (to be childless versus to have children) were predictors of pet ownership. We found interaction between pet ownership and sex on well-being indicators: the Mann-Whitney test showed that men who owned a pet reported better sleep quality, better relationship with neighbors and less sadness; whereas women who owned a pet reported lower life organization. With respect to life satisfaction, no differences were found between pet owners and non-pet owners. Implications of our findings and new research directions are discussed. Our study was conducted before the Covid-19 pandemic. The survey should be reapplied during and after the pandemic, so that we can deepen our knowledge of the socio-demographic characteristics and subjective well-being indicators associated with pet ownership.

1. Introduction

Pets are animals maintained by humans in their households without an apparent function (Serpell, 1989; Serpell and Paul, 2011).¹ They are named, and frequently considered members of the family. Many live inside the home, with access to the private space of the bedroom, and even share their owners' beds (Thompson and Smith, 2014). They have been described as serving the function of a "living security blanket" for children (Triebenbacher, 1998). Various theories exist to explain pet keeping in human households:² (i) a deep rooted tendency to seek connection with nature, (ii) social buffering against negative effects of stress and isolation in modern urban societies, (iii) expectancy that the contact with animal companions promotes empathy and prosocial behaviors in children, (iv) ingrained propensity to project human mental

states onto non-human species, (v) low cost byproduct of parental motivation explored by other species, and (vi) selectively neutral feature maintained by genetic drift (Herzog, 2011; Serpell, 2003; Serpell and Paul, 2011).³

In Brazil, dogs and cats are the most popular pets. In 2013, for the first time, the Brazilian Institute of Geography and Statistics [Instituto Brasileiro de Geografia e Estatística - IBGE] surveyed Brazilian residents on the number of dogs and cats owned. The estimated canine population was 52.2 million, and the feline population was 22.1 million, with 44.3% of households having at least one dog, and 17.7%, at least one cat (IBGE, 2013). The National Household Sample Survey [Pesquisa Nacional por Amostra de Domicílios - PNAD] revealed that there were 44.9 million children aged 14 years or less, concluding that there were more pets than children in Brazil. The Brazilian Association of the Industry of Products for Pets [Associação Brasileira da Indústria de Produtos para Animais de Estimação]⁴ reported in 2015 that, even during the crisis faced by the country (Barbosa Filho, 2015), the pet market obtained a turnover of R\$ 19.2 billion and an expansion of almost 7% compared to 2014 (Carvalho de Ostos, 2017). In 2018, Brazilians had an average expenditure with

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E-mail address: rededefelipe@gmail.com (R. Defelipe).¹ Humane Society of the United States. US pet ownership statistics <https://www.animalsheltering.org/page/pets-by-the-numbers> (Accessed March, 24, 2019).² American Pet Products Association. https://www.americanpetproducts.org/press_industrytrends.asp (Accessed March, 24, 2019).³ <https://sidra.ibge.gov.br/tabela/4930>.⁴ <http://abinpet.org.br/mercado/>.

their pets of R\$ 294 per month (R\$ 121 being destined dogs, and R\$ 90, to cats) (Miranda and de Otoni, 2019). Few studies to date in Brazil have assessed pet owner's socio-demographic characteristics. These studies are more often conducted in other countries, as can be seen in two recent large-scale studies carried out in the US showing several socio-demographic factors associated with pet ownership. While Saunders et al. (2017) found that more pet owners were married, females, over 50 years old, homeowners, lived in a house, and had high household income (Saunders et al., 2017), Applebaum et al. (2020) did not find significant associations of pet ownership with gender and family income.

Besides characterizing the socio-demographic profile of pet owners, there are several studies that have discussed some benefits regarding mental health and subjective well-being of pet ownership. Focusing on sleep quality, while Smith et al. (2018) found that co-sleeping with dogs apparently increased arousal and the frequency of wake ups in humans, Hoffman et al. (2018) showed that dogs were perceived as bed partners less disturbing than humans, promoting stronger feelings of comfort and security. It is notable that most pet owners describe their pets as significant members of their family, and report they offer comfort, friendship, and help to cope with stress. Serpell (1991) also found that people who adopted dogs or cats experienced one month later an important reduction in minor health problems including headaches and painful joints. Some studies have found that pet ownership is associated with lower levels of depression (e.g., Clark Cline, 2010), while others have not found such association (e.g., Siegel et al., 1999). In relation to social interactions, one study pointed out that pet ownership is positively associated with perceptions of neighborhood friendliness, favor exchanges, civic engagement, and sense of community (Bulsara et al., 2007). Also, dog owners showed more interest in the neighborhood (Cutt et al., 2008) and presented higher chances to engage in a conversation with strangers during a walk (McNicholas and Collis, 2000). Regarding conscientiousness, Allen et al. (2000) reported that pet owners expressed a sense of responsibility for their pets, which contributed to the structure and organization of their everyday lives. Daily routines of pet maintenance motivated physical exercise including daily walks, grooming and bathing, veterinary visits, and social events with other pet owners. In the same line, other studies showed that people who owned dogs walked more and were more likely to exercise regularly than non-pet owners (Serpell, 1991; Cutt et al., 2008; Brown and Rhodes, 2006).

The disregard of sociodemographic characteristics might be one reason for the notable inconsistencies in the literature on pets and well-being. The effects may not be the same for everybody. For example, Clark Cline (2010) showed no main effects of pet ownership on depression, but found interaction effects with sex and relationship status, with more beneficial effects for women and for singles. It is possible that for married individuals to take care for a pet represents a burden, whereas for those living alone it may reduce loneliness (Branson et al., 2017).

1.1. Goal

This research was conducted by the Center for Applied Research on Well-Being and Human Behavior (CPBEC: <https://cpbec.org.br/>). The first goal was to explore differences between pet owners and non-pet owners with respect to nine socio-demographic factors (sex, age, household type and status, marital status, parenthood, region of residence, educational level, familiar income). The second goal was to compare pet owners and non-pet owners with respect to seven self-reported well-being indicators (sleep quality, sadness, depression, neighborhood relationships, level of life organization, physical fitness, and life satisfaction). Given the exploratory nature of the present study, the analyses of association among pet ownership, socio-demographic factors, and well-being indicators were carried out with due caution with regard to assuming causal relationships.

2. Method

2.1. Participants & procedure

The sample was composed of 801 Brazilians, 431 females (53.8%) and 370 males (46.2%). The respondents came from the five macro-regions of Brazil (8% North, 28% Northeast, 36% Southeast, 18% South, and 10% Central-West). Ages ranged from 20 to 50 years ($M = 34.35$ years, $SD = 8.41$) and were divided into three groups: 20–29 (36.1%), 30–39 (33.7%), 40–50 (30.2%). Over half of the sample had children (56.2%).

The inclusion criteria were: Brazilian, over 18 years old and access/familiarity with computer/tablet for internet use. The survey was conducted by a Research Institute (Netquest), between April and June of 2018, using quota sampling defined by sex, age, and social class. The study was approved (Protocol Number 80833817.6.0000.5561) by the Research Ethics Committee on Human Beings of the Institute of Psychology at the University of São Paulo.

2.2. Measures

2.2.1. Socio-demographic data form

The socio-demographic data form collected information regarding sex, age, marital status (single, cohabiting, married, divorced, widow/er), parenthood (childless, with children), region of residence (North, Northeast, Center-West, Southeast, South), household type (house, apartment) and status (owner, renter), educational level (elementary school, high school, some college, complete college), and monthly familiar income (<R\$2,000; R\$2,000–R\$4,000; R\$4,000–R\$8,000; >R\$8,000; 1 US Dollar = 5.13 Brazilian Reais).

2.2.2. Pet ownership status

A single-item 'yes' or 'no' question was designed to ascertain pet ownership.

2.2.3. Well-being self-report measures

Respondents were asked, on a 11-point rating scale with verbal anchors in each pole, to report their: Sleep quality (*Do you sleep well? 0 - I do not sleep well to 10 - I sleep extremely well*); Physical fitness (*Are you in good physical shape? 0 - I am in terrible physical shape to 10 - I am in great physical shape*); Sadness (*Are you a sad person? 0 - Not sad at all to 10 - Extremely sad*); Depression (*Do you feel depressed in your life? 0 - Not depressed at all to 10 - Extremely depressed*); Personal life's organization (*Are you an Organized Person? 0 - Not organized at all to 10 - Extremely organized*); Relationships with neighbors (*How are your relationships with neighbors? 0 - Not good to 10 - Extremely good*); and Life satisfaction (*Thinking about your life nowadays, how satisfied are you? 0 - Not satisfied at all to 10 - Extremely satisfied*). Negatively-worded items (Sadness and Depression) were reverse coded before analysis, so that high values express better well-being, that is, lower sadness and depression. The questionnaire used in his study is available as supplementary file (Appendix 1). These questions about well-being took part of the CPBEC material which assessed opinions and attitudes of Brazilian population according to the Organization for Economic Co-operation and Development (OECD) Guidelines on Measuring Subjective Well-being.

2.2.4. Satisfaction with Life Scale

Respondents also evaluated their life satisfaction through the validated Brazilian version of Diener's 5-item Satisfaction with Life Scale (SWLS). It includes items such as "In most ways, my life is close to my ideal" and "So far, I have gotten the important things I want in life", using a 7-point scale that ranges from 1 strongly disagree to 7 strongly agree (Diener et al., 1985; Zanon et al., 2013).

2.3. Statistical analyses

Statistical analyses were conducted using the software Statistical Package for Social Sciences, version 26 (SPSS 26). In all analyses, the significance level adopted was 5%. Initially data screening was carried out to check data integrity, by verifying inconsistencies, improbable response patterns (e.g., same response to most items) and missing values (Osborne, 2013). There were no missing data, but in total five cases considered outliers in their response patterns were filtered out, which resulted in $N = 801$. The chi-square test of independence compared the proportion of respondents that owned or not a pet regarding to nine categorical socio-demographic characteristics (sex, age group, region of residence, residence type, residence status, marital status, educational level, familiar income, and parenthood). A multivariate logistic analysis considered pet ownership as the response and included the variables that were significant in the previous univariate analyses as predictors (sex, parenthood, and residence type). All odds ratio's and respective confidence intervals presented were obtained from the logistic regression. In addition, comparisons of pet owners and non-pet owners on each of the *Self-report Well-being measures* (physical fitness, sleep quality, sadness, depression, personal life's organization, and relationship with neighbors)

were performed using the Mann-Whitney U test (Deshpande et al., 2017). Since sex factor was associated with some of these measures, comparisons between pet and non-pet owners were performed separately by sex.

3. Results

Sixty percent of the respondents owned pets ($\chi^2 = 29.225$, $N = 801$, $df = 1$, $p < 0.001$).

3.1. Socio-demographic characteristics assessed in relation to pet ownership

Table 1 presents socio-demographic data. Residence type was found to be significantly related to pet ownership (Figure 1). The odds of owning a pet for a respondent who lived in a house was 2.338 times higher (95% CI: 1.531–3.570) than for a respondent who lived in an apartment. In addition, residence status had just a marginally significant effect. Residence owners had higher odds of owning pets than renters. Family income had also just a marginally significant effect. There were fewer pet owners in the lowest income range (<R\$2,000) in comparison to the second income range (R\$ 2,000–4,000). No significant association

Table 1. Demographics of respondents in relation to pet ownership status.

Demographics characteristic	Category	Pet ownership				χ^2	df	p
		No		Yes				
		n	%	n	%			
Residence type	House	231	37.1	392	62.9	14.399	1	.000
	Apartment	60	56.6	46	43.4			
Residence status	Owner	180	37.6	300	62.4	3.242	1	.074
	Renter	111	44.5	137	55.5			
Familiar income	< R\$2,000	129	45.4	155	54.6	6.978	3	.073
Range	R\$2,000-R\$4,000	79	34.1	153	65.9			
	R\$4,000-R\$8,000	42	40.8	61	59.2			
	>R\$8,000	12	37.5	20	62.5			
Parenthood	With children	196	43.6	254	56.4	4.113	1	.043
	Childless	128	36.5	223	63.5			
Sex	Women	160	37.1	271	62.9	4.286	1	.038
	Men	164	44.3	206	55.7			

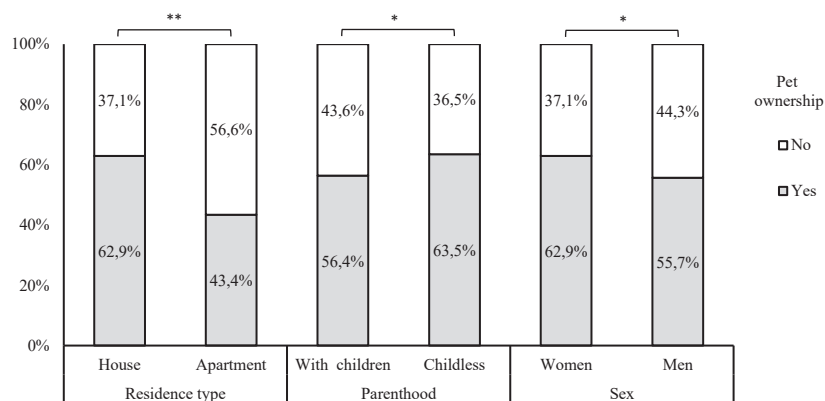
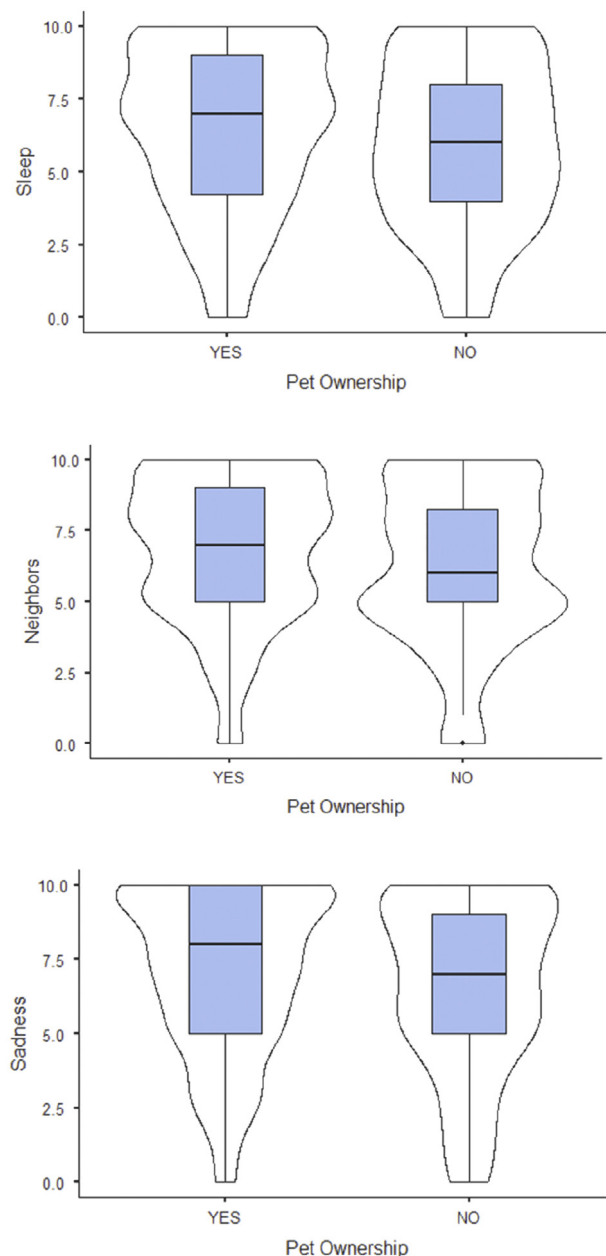


Figure 1. Proportion of pet owners and non-pet owners associated to residence type, parenthood and sex (** $p < 0.001$, * $p < 0.05$).

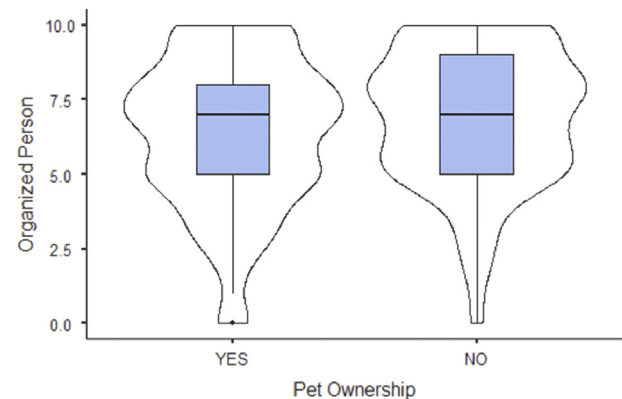
Table 2. Multivariable logistic regression model of factors associated with pet ownership.

Predictor	B	S.E.	Wald	df	Sig.	95% CI for Exp (B)	
						Lower	Upper
Sex	.272	.154	3.131	1	.077	.971	1.774
Children	-.341	.157	4.727	1	.030	.523	.967
Residence type	.849	.216	15.470	1	.000	1.531	3.570

**Figure 2.** Violin plots comparing male pet owners and non-pet owners regarding relationship with neighbors, sleep quality and sadness.

with pet ownership was found for educational level nor for region of residence (Appendix 2).

A significant sex effect was found (Figure 1) with women presenting 1.313 greater chances of owning a pet (95% CI: 0.971–1.774) than men. A significant parenthood effect was also found (Figure 1). The odds of owning a pet for a respondent that had children was 0.711 times smaller (95% CI: 0.523–0.967) than for childless respondents. No significant

**Figure 3.** Violin plots comparing female pet owners' and non-pet owners' level of self-organization.

association with pet ownership was found for marital status nor for age (Appendix 2).

In addition, only the significant socio-demographic variables found by the Chi-square tests (residence type, parenthood, and sex) were included into the multivariate logistic regression model as predictors (see Table 2). The Hosmer-Lemeshow goodness-of-fit criterion suggested that the final logistic regression model was well fitted ($p = 0.884$).

3.2. Well-being self-reported measures associated with pet ownership

Significant differences were found between males and females for sadness (Mann–Whitney U test, $U = 64057.5$, $p < 0.001$), and depression (Mann–Whitney U test = 68750, $p = 0.001$). Males reported more absence of Sadness (Median males = 7, IQR = 5–9; Median females = 6, IQR = 4–8) and Depression (Median males = 7, IQR = 4–10; Median females = 6, IQR = 3–9). Separating the sample by sex, we found an interaction effect between pet ownership and sex. Among males ($N = 370$), pet owners reported better relationships with neighbors (Mann–Whitney U test, $U = 14668.5$, $p = 0.028$), better sleep quality (Mann–Whitney U test, $U = 14924.5$, $p = 0.005$) and tended to report less sadness (Mann–Whitney U test, $U = 15165.5$, $p = 0.088$) than non-pet owners (Figure 2). For males, pet and non-pet owners did not differ regarding physical fitness, depression and personal life's organization. Among females ($N = 431$), pet owners reported somewhat worse organization of personal life than non-pet owners (Mann–Whitney U test, $U = 24581$, 0.019) (Figure 3); females, pet and non-pet owner, did not differ for all other well-being measures. With respect to life satisfaction, no differences were found between pet owners and non-pet owners, neither for the sample as a whole, nor for the sex-segmented sample.

4. Discussion

In short, our study showed that: (1) pets were present in more than half of the Brazilian homes (60%), (2) to be a homeowner and childless enhanced the odds of owning a pet, and (3) men who owned a pet presented better well-being indicators (better sleep quality, better relationships with neighbors, and less sadness) than women (lower life organization).

Five socio-demographic variables (residence type and status, family income, sex, and parenthood) distinguished pet owners from non-pet owners. Respondents who resided in houses were more likely to be pet owners than those who lived in apartments, probably due to space availability. This was found in other studies, in Brazil (Serafini et al., 2008), and also in Ireland (Hepper and Wells, 1997; Downes et al., 2011). In addition, in our study renters tended to report less pet ownership compared to homeowners. There are rental agreements that contain no-pet clauses. Although there is no law that specifically addresses the issue of pets, the homeowner has the right to deny rent to anyone for whatever reasons he/she wishes because the residence is his/her property. The same happens in US where, according to O'Reilly-Jones (2019), homeowner-imposed restrictions disproportionately impact low-income renters.

Although the sex difference regarding pet ownership was relatively small, we found that females had higher chances to be pet owners than males. In surveys conducted in 11 Eurasian countries (Phillips et al., 2011) and in US (Dotson and Hyatt, 2008), females were the pets' primary caregivers. This may have also happened in our study, but, to know for sure, this question should be examined more directly in future studies.

In our study, childless respondents were more likely to own a pet compared to those who had children. This result is in line with the idea that pets can serve as substitutes for friends, spouses or children, especially in today's society where people feel socially isolated and have fewer children (Chur-Hansen, 2010; Antonacopoulos and Pychyl, 2010). In summary, in the current study, pet owners tended to live in houses, to be homeowners, females, and childless.

We further investigated the relationship of pet ownership and sex with well-being self-reported measures. This analysis showed that females, regardless of pet ownership status, reported somewhat more depression and sadness than males. These results are consistent with findings from other studies that have shown that females experience more negative emotions (Else-Quest et al., 2012), and are more vulnerable to develop general anxiety disorder, post-traumatic stress, and depression than males (Kessler, 2003; Victor et al., 2017). In our study, we found interaction between pet ownership and sex. However, contrary to our expectation (see Clark Cline, 2010), we found that pet ownership was associated with better sleep quality, better relationships with neighbors and less sadness among men, and lower life organization among women. Other studies showed that pet owners, regardless of sex, fell asleep more easily than non-pet owners (Coleman et al., 2008; Mein & Grant, 2018). Pets may provide humans with opportunities of: (a) social interaction and closeness (being represented here by better relationships with neighbors), and (b) worth reassurance and feelings of protection (being represented here by less sadness) (e.g., Staats et al., 2008). These opportunities may also mediate the better quality of sleep associated with animal companionship. Some pet owners may share their beds with dogs, and this may promote good sleep via increased feelings of comfort and security. Future studies could investigate the association with the place where pets sleep in the house among pet owners. Finally, we highlight that the lower level of life organization reported by female pet owners was an unexpected result. Allen, Kellegrew, and Jaffe (2000) found that pet owners structured more their everyday lives, becoming more and not less organized. However, we could consider that non-pet owners may prioritize a neat and clean home, whereas pet owners may prioritize mitigation of social isolation (Fishbein and Ajzen, 1975). Although pet ownership can bring more structure to daily routines, when life is too busy, having a pet can represent a burden for the pet's primary caregiver, disorganizing daily routines. This is a hypothesis that should be investigated in future studies. In the present study, pet owners did not differ in life satisfaction from non-pet owners, neither considering the single-item life satisfaction measure used nor Diener's 5-item Satisfaction with Life Scale (SWLS). This result is different from Applebaum et al. (2020) online survey, that found that American adults who owned a pet were more satisfied with their lives than non-pet owners (Bao & Schreer, 2016).

Our study was conducted before the Covid-19 pandemic. The survey can be reapplied during and after the pandemic, so that we can deepen our knowledge of the socio-demographic characteristics and subjective well-being indicators associated with pet ownership. Life perspectives and motivational priorities may change in times of great challenges that bring growing mental health concerns. The value of a pet's company may be rethought. There may be increasing recognition of their positive impact on human health and subjective well-being as human social distancing increases. At the time of this publication, infectious diseases specialists do not have evidence that companion animals can spread COVID-19 to other animals or to people (AVMA, 2020).

4.1. Limitations and future research

One limitation of our study is that the survey offered only one question about pet ownership, with a "yes" or "no" answer choice that did not allow respondents to tell what type of pet they owned. Moreover, to establish causal associations on pet ownership and mental health, it would be necessary to implement a longitudinal study comparing repeated well-being self-reports from pet owners and non-pet owners, controlling both groups by sociodemographic characteristics, to identify what kind of mental health improvement could be attributed, in fact, to pet ownership.

Declarations

Author contribution statement

R. Defelipe: Performed the experiments; Contributed reagents, materials, analysis tools or data; Wrote the paper.

C. Savalli: Analyzed and interpreted the data; Wrote the paper.

E. Otta: Conceived and designed the experiments; Analyzed and interpreted the data; Wrote the paper.

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Competing interest statement

The authors declare no conflict of interest.

Additional information

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