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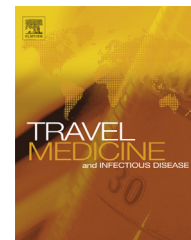
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# Factors associated with non-use of condoms in an online community of frequent travellers

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## KEYWORDS

Travel;  
Unsafe sex;  
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diseases;  
Latin America

**Summary** *Background:* Millions of travellers around the world have gathered together into online communities. The objective is to analyse the factors associated with risky sexual behaviour among travellers.

*Methods:* Cross-sectional study was conducted within an online community of travellers using an online survey; we included travellers who had engaged in sexual activity while on their last trip. Risky sexual behaviour was defined as inconsistent condom use (<100%), and the factors associated were evaluated using the prevalence ratio (PR).

*Results:* Of the 468 participants, 245 had sex during their last trip. 59.7% did not consistently use condoms, and one out of every four participants reported never using condoms. Having a travel destination of Latin America or the Caribbean was significantly associated with inconsistent condom use. This association was maintained (PR 1.37, CI 95% 1.06–1.77) after adjusting for gender, age, migration, the presence of travel partners, and the use of drugs and alcohol prior to sexual activity.

*Conclusion:* An association was observed between travel destination (specifically Latin America or the Caribbean) and risky sexual behaviour. For this reason, tourists should be educated in STI transmission and regional STI and HIV incidences both before and during their travels; public health systems ought to work together with travel agencies, international airports, etc., in order to distribute this information and ensure a responsible travel experience.

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## 1. Introduction

An undeniable phenomenon in the modern world is the growth and mobility of populations outside of their native countries. In 2013, the World Tourism Organisation (WTO) estimated that the number of tourists reached 1087 million individuals, a figure that represents a 5% growth from the previous year [1]. One important consequence of this increasingly mobile population is the fact that these individuals can transmit infections in the locations they visit and can spread new infectious diseases or resistant strains of known diseases in their home country [2,3]. Among such diseases, sexually transmitted infections (STIs) are of particular concern due to the fact that almost 50% of tourists travelling abroad are acquiring new sexual partners and having unprotected sexual intercourse [1,2].

In analysing STI transmission among travellers, the role of risky sexual behaviours in the spread of STIs should not be overlooked [2]. Although there is no consensus definition of risky sexual behaviour, a series of proxy measures have been proposed for measuring risky sexual behaviour. According to several authors, risky sexual behaviour directly depends on the number of sexual partners, condom use, and the use of drugs prior to performing a sexual act [4]; also, the age of first sexual experience [5], and the number of new sexual partners [6] have been reported.

A series of published studies have identified several factors that influence risky sexual behaviour during travel, including travel patterns (e.g., solo travel, travelling with others of the same sex, and short travel time) [7], relationship status during travel and STI/HIV diagnosis in the past 5 years [8], a pre-travel history of multiple partnerships [2], the availability of sexual services in the travel destination [9], and high purchasing power [10]. In regard to this, a question rises on whether travel destination may have a role in the increase of risky sexual behaviour beside other travel characteristics mentioned previously.

Online communities of travellers, such as *Couchsurfing*, represent important sites for the analysis of risky sexual behaviour because these types of websites attract millions of individuals who frequently travel to numerous destinations across the globe; through these social media websites, they are able to share their experiences (e.g., photos, videos, commentaries, etc.), suggest travel destinations, participate in cultural events and, most importantly, help their fellow members find a place to stay [11], all those may have an influence in their behaviour.

Consequently, the primary objective of the present study is to identify the factors associated with risky sexual behaviour among members of such communities. In particular, the association between travel destination and risky sexual behaviour will be evaluated.

## 2. Methods

### 2.1. Design and population

An analytical cross-sectional study was conducted that examined members of *Couchsurfing*, an online community of travellers. This online community brings together more than three million travellers from all parts of the world and

allows them to seek accommodations from other members of the community during their travels. The *Couchsurfing* website groups members according to their city of residence, and the current study examined English-speaking members from the most populated cities in North America and Europe who had travelled at least once in the past 12 months. Individuals that were minors were excluded, as were those who did not give informed consent.

### 2.2. Sample size

The *Power Analysis and Sample Size* (PASS, 2008) program was used to calculate the appropriate sample size. With an alpha of 0.05 and assuming 80% power, a sample size of 250 was shown to be required to detect an association strength of 2.04 [12] or higher, given the proportion of 41.7% of affected individuals who were not exposed and 52.9% who were exposed.

### 2.3. Questionnaire and definition of variables

The response variable was inconsistent condom use during sexual activity. Most studies tend to extend their definition of condom use, for example, a study conducted in South Africa used a score consisting of three items: "always", "sometimes" and "never" [12]. However, given that the World Health Organisation (WHO) has reported that condoms must be used during 100% of sexual activity to effectively prevent STIs, for the purposes of the current study, inconsistent condom use was defined as condom use at a frequency less than 100% during sexual activity [4].

To examine the variables related to the use of alcohol and drugs prior to sexual activity, questions were drawn from the *Youth Risk Behaviour Survey* from the Centers for Disease Control and Prevention (CDC) in the United States [14,15].

The most recent travel destinations of the study participants over the 12 months prior to the study were grouped into the following regions: North America, Africa, Latin America and/or the Caribbean, Europe, Asia, and Oceania. In addition, several other exposure variables were examined, including gender (female/male), age (years), and the use of alcohol and/or drugs (yes/no) prior to sexual activity.

### 2.4. Data collection

The survey was developed using the *Survey Monkey* program, and a link was generated with the electronic web address. The 20 cities in North America and the 20 cities in Europe with the highest number of *Couchsurfing* members were selected, and members from these cities were subsequently invited to participate in the study through an advertisement on the main page. The data collection period lasted one month and was conducted between February and March of 2012.

### 2.5. Data analysis

The database was downloaded from the *Survey Monkey* site in *Excel* format and was imported into STATA 11.0 for

Windows following a quality check. Shortly thereafter, the population was described using measures of central tendency (mean and median), distribution (standard deviation (SD), and interquartile range (IQR) for numeric variables. For the categorical variables, the frequencies and percentages were reported. Next, a bivariate analysis was conducted using chi-squared and Fisher's exact tests for the corresponding categorical variables, and the significance level was set at  $p < 0.05$ . The crude and adjusted prevalence ratio (PR) values were calculated with their respective confidence intervals using Poisson regression analysis with robust error variance.

## 2.6. Ethical considerations

This study was approved by the Ethics Committee of the Universidad Peruana de Ciencias Aplicadas (UPC) in Lima, Peru, and permission was granted by the administrators of the *Couchsurfing* website to conduct the study. Furthermore, the informed consent process was designed to specify that the survey was anonymous and that participation was voluntary. Individuals were only allowed to begin the full survey after they had provided informed consent to participate in the study.

## 3. Results

Of the contacted population of 626 individuals, four refused to participate in the study, seven were eliminated because of their age, and 144 registered participants were excluded for not completing the survey. Thus, the final number of individuals included in the study was 468 (Fig. 1).

With regards to the demographic characteristics of the population, the majority of the study participants (60.0%) were women. The mean age was  $27 \pm 8.2$  years. In addition, approximately 20% of the survey respondents reported being bisexual/homosexual. Finally, most participants resided in Europe (57.5%), while 32.5% lived in North America.

Regarding travel destinations, 36.54% of the study participants travelled outside of their region of origin for their

most recent trip. The median travel duration was four weeks (IQR 2-12), and the median daily expense was 30 American dollars (IQR 20-70). The majority of survey respondents (61.1%) reported being single during the time of their last trip, and 54.5% travelled for tourism. Approximately one-third (33.6%) of the study participants selected a private residence for the location of their stay, and 22.4% were hosted by another *Couchsurfing* member. Finally, 44.7% of the participants travelled with companions, and the median number of travel companions was one (IQR 1-2) (Table 1).

Regarding sexual behaviour, approximately half (52.4%) of the population included in this study had sex during their most recent trip. The median number of sexual partners was one (IQR 1-2). Most travellers (96.8%) reported having sex with locals or other travellers, while only 3.2% engaged in sexual activity with sex workers. The median number of sexual encounters reported during this most recent trip was three (IQR 1-8.8), and 10.6% of all sexual encounters were homosexual.

With regards to risky sexual behaviour, the majority of the population (59.7%) did not practice consistent condom use during their most recent trip. Specifically, one out of every four participants reported never having used a condom during their sexual encounters. Moreover, the majority (61.7%) of survey respondents reported having consumed alcohol before engaging in sexual activity. However, the majority of participants (60.4%) reported being sober on the occasions in which they engaged in sex. With regards to drug use, a large majority (85.4%) confirmed not having used any type of drug prior to their sexual encounters. Of the population that reported having used drugs prior to sex (14.6%), most (63.6%) reported using cannabis (Table 2).

Table 3 shows the results of the bivariate analysis. This analysis established that travelling alone, travelling with a partner, and travelling to Latin America or the Caribbean were statistically associated ( $p < 0.05$ ) with inconsistent condom use during sexual activity. No significant associations were observed ( $p > 0.05$ ) for the variables of sex, age, city of origin, reason for travel, accommodation, sexual orientation, duration of travel, daily travel expenses,

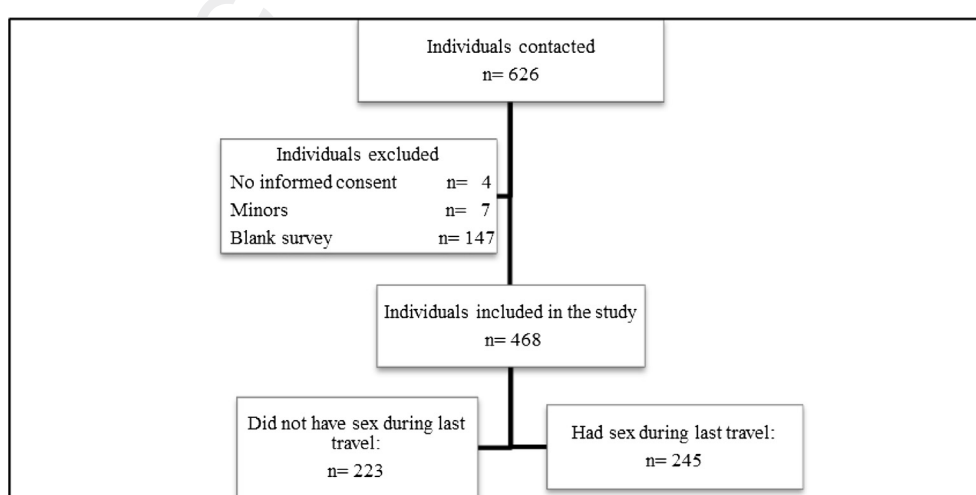


Figure 1 Flowchart of population study.

**Table 1** Demographic characteristics and characteristics of the most recent travel destination among an online community of travellers ( $n = 468$ ).

Variables	$n^a$ (%)
<b>Demographic characteristics</b>	
Male	187 (40.0)
Age (Mean, SD)	27.6 ( $\pm 8.2$ )
In a relationship	174 (37.2)
Sexual orientation	
Heterosexual	375 (80.8)
Bisexual	62 (13.4)
Homosexual	27 (5.8)
Place of residency	
Europe	265 (57.5)
North America	150 (32.5)
Asia	25 (5.4)
America or the Caribbean	16 (3.5)
Oceania	4 (0.9)
Africa	1 (0.2)
<b>Characteristics of the last point of travel</b>	
Destination	
Europe	276 (59.7)
North America	83 (18.0)
Latin America or the Caribbean	47 (10.2)
Asia	39 (8.4)
Africa	11 (2.4)
Oceania	6 (1.3)
Reason for Travel	
Tourism	255 (54.5)
Visiting family	55 (11.8)
Business	49 (10.5)
Other	109 (23.3)
Accommodations	
Hotel/Hostel	173 (36.9)
Private residence	157 (33.6)
Couchsurfing member	105 (22.4)
Other	31 (7.0)
Travelled outside region of residency	167 (36.5)
Travelled alone	259 (55.3)
Duration of travel in weeks (median, IQR)	4 (2–12)
Daily expenses (US) (median, IQR)	30 (20–70)
Number of travel companions (median, IQR)	1 (1–2)

<sup>a</sup> Some numbers may not add up to 468 due to missing values.

homosexual encounters, or the consumption of alcohol and/or drugs prior to sexual activity.

The results of the multivariate analysis are shown in [Table 4](#). After adjusting for sex, age, migration, and the use of alcohol and/or drugs, having travelled to Latin America or the Caribbean was shown to be significantly associated with an increased risk of inconsistent condom use (PR: 1.37; 95% CI 1.06–1.77).

#### 4. Discussion

The current results reveal that nearly 60% of individuals who engaged in sex during their last travel did not consistently use condoms. The present study demonstrates that

**Table 2** Characteristics of sexual behaviour during the last point of travel among members of an online community of travellers ( $n = 245$ ).

Variables	$N$ (%)
Number of sexual partners during travel (median, IQR)	1 (1–2)
Number of sexual encounters (Median, IQR)	3 (1–8,8)
Type of sexual partner <sup>a</sup>	
Locals	130 (46.8)
Other travellers	139 (50.0)
Sex workers	9 (3.2)
Homosexual encounters	26 (10.6)
Condom use	
Consistent	92 (40.4)
Inconsistent	37 (59.6)
Alcohol before sex	
Yes	140 (61,7)
No	87 (38.3)
Condition after alcohol ingestion	
Sober	84 (60.4)
Intoxicated	53 (38.1)
Unconscious	2 (1.4)
Drug use	
Yes	33 (14.6)
No	193 (85.4)
Type of drug	
Amphetamines	3 (9.1)
Cannabis	21 (63.6)
Cocaine	2 (6.1)
Others	7 (21.2)

<sup>a</sup> This question is multiple choice.

travel to Latin America or the Caribbean was associated with a 44% increase in the prevalence of not using condoms in all sexual encounters, even after adjusting for the variables of sex, age, travel outside of the region of origin, and the use of alcohol and/or drugs prior to sexual activity. The results of multivariate analysis also revealed that travelling with a partner increases the rate of inconsistent condom use, which might be expected given that the risk of STI transmission is lower for individuals in a stable relationship; in a study analysing the dynamics of condom use in heterosexual males in Thailand, it was determined that being married and being in a long relationship (over 90 days) were both associated with decreased use of condoms [16].

According to the WHO, the efficacy of condoms to decrease STIs requires that condoms be used consistently [4]. Numerous studies have reported the rate of condom use in the general population. For example, Brazil's Ministry of Health found that 63% of men and 69% of women reported using a condom during their last sexual encounter [18]. Nonetheless, beyond simply reporting the rate of condom use in the general population, it is important to identify populations at high risk for contracting STIs, especially during situations associated with an increased risk of acquiring STIs, such as while travelling [17,19,20].

A cross-sectional study of travellers in Hong Kong reported a frequency of inconsistent condom use of 53% when examining the most recent travel experience within the

**Table 3** Variables associated with inconsistent condom use during sexual encounters at the last point of travel.

Variable	Inconsistent condom use	Consistent condom use	<i>p</i>
	( <i>n</i> = 136)	( <i>n</i> = 92)	
	<i>n</i> (%)	<i>n</i> (%)	
<b>Sex<sup>a</sup></b>			
Male	61 (57.6)	45 (42.5)	0.546
Female	75 (61.5)	47 (38.5)	
<b>Origin<sup>b</sup></b>			
North America	51 (68.0)	24 (32.0)	0.148
Europe	66 (54.6)	55 (45.5)	
Latin America/ Caribbean	7 (77.8)	2 (22.2)	
Asia	9 (64.3)	5 (35.7)	
Oceania	1 (25.0)	3 (75.0)	
<b>Destination: Latin America or the Caribbean<sup>a</sup></b>			
Yes	23 (82.1)	5 (17.9)	0.011
No	112 (56.9)	85 (43.2)	
<b>Travel outside region of origin<sup>a</sup></b>			
Yes	58 (62.4)	35 (37.6)	0.572
No	75 (58.6)	53 (41.4)	
<b>Reason for travel<sup>b</sup></b>			
Business	8 (38.1)	13 (61.9)	0.081
Tourism	73 (58.4)	52 (41.6)	
Visiting family	18 (75.0)	6 (25.0)	
Other	37 (63.8)	21 (36.2)	
<b>Sexual Orientation<sup>b</sup></b>			
Heterosexual	105 (57.7)	77 (42.3)	0.445
Bisexual	21 (70.0)	9 (30.0)	
Homosexual	9 (60.0)	6 (40.0)	
<b>Person with whom travelled<sup>a</sup></b>			
Solo	61 (46.9)	69 (53.1)	0.020
Friends	24 (60.0)	16 (40.0)	
Partner	43 (74.1)	15 (25.9)	
<b>Homosexual Encounters<sup>a</sup></b>			
Yes	15 (57.7)	11 (42.3)	0.829
No	121 (59.9)	81 (40.1)	
<b>Hosted by a Couchsurfing member</b>			
Yes	26 (50.0)	26 (50.0)	0.106
No	110 (62.5)	66 (37.5)	

Some numbers may not add up due to missing values.

<sup>a</sup> Chi squared.

<sup>b</sup> Fisher's Exact test.

past 12 months [19]. This study of travellers in Hong Kong is quite similar to the current study in terms of the population characteristics and the primary findings, which are largely consistent with our results. However, another cross-sectional study conducted with travellers (backpackers) in Australia reported a frequency of inconsistent condom use of 78%, which is higher than that observed in the present study [21]. In contrast, a cross-sectional study of a sample of 45 travellers returning from tropical destinations reported that none of the participants practised consistent condom use (40% confirmed irregular use, and 60% never used condoms). However, this finding is likely due to the smaller sample size than the previously cited studies [19,21,22].

A cross-sectional study was conducted using a self-administered survey with a sample of 2540 travellers who had visited the city of Cuzco, Peru. They reported a 69.3% rate of consistent condom use, although 93.4% of the participants had previously responded on the survey that they had planned to use a condom in the event of sexual activity [23]. This difference obligates us to reflect on the factors that affect consistent condom use, especially in the present study, in which a statistically significant association was observed between consistent condom use and the selection of Latin America or the Caribbean as a travel destination.

Based on a review of the literature, this association could be due to the great majority of travellers only being knowledgeable about the high prevalence of HIV infections that result from casual sexual encounters of tourists in other parts of the world (i.e., Sub-Saharan Africa, South-east Asia, and India) [24]. If, in fact, they underestimate the possibility of contracting STIs in Latin America, travellers might be expected to be more likely to use a condom in regions of the world where they know HIV rates to be highly prevalent.

Recently, several studies have been published regarding the risks encountered by volunteers who travel as part of international social projects. These studies have shown that volunteers who travel to participate in social projects in Latin America and the Caribbean showed a higher frequency of new sexual partners than those who travelled to other destinations [25]. According to the authors, this was due to the local attitudes about sexuality, as well as the knowledge of the transmission of HIV and other STIs in Africa and Asia. For instance, in a communication given to the British general public in 2012, the British HIV Association reported that 15% of all new HIV infections between 2002 and 2010 were produced abroad, with the most common

**Table 4** Factors associated with condom use in an online community of travellers who had sex during their most recent trip.

Variables	Crude <sup>a</sup>	<i>p</i>	Adjusted**	<i>p</i>
	PR (95% CI)		PR (95% CI)	
Destination Latin America or the Caribbean	1.44 (1.17–1.79)	0.001	1.37 (1.06–1.77)	0.016
Person with whom travelled				
With partner	1.40 (1.12–1.74)	0.003	1.43 (1.11–1.84)	0.006
With friends	1.13 (0.84–1.53)	0.425	1.13 (0.84–1.53)	0.410
Alone	1.00		1.00	

<sup>a</sup> Adjusted for gender, age, migration, use of alcohol and drugs.

locations being Thailand and South Africa, popular travel destinations in both Asia and Africa respectively [26].

Another important finding of the current study involved the consumption of alcohol and/or other drugs prior to sexual activity. Regarding the consumption of alcohol, three out of every five individuals who had sex during their most recent trip reported having ingested alcohol before sex. However, only 40% confirmed being intoxicated as a consequence of said ingestion. With regards to drug use, approximately 15% reported having used drugs before sex. It is fitting to highlight the fact that both of these behaviours have been described in the literature as factors associated with risky sexual behaviour and STI transmission [4,27].

#### 4.1. Limitations

This study has several limitations. First, because this is a cross-sectional study, it cannot be used to establish causal relationships. However, our results are similar to those of other cross-sectional studies with larger sample sizes [19,21]. We recommend conducting additional studies in the future to evaluate other factors, such as the intrinsic sexual behaviour of each individual. Because we did not have access to a list of community members, we decided to use a non probabilistic sample.

Also, given that the members of *CouchSurfing* may not represent the average traveller, our results are not generalizable to tourists engaging in unprotected sex abroad.

Regarding potential bias, there is a possibility of recall bias because of the fact that the variables were studied retrospectively. For this reason, we decided to limit the interval of variables to the most recent travel experience within the past 12 months. In addition, social desirability bias may have played a role because of the fact that the survey dealt with the sensitive topic of human sexuality. Nonetheless, the risk of this type of bias is minimised by the fact that the survey was anonymous and self-administered.

#### 5. Conclusion

Despite its limitations, this study identified an association between travel destination, in this case Latin America or the Caribbean, and risky sexual behaviour. This result is consistent with previous studies reported in the literature. For this reason, tourists should be educated in STI transmission and regional STI and HIV incidences both before and during their travels; public health systems ought to work together with travel agencies, international airports, etc., in order to distribute this information and ensure a responsible travel experience.

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#### Conflict of interest

None.

#### Uncited reference

[13].

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