RESEARCH ARTICLE

Frequency and associated factors related to sexual addiction in medical students from 16 Latin American cities, 2016: a regional multicentric study [version 1; peer review: 1 approved, 1 approved with reservations]

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Abstract

Background: Examples of addiction problems that have been reported in growing populations are those related to sexual impulses and addictions. However, such studies have not been carried out in Latin America. The aim of this study was to characterize and identify possible associations of sexual addiction in medical students in Latin America.

Methods: An analytical cross-sectional study was carried out among the university students of a medical school in 16 cities; students of medical schools were interviewed during the first semester of 2016. To define sexual addiction, the multi-cage cad-4 test was used, categorizing individuals as possibly or not a potential problem. Additionally, associations with several social and educational variables were obtained.

Results: In our study, 6% (221) of the 3691 respondents exhibited a possible problem of sexual addiction; men had 95% more problems (95% confidence interval (95%CI): 21-214, p=0.006), for each year of age it increased by 9% (95%CI: 1-18%, p=0.034), those who had a partner were 67% more likely to exhibit sexual addiction (95%CI: 1.34-2.08%, p <0.001) and those who professed a religion present 44% less frequency (95%CI: 20-60%, p: 0.001). When adjusted for marital status, having children, year of studies, and the university where the

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Approval Status

	1	2
version 1		
11 Feb 2020	view	view

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University of Ibadan, Ibadan, Nigeria

Any reports and responses or comments on the article can be found at the end of the article.

respondent studied were not associated.

Conclusion: Although the percentage of students who had problems with sexual addiction is minimal, screening programs should be created to find students who suffer from these problems, to avoid the possible consequences that may arise.

Keywords

Sexual addiction, risk factor, medical students, sexual behavior

This article is included in the **Addiction and Related Behaviors** gateway.

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Author roles: **Mejia-Alvarez CR:** Conceptualization, Data Curation, Formal Analysis, Investigation, Project Administration, Software, Validation, Visualization, Writing – Original Draft Preparation, Writing – Review & Editing; **Chacon-I J:** Conceptualization, Data Curation, Investigation, Methodology, Project Administration, Supervision, Validation, Writing – Original Draft Preparation, Writing – Review & Editing; **Benites-Gamboa D:** Conceptualization, Formal Analysis, Investigation, Methodology, Project Administration, Resources, Software, Supervision, Writing – Original Draft Preparation, Writing – Review & Editing; **Pacheco-Barrios N:** Conceptualization, Data Curation, Investigation, Methodology, Project Administration, Visualization, Writing – Original Draft Preparation, Writing – Review & Editing; **Castillo-Tarrillo GF:** Conceptualization, Methodology, Project Administration, Visualization, Writing – Original Draft Preparation, Writing – Review & Editing; **Centeno-Leguía D:** Conceptualization, Data Curation, Investigation, Methodology, Project Administration, Resources, Writing – Original Draft Preparation, Writing – Review & Editing; **Wendell-Cubilla J:** Conceptualization, Data Curation, Investigation, Methodology, Project Administration, Resources, Visualization, Writing – Original Draft Preparation, Writing – Review & Editing; **Grandez-Urbina JA:** Writing – Original Draft Preparation, Writing – Review & Editing

Competing interests: No competing interests were disclosed.

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Introduction

Throughout life, young people experience a series of changes, including biological, cognitive and psychosocial type changes, which are influenced by various factors, such as gender, social, cultural, political and economic environment, as well as the level of physical and psychosocial/cognitive maturity of the person¹. Some studies have found that by submitting these young people to stressful environments can trigger them to be disinhibited, which leads them to adopt risky behaviors^{1,2}. It is essential to know that one of the populations with the most considerable stress and interpersonal relationships is the students³. If early sexual initiation and the non-use of protective measures are added to this, it becomes an immediate health problem⁴, especially if these individuals have had an inadequate sexual education⁵.

Some studies have explored the sexual sphere of university students, for example, in Turkey, this topic was characterized, and other topics considered “taboo” for their culture were touched⁶. In Finland, thousands of university students were surveyed to determine continuity/frequency according to age group⁷, another one performed in India measured sexual knowledge and practices⁸. All of these studies highlight the importance of the student having an adequate orientation for the correct expression of their sexuality. In the future, this will help them to advise their patients, allowing them to establish better interactions and communication with them⁹. In Latin America, the studies performed in the sexual sphere try to link the sexual behavior with factors that could influence this behavior, finding only one study, performed in Colombia, that analyzes this relationship through the lifestyle of university students¹⁰. For all these reasons mentioned, the objective of the study was to characterize and find the associations of sexual addiction that medical students have in Latin America.

Methods

Study background

We performed an analytical cross-sectional study; this was based on the data that was generated after the application of surveys to medical students from 16 cities in Latin America.

The students resided in the cities of David, Panama; San José, Costa Rica; Tucumán, Argentina; Ciudad Bolívar, Venezuela; Tunja, Colombia; Bogotá, Colombia; Cochabamba, Bolivia; Tarija, Bolivia; Arequipa, Peru; Metropolitan Lima, Peru; Ayacucho, Peru; Ica, Peru; Chiclayo, Peru; Cusco, Peru; and Huancayo, Peru.

A multicenter study was conducted, because the minimum sample size required was 3506 medical students, this is important to find minimum differences of 1% of sexual impulses according to marital status (the smallest difference detected in the prior study); this was calculated with a potency of 80% and a confidence level of 95%. Calculation was performed using STATA 11.1 with the SAMPSI command for sample size calculation,

We calculated the statistical power for the crossing of the variables; in almost all cases, the statistical power obtained was

greater than 99%. However, in two of the crosses, the power was not reached (for marital status: 56% and for the type of the university: 25%); Therefore, the results obtained in these two cases must be taken as purely exploratory.

Study participants

Medicine students of both sexes who agreed to participate voluntarily between 18 and 26 years in the study were included, they were recruited by direct contact. Written informed consent was obtained, and 148 surveys that had no answers from the primary survey were excluded, from which the dependent variable was extracted.

Ethics

The study began in April 2016, after the Ethics Committee of “Hospital Nacional Docente Madre Niño San Bartolome” approved the research with the code CIEI-170023, and was completed in April 2017. The study was performed by capturing the necessary amount of medical schools to reach the minimum sample size; those in charge of surveying in each campus made the request for institutional permission.

We explained the purpose of the study and that the participation was voluntary and anonymous; The students were surveyed in environments where students had the necessary privacy conditions for the proper resolution of the survey.

Participant assessment

The primary variable was based on a previously validated questionnaire¹¹. The CAD-4 Multi Cage Test used consist in the validation of eight kind of addiction, so we based our questionnaire in four questions related to sexual addiction:

1. Has your sexual activity prevented you from performing usual tasks in your life, such as work or family obligations?
2. Have your partners complained about your excessive sexual activity?
3. Have you ever considered that your sexual activity is excessive?
4. Have you ever tried unsuccessfully to moderate your sexual activity?

For this investigation, only the questions that measured sexual addiction were taken. The questionnaire is self-administered and is answer on a dichotomous scale (yes/no) and it is estimated that none or an affirmative answer indicates not an existence of that problem; two affirmative answers indicate a possible presence of that problem; three affirmative answers suggest a very probable presence of that problem; and answer affirmative at four suggests the sure existence of that problem¹¹. The cut-off point was two definite answers, as an answer of zero or one indicated the absence of this problem. On the other hand, two or more positive answers indicated there was the possible existence of addiction. Frequencies and percentages were described. Also, this was disclosed according to the number of affirmative answers that all surveyed students had.

Statistical analysis

The dependent variable was crossed with the independent variables using the chi-square statistical test for crossing with sex, marital status, having a romantic partner currently, having children, and studying in a private university. The dependent variable was compared to the quantitative variables (age and year of studies) with the sum of Wilcoxon ranks. The software used to perform the analysis was STATA 14.0.

A 95% confidence level was used for bivariate and multivariate analysis, prevalence ratios (RP), 95% confidence intervals (95% CI) and p values (considering values $p < 0.05$ as statistically significant), through the use of generalized linear models, with the Poisson family, the log link function, robust models and using the university as a cluster adjustment group. For the preparation of the multivariate model, all the variables in **Table 1** were taken into account (both those that were statistically significant and those that were not, this being important in the context of a student with a possible addiction to sex). The variables that were significant in the bivariate analysis were maintained in the multivariate. Of those that were not significant, age became significant in the multivariate model (the others served as an adjustment).

Table 1. Characteristics of medical students according to having sexual addiction problems.

Variables	Sexual addiction n (%)		P value
	Yes	No	
Sex			
Male	145 (65.6)	1878 (54.1)	<0.001
Female	76 (34.4)	1592 (45.9)	
Age (years)*	21 (19–23)	20 (19–22)	0.060
Single			
Yes	211 (95.5)	3339 (96.3)	0.542
No	10 (4.5)	129 (3.7)	
With romantic partner			
Yes	110 (50.5)	1256 (36.4)	<0.001
No	108 (49.5)	2191 (63.6)	
Profess any religion			
Yes	168 (76.0)	3015 (87.0)	<0.001
No	53 (24.0)	451 (13.0)	
Have children			
Yes	9 (4.1)	123 (3.6)	0.687
No	212 (95.9)	3339 (96.5)	
In college			
Years of studies*	3 (2–4)	3 (2–4)	0.175
Private college	76 (34.4)	1095 (31.6)	0.380

* Medium and interquartile range. P values obtained with chi square (for two categorical variables) or sum of ranges (for the cross of a quantitative variable versus a categorical variable).

Results

A total of 3691 students were surveyed in the medical schools, according to the answers of the cad-4 multi cage test, it was obtained that 87.3% (n=3222) and 6.7% (n=248) had no positive answers and had only one positive answer regarding sexual addiction, respectively. These individuals were classified as having no sexual addiction. In total, 3.1% (n=113), 1.9% (n=70), and 1.0% (n=38) had 2, 3, and 4 definite answers, respectively. These individuals were categorized with sexual addiction problems. **Table 1** shows the characteristics of the students determined to exhibit potential sexual addiction problems. De-identified responses for each participant are available as *Underlying data*¹².

Figure 1 shows the percentage of sexual addiction according to the year of study of the surveyed students. Students residing in the capitals of Peru and Colombia had the highest frequency of sexual addiction problems, both with 11%, while those who studied in the cities of Tucumán, Argentina and Ciudad Bolívar, Venezuela both had 0% (**Figure 2**).

In the multivariate analysis, an association was found between the highest frequency of sexual addiction and male sex (PR: 1.95; 95% CI: 1.21-3.14, p-value: 0.006), years of age (PR: 1.09; 95% CI: 1.01-1.18; p-value: 0.034) and having a partner (PR: 1.67; 95% CI: 1.34-2.08, p-value <0.001).

On the other hand, those who described themselves as followers of a religion had a lower frequency of sexual addiction (PR: 0.56; 95% CI: 0.40-0.80; p-value: 0.001); all these variables were adjusted for marital status, having children, the year of studies and using the university where the surveyed studied as a cluster (adjustment variable) (**Table 2**). **Figure 3** shows the percentages of sex addiction according to the statistically significant categorical variables in the multivariate model. **Figure 4** shows the percentages of specific answers to the four questions of the sexual addiction test in medical students in Latin America.

Discussion

Our study found that few students had a sexual addiction. Our findings differ from a study performed at a private university in the US, which showed that 26% of the students had symptoms of risk for sexual addiction¹³; this could be due to population differences. Broader population studies have obtained similar percentages to ours. A nationwide study conducted in Sweden found that 10% of the population is considered “hypersexual”¹⁴. Regional and local surveys have been performed in the US, which suggests that approximately 5% of the general population can meet the criteria of a compulsive sexual disorder¹⁵. Another factor that led to finding different results could be the test that was applied, because some research is not based on validated instruments. These results should be confirmed, since the objective of the study was not to give prevalence, because a random sampling was not performed out in each campus, so each institution should rate this situation of its students.

It was found that men had higher frequencies of sexual addiction; this is similar to what was found in studies conducted

Figure 1. Percentage of sexual addiction according to the year of the career of medical students of sixteen cities in Latin America.

Figure 2. Percentage of sexual addiction among medical students in 16 cities in Latin America.

Table 2. Bivariate and multivariate analysis of sexual addiction according to their socio-educational factors in medical students from eight Latin American countries.

Variables	RP Analysis (95%CI)		P value
	Bivariate	Multivariate	
Male sex	2.15 (1.30-3.53)	1.95 (1.21-3.14)	0.006
Years of age	1.07 (1.01-1.13)	1.09 (1.01-1.18)	0.034
Single	0.83 (0.42-1.64)	1.34 (0.55-3.26)	0.520
With romantic partner	1.71 (1.31-2.24)	1.67 (1.34-2.08)	<0.001
Profess any religion	0.51 (0.34-0.73)	0.56 (0.40-0.80)	0.001
Have children	1.14 (0.50-2.62)	0.89 (0.34-2.34)	0.808
Year of study	0.97 (0.80-1.17)	0.85 (0.66-1.10)	0.220
Private college	1.13 (0.64-2.00)	1.18 (0.69-2.03)	0.540

RP, reason for prevalence; 95%CI, 95% confidence interval. p-value obtained with generalized linear models, with Poisson family, log link function, robust models and using the university as a cluster group.

Figure 3. Percentages of sex addiction according to the statistically significant categorical variables in the multivariate model in Latin American medical students.

Figure 4. Percentages of specific answers to the four questions of the sexual addiction test in medical students in Latin America.

in Mexico, where more male university students than female had a sex addiction and risky sexual behavior, such as practicing sex without condoms¹⁶. Therefore, counseling activities should focus on them so that they can receive recommendations for safe sex practices.

With regard to age, the frequency of sexual addiction increased at an older age; these results are consistent with studies performed in Sweden and the United States of America; in which it was determined that young adults are more likely to suffer from “hypersexuality” and to show behaviors related to compulsive sexuality^{14,17}. However, it is essential to highlight that the relationship between younger age and hypersexuality has not always shown an association, being demonstrated by a study that used a virtual platform¹⁸. Therefore, it is necessary to characterize the age groups that present more significant problems of addiction in each reality, to focus on them the programs of prevention of sexually transmitted diseases.

It was also found that people who have a sexual partner had a higher frequency of sexual addiction problems; this is similar to what was found in an investigation in Mexico¹⁹. Those who professed to have a religion had lower frequencies of sexual addiction; this could be due to the less liberal life they present and the religious principles they have²⁰.

Limitations

Our study had the limitation that there was no random sampling, which generated a selection bias. However, this is the first report of this problem in the student population, and because of

the large number of students that were achieved, this generates results that are pertinent to the subject addressed.

Conclusion

It is concluded that sexual addiction problems occurred in a small proportion of Latin American medical students. These addiction problems were positively associated with male sex, age, and having a romantic partner, being negatively associated with professing a religion.

Data availability

Underlying data

Figshare: Sexual_addiction_med_students_LATAM. <https://doi.org/10.6084/m9.figshare.9917018.v2>¹².

This project contains basic demographic information about each participant, alongside their answers to each of the questions asked.

Data are available under the terms of the [Creative Commons Zero “No rights reserved” data waiver](#) (CC0 1.0 Public domain dedication).

Acknowledgments

Thanks to all those who gave their input for the elaboration and review of the work, thanks to these comments, the research won the second place in the scientific contest organized by the Latin American Federation of Scientific Societies of Medical Students, occurred in Bolivia during the month of September.

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General Comments

The paper presents important findings. The authors however need to make revisions in line with suggestions made before it can be fully accepted for indexing. Importantly, the paper requires English language editing to improve comprehension by readers. The editing needs to be done before final approval.

The paper describes findings on information obtained from 16 different cities but this has been treated as one i.e. findings are not disaggregated by city. Could authors provide some explanation for why they decided to analyze and present their findings like this?

Were all 16 cities in 16 different countries or were there situations in which more than one city was selected in a country?

Comments on specific sections of the paper

Introduction

- Delete "by" in the statement (Introduction; paragraph 1) below.
"Some studies have found that by submitting these young people to stressful environments can trigger them to be disinhibited, which leads them to adopt risky behaviors".
- Please revise the statements below. Meanings are not clear.
In Finland, thousands of university students were surveyed to determine continuity/frequency according to age group⁷, another one performed in India measured sexual knowledge and practices⁸.

Methods.

- Sampling
Please provide additional information about how the participants were recruited. Was this by simple random sampling or some other convenience??

- Please revise the statement below. It is currently not clear:
Statistical analysis: The dependent variable was crossed with the independent variables using the chi-square statistical test for crossing with sex, marital status, having a romantic partner currently, having children, and studying in a private university.

Discussion

- Discussion Paragraph 1, lines 13 to 16, "These results should be confirmed, since the objective of the study was not to give prevalence, because a random sampling was not performed out in each campus, so each institution should rate this situation of its students". The information is not clear.
- Discussion paragraph 2, Opening line: "Tt was found that men" Please change Tt to "It".

Is the work clearly and accurately presented and does it cite the current literature?

Yes

Is the study design appropriate and is the work technically sound?

Partly

Are sufficient details of methods and analysis provided to allow replication by others?

Yes

If applicable, is the statistical analysis and its interpretation appropriate?

Yes

Are all the source data underlying the results available to ensure full reproducibility?

Yes

Are the conclusions drawn adequately supported by the results?

Yes

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Adolescent health

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

Reviewer Report 02 December 2020

<https://doi.org/10.5256/f1000research.23590.r68735>

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Mahmood Karimy

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The introduction is very short, please describe the importance, necessity and benefits of this study.

- The main issue of the introduction is that the relevance of the study is not clear. First, the risks of existing sexual addiction in students are underrepresented
- Second, it is unclear what the added value of this study is in the current field.
- Another issue is that the first paragraph should state the definition of sexual addiction behavior. The definition must conform DSM-IV or ICD-10.

Methods:

- The choice for administered on all questions is unclear. For example, why is there no researcher/teacher report on sexual behaviors of the student in the classroom? Also, strength in the design is the fact that the teacher left the classroom during completing the questionnaire, in the hope student answered the questions socially less desirable. However, it is unclear what was done when the students finished their questionnaire. How were the questionnaires collected?
- Please write the inclusion and exclusion criteria.
- Please add the used method for the sampling.

Result:

- OK.

Discussion:

- The generalization of the results should be stated.-The conclusion should be short aim the main objective of the study based on the study results.
- The implications of the study are just marginally described. Preferably, given the similarities and differences between other international studies, which policy would be suitable for world students? And which group should be targeted in prevention plans, and which goals fits the results?

Is the work clearly and accurately presented and does it cite the current literature?

Yes

Is the study design appropriate and is the work technically sound?

Partly

Are sufficient details of methods and analysis provided to allow replication by others?

Partly

If applicable, is the statistical analysis and its interpretation appropriate?

Yes

Are all the source data underlying the results available to ensure full reproducibility?

Yes

Are the conclusions drawn adequately supported by the results?

Yes

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: public health, addiction, change behavior, risk behavior

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.

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