

Trends

in Psychiatry and Psychotherapy

JOURNAL ARTICLE PRE-PROOF **(as accepted)**

Original Article

Mobile dating apps use and sexual risk behavior among Brazilian undergraduate students

Edson Zangiacomi Martinez, Vitoria de Souza Pinto Frazatto, Jonathan Leonardo Gonçalves Prudencio, Guilherme Galdino, Miriane Lucindo Zucoloto

<http://doi.org/10.47626/2237-6089-2023-0746>

Original submitted Date: 17-Oct-2023

Accepted Date: 19-Dec-2023

This is a preliminary, unedited version of a manuscript that has been accepted for publication in Trends in Psychiatry and Psychotherapy. As a service to our readers, we are providing this early version of the manuscript. The manuscript will still undergo copyediting, typesetting, and review of the resulting proof before it is published in final form on the SciELO database (www.scielo.br/trends). The final version may present slight differences in relation to the present version.

Mobile dating apps use and sexual risk behavior among Brazilian undergraduate students

Edson Zangiacomi Martinez¹, Vitoria de Souza Pinto Frazatto¹, Jonathan Leonardo Gonçalves Prudencio¹, Guilherme Galdino², Miriane Lucindo Zucoloto¹

¹ Department of Social Medicine. Ribeirão Preto Medical School – University of São Paulo. Ribeirão Preto, São Paulo, Brazil.

² Department of Psychology. University of Ribeirão Preto. Ribeirão Preto, São Paulo, Brazil.

Correspondence to: Edson Z Martinez

Department of Social Medicine. Ribeirão Preto Medical School, University of São Paulo.

Av Bandeirantes 3900, 14049-900. Monte Alegre. Ribeirão Preto – SP, Brazil.

E-mail: edson@fmrp.usp.br

Telephone: 55 16 36022569

ABSTRACT

Introduction: One of the most popular ways to meet new people in the modern world is through dating apps. However, its use may facilitate casual sexual encounters and quick partner changes, both of which associated to endangering sexual health in different populations. **Objective:** To describe the use of mobile dating apps among undergraduate students at a major Brazilian public university and investigate its associations with sexual risk behaviors and sociodemographic factors. **Method:** This is a cross-sectional study based on a web survey. The link for participation was made available to students enrolled in undergraduate courses in the eight units of the University of São Paulo, Campus Ribeirão Preto. Use of dating apps, sociodemographic/behavioral profile, and sexual risk behaviors were among the

variables studied. The distribution of apps users was calculated for each variable of interest, and prevalence ratios (PRs) were used for comparisons. PRs were reported with 95% confidence intervals. **Results:** A total of 487 students participated, with 32.9% reporting using dating apps. Male participants were more likely to use. The use of dating apps was associated with having multiple sexual partners and risky behaviors such as smoking, alcohol consumption, and substance abuse. **Conclusion:** It is critical to describe the pattern of app use in undergraduate students and understand their influence on sexual health in order to avoid stigmatizing users. Additionally, this information can be helpful in directing the creation of strategies for using these apps as resources to promote health, such as the information-sharing regarding the sexual health.

Key-words: Sexual behavior; Mobile applications; Students; Health promotion.

INTRODUCTION

Mobile dating apps are one of the most well-liked ways to meet new people in the modern world, having been used by millions of users. The majority of dating apps, including Tinder - the most popular in Brazil, are free to download and use, and can be viewed on any smartphones or other internet-connected devices.

According to Albury and Byron¹ and Anzani et al.,² dating apps offer significant advantages for interpersonal connection, including the chance to vet potential partners before a date, explore sexual identity, meet more geographically nearby partners, and decide how and when to connect with them. These advantages have grown during the COVID-19 pandemic, as dating apps have introduced new virtual-dating options to adhere to physical distancing guidelines.³⁻⁵

Beyond these advantages, however, using dating apps can also encourage a higher exposure to risk behaviors according to recent publications.⁶⁻⁹ Studies have linked the use of dating apps to risky behaviors such as having multiple sexual partners, since its use may facilitate casual sexual encounters and rapid partner change, having a higher chance of having unprotected sex, which may endanger sexual health.^{10,11.}

Young people are the most likely to use new technology to connect with others for friendship, dating, and sexual relationships.¹² However, few studies have been conducted to investigate and generate evidence regarding the relationship between using dating apps and the sexual health of youths of various sexual orientations.^{8,9,11,12} The majority of previous studies concentrated on the experiences of homosexual men, it is unclear how using dating apps affects the sexual health of other populations.¹³⁻¹⁵

In this sense, this study aims to describe the use of dating apps among undergraduate students at a major Brazilian public university, examining its associations with sexual risk behaviors and sociodemographic and behavioral factors, including age, gender, sexual orientation, relationship status, monthly income, and smoking and drinking habits.

METHODS

This cross-sectional study was conducted on a sample of undergraduate students enrolled in the Ribeirão Preto Campus of the University of São Paulo (USP-RP), located in Southeast Brazil. At the time of the survey, the campus had a total of 7,181 undergraduate students enrolled. The sampling process involved a stratified design that considered each of the eight academic units on the campus as a separate stratum. Data collection occurred between March and May 2021, a period during which

social isolation measures were in effect in Brazil due to the COVID-19 pandemic. To minimize personal contact, an online self-administered questionnaire was employed via the RedCap platform for data collection. The study was promoted in collaboration with academic centers, student leagues, and athletic associations at USP-RP, who helped disseminate the research among students within each stratum through various social media channels such as Facebook groups, WhatsApp, and e-mail.

The authors developed the study's questionnaire by reviewing existing literature and drawing on prior studies of the group.^{8,9,15} Three sections made up the online survey: use of dating apps, sexual behavior, and sociodemographic and behavioral profile. The following question regarding the use of apps was posed to participants: "Have you ever used mobile applications or websites to search for sexual partners?". Additionally, some sociodemographic and behavioral questions were made, which included items related to their age, gender, sexual orientation, relationship status, monthly income, and smoking and drinking habits. Questions about sexual relations with occasional partners in the previous 12 months (male and female), the number of these partners, and condom use were used to assess risk behavior.

The distribution of apps users was calculated for each variable of interest, and prevalence ratios (PRs) were used for comparisons. PRs were reported with 95% confidence intervals (95%CI). CIs that do not include the value 1 show significant associations (similar to $p < 0.05$). The organization and analysis of data were conducted using R statistical software (version 4.1.0, www.r-project.org/).

The study received approval from the local Research Ethics Committee, registered under the number CAAE: 31049220.4.0000.5440. An informed consent form was provided on the initial page of the online questionnaire.

RESULTS

A total of 525 students voluntarily completed the questionnaire, with proportional representation from each of the eight units at USP-RP. However, 38 participants did not answer all of the questions on the questionnaire and were therefore excluded from the final analyses. The final sample included 487 students aged between 18 and 46 years (mean 22.2, standard deviation 3.1 years), with 68.9% identifying as female. Among the male respondents, 60.1% identified themselves as heterosexual, 20.7% as homosexual, and 16% as bisexual. Among the female respondents, 63.2% identified themselves as heterosexual, 5.7% as homosexual, and 27.1% as bisexual.

The use of dating apps was reported by 32.9% of the students. Among them, 47.9% of male participants and 20.7% of female participants reported using Tinder. Grindr is used by 41.2% and 60.3% of the partnered and unpartnered male non-heterosexual respondents, respectively. Other apps and websites mentioned by respondents included Hornet, Bumble, Fem Dating, Happn, Instagram, OkCupid, Scruff, Umatch, and Zoe.

Table 1 describes the use of dating apps based on participants' characteristics. Because the frequency of app use among female and male participants is moderated by relationship status and sexual orientation, we used the combinations between the classes of these variables in Table 1. Among our results, older participants, non-heterosexual men (partnered and unpartnered), unpartnered heterosexual men, those who had previously engaged in sexual activity, those with a history of sexually transmitted infections, those who currently use alcohol or tobacco, those who report the use of drugs, and those who are financially independent were more likely to use dating apps.

Table 1. Use of dating apps according to participants' characteristics ($n = 487$). Ribeirão Preto, São Paulo, Brazil, 2021.

	Total (a)	App users n (%)	PR (95%CI)#	
Age (years)				
18 20	86	19 (22.1)		Ref.
20 22	132	41 (31.1)	1.41 (0.88 – 2.25)	
22 24	101	38 (37.6)	1.70 (1.06 – 2.72)	*
24 26	42	16 (38.1)	1.72 (0.99 – 3.00)	
26 or more	34	19 (55.9)	2.53 (1.54 – 4.16)	*
Relationship status, sex and sexual orientation				
Partnered female heterosexual	94	6 (6.4)		Ref.
Partnered male heterosexual	53	9 (17.0)	2.66 (1.00 – 7.05)	
Partnered female non-heterosexual	48	11 (22.9)	3.58 (1.41 – 9.09)	*
Unpartnered female heterosexual	95	22 (23.2)	3.62 (1.54 – 8.54)	*
Unpartnered female non-heterosexual	62	23 (37.1)	5.80 (2.50 – 13.42)	*
Unpartnered male heterosexual	60	30 (50.0)	7.81 (3.46 – 17.64)	*
Partnered male non-heterosexual	17	10 (58.8)	9.19 (3.85 – 21.94)	*
Unpartnered male non-heterosexual	58	49 (84.5)	13.20 (6.04 – 28.86)	*
Ethnicity				
White	379	124 (32.7)		Ref.
Brown	61	21 (34.4)	1.05 (0.72 – 1.53)	
Black	23	7 (30.4)	0.93 (0.49 – 1.75)	
Yellow	18	6 (33.3)	1.02 (0.52 – 1.99)	
Ever had sexual intercourse				
No	49	7 (14.3)		Ref.
Yes	430	152 (35.3)	2.47 (1.23 – 4.96)	*
Religion				
Yes	204	47 (23.0)		Ref.
Not but believe in God	160	53 (33.1)	1.44 (1.03 – 2.01)	*
Atheist	103	51 (49.5)	2.15 (1.57 – 2.96)	*
History of STIs				
No	439	136 (31.0)		Ref.
Yes	47	24 (51.1)	1.65 (1.21 – 2.25)	*
Smoking status				
Never smoked	313	83 (26.5)		Ref.
Current smoker	145	63 (43.4)	1.64 (1.26 – 2.13)	*
Ex-smoker	17	5 (41.7)	1.57 (0.79 – 3.15)	
Current alcohol use				
No	114	21 (18.4)		Ref.
Yes	368	137 (37.2)	2.04 (1.35 – 3.03)	*
Current drug use				
No	329	82 (24.9)		Ref.
Yes	149	75 (50.3)	2.02 (1.58 – 2.58)	*
Financially independent				
No	440	134 (30.5)		Ref.
Yes	47	26 (55.3)	1.82 (1.35 – 2.44)	*

(a) Numbers may not add up to total due to missing values

Prevalence ratios (95% confidence interval – CI)

* CIs that do not include the value 1 show significant associations

Meanwhile, Table 2 provides information on the sexual behaviors of students who had occasional partners in the last 12 months, categorized by sex. Among those participants who have occasional partners, males who had sex with only male occasional partners, and females who had sex with males and female occasional partners were more likely to use apps.

Table 2. Students' sexual behaviors with occasional partners in the last 12 months, stratified by sex ($n = 487$). Ribeirão Preto, São Paulo, Brazil, 2021.

Sex	Sexual behaviors in the last 12 months	Total	App users n (%)	PR (95%CI) [#]	
Male	Have sex with occasional partners (n=188)				
	No	110	37 (33.6)	Ref.	
	Only male occasional partners	35	32 (91.4)	2.72 (2.05 – 3.60)	*
	Only female occasional partners	37	25 (67.6)	2.01 (1.43 – 2.84)	*
	Both male and female partners	6	4 (66.7)	1.99 (1.06 – 3.70)	*
	Number of male occasional partners (n=41)				
	Only one	10	7 (70.0)	Ref.	
	2 – 4	21	19 (90.5)	1.29 (0.84 – 1.99)	
	5 – 10	7	7 (100.0)	1.43 (0.95 – 2.14)	
	>10	3	3 (100.0)	1.43 (0.95 – 2.14)	
	Number of female occasional partners (n=43)				
	Only one	13	8 (61.5)	Ref.	
	2 – 4	17	11 (64.7)	1.05 (0.60 – 1.83)	
	5 – 10	10	7 (70.0)	1.14 (0.63 – 2.06)	
	>10	3	3 (100.0)	1.63 (1.06 – 2.50)	*
	Condom use with male occasional partners (n=41)				
	Always used	19	18 (94.7)	Ref.	
	Used most of the time	11	10 (90.9)	0.96 (0.77 – 1.19)	
	Not used most of the time	3	3 (100.0)	1.06 (0.95 – 1.17)	
	There was no penetration	6	5 (83.3)	-	
	Not used at all	1	0	-	
	Condom use with female occasional partners (n=43)				
	Always used	26	15 (57.7)	Ref.	
Used most of the time	8	6 (75.0)	1.30 (0.77 – 2.18)		
Not used most of the time	7	7 (100.0)	1.73 (1.25 – 2.41)	*	
There was no penetration	2	1 (50.0)	-		
Female	Have sex with occasional partners				
	No	211	26 (12.3)	Ref.	
	Only male occasional partners	68	27 (39.7)	3.23 (2.03 – 5.13)	*
	Only female occasional partners	7	3 (42.9)	3.49 (1.38 – 8.82)	*
	Both male and female partners	12	6 (50.0)	4.07 (2.08 – 7.95)	*

Number of male occasional partners (n=80)				
Only one	22	6 (27.3)		Ref.
2 – 4	47	21 (44.7)	1.64 (0.77 – 3.48)	
5 – 10	10	5 (50.0)	1.83 (0.73 – 4.60)	
>10	1	1 (100.0)	3.66 (1.85 – 7.25)	*
Number of female occasional partners (n=19)				
Only one	16	7 (43.8)		Ref.
2 – 4	2	1 (50.0)	1.14 (0.26 – 5.08)	
5 – 10	1	1 (100.0)	2.28 (1.31 – 3.98)	*
Condom use with male occasional partners (n=80)				
Always used	36	14 (38.9)		Ref.
Used most of the time	32	16 (50.0)	1.29 (0.75 – 2.20)	
Not used most of the time	10	3 (30.0)	0.77 (0.27 – 2.16)	
There was no penetration	1	0	-	

Prevalence ratios (95% confidence interval – CI)

* CIs that do not include the value 1 show significant associations

DISCUSSION

The study found that 32.9% of the students reported using dating apps. This percentage is lower than that found in a previous study that included students from a university in the Brazilian state of Tocantins, in the Legal Amazon (66.3%).¹⁶ Another study, which included freshmen undergraduate students at a university in the southern region of Brazil, found that 22% of them used smartphone apps to seek sex within three months prior to the survey.¹⁷ While there are few studies published in Brazil on the use of apps by undergraduate students, these results suggest that the prevalence of usage may be influenced by regional differences and population profiles.

According to a literature review, the average dating app user profile is characterized by white men who have sex with men (MSM), aged 25 to 35, with high education and income, who has frequent sexual encounters and often engages in risky behavior.^{2,18} In our study, we did not find an association between app use and students' ethnicity. Nonetheless, we observed a higher prevalence of dating app users among those over 25 years of age, sexually active individuals, those who identify as atheist or non-

religious, those who are financially independent, those with a history of sexually transmitted infections, smokers, and individuals who use drugs or alcohol. **When examining the interaction between relationship status, sex, and sexual orientation, the results show that dating app use is relatively low among partnered heterosexual female students (6.4%), but significantly higher among partnered and unpartnered male non-heterosexual students (58.8% and 84.5%, respectively).**

A large number of research on apps use by MSM has been carried out worldwide.¹³⁻
¹⁵ Most of these studies describe the engagement of MSM with high-risk behaviors and state that the apps can be timely for obtaining information about sexual health and HIV prevention, and for promoting HIV testing.¹⁹ In their findings about the acceptability and potential impact of delivering sexual health promotion information via social media and dating apps, Kesten et al.²⁰ suggested that these tools appear to be acceptable and efficient ways to reach key populations. They also emphasize the importance of such information being engaging, simple, not overly clinical, and focused on developing preventative social norms.

In our study, men and women who have relationships with occasional partners, both in homosexual and heterosexual relationships, often use dating apps. The use of condoms during sexual encounters varies among different groups. For men who had occasional same-sex partners, 73.2% reported using condoms all or most of the time. For men who had occasional sex with women, 79.1% reported using condoms all or most of the time. Among women who had sex with occasional male partners, the percentage of condom users was highest, with 85% reporting using condoms all or most of the time. **In all of these situations, however, our study did not show a clear association between the use of dating apps and condom use.**

Tinder was the most commonly used dating app among the sample. However, male non-heterosexual students also reported using Grindr and Hornet, which are specifically designed for gay individuals. Some websites have rated OkCupid as better for more serious dating and Tinder for more casual dating,¹⁰ although some surveys show that many Tinder users use the app to look for romantic relationships.^{6,18} In addition, with respect to other dating apps, a literature review showed that the Tinder use is less related to the risk of STIs.⁶ **Independently of the dating app being used and the sexual orientation of the user, this study shows an association between dating app usage and history of STIs and risky behaviors such as smoking, alcohol consumption, and substance abuse.** Although our findings do not show any association with inappropriate use of condoms, our results reinforce that the dating apps can be timely for obtaining information about sexual health and STIs prevention, and for promoting HIV testing.¹⁹ Given that the relationship between dating app use and sexual risk behaviors is also present among heterosexual young adults,²¹ opportunities to provide sexual health and risk education through the apps can be considered for young people of all sexual orientations.

This study has some limitations, including the fact that the data was collected during the COVID-19 pandemic, when individuals were required to stay at home and limit their social interactions, which also preventing face-to-face interviews. The data for this study were collected from a sample of college students in the southeastern region of Brazil. Therefore, caution should be taken when extending the findings to other populations and geographic areas. Additionally, the self-reported nature of the data, as well as the possibility of self-selection bias within strata, may affect the accuracy and generalizability of the results. Despite these limitations, this study is one of the few to assess the relationship between the use of mobile dating apps and sexual and risky

sexual behaviors in Brazilian young adults, not only considering the homosexual population. Their findings describe the popularity of dating apps among college students and their motivations for their use, and suggest that the apps may offer opportunities to provide sexual health education among young adults.

CONCLUSION

Our study found a frequent use of dating apps among undergraduate students and presents evidence of association between dating app usage and history of STIs and risky behaviors such as smoking, alcohol consumption, and substance abuse. Despite these findings, and the fact that numerous studies have suggested that dating apps have a negative impact on sexual health, it is important to recognize that they are widely used and should not be stigmatized. In fact, dating apps have the potential to be effective resources for promoting health.

Funding: This study was supported by the Fundação de Amparo à Pesquisa do Estado de São Paulo under grant #2020/03039-9.

Conflict of Interest: The authors have no conflicts of interest to declare.

REFERENCES

1. Albury K., Byron P. Safe on my phone? Same-sex attracted young people's negotiations of intimacy, visibility, and risk on digital hook-up apps. *Social Media + Society* 2016; 2(4).
2. Anzani A, Di Sarno M, Prunas A. Using smartphone apps to find sexual partners: A review of the literature. *Sexologies*. 2018; 27(3):e61-e65.
3. Duguay S, Dietzel C, Myles D. The year of the "virtual date": Reimagining dating app affordances during the COVID-19 pandemic. *New Media & Society*. 2022; 146144482110722.

4. Marston HR, Morgan DJ, Earle S, Hadley RA. Shiver Me Tinders and Ring a Ding for a Fling— Sex Tech Use during COVID-19: Findings from a UK Study. *Healthcare*. 2023; 11(6):897.
5. Klinsky B. Just a swipe away: Navigating the motivations behind downloading and using mobile dating applications during a global pandemic. Available from ProQuest Dissertations & Theses Global, 2023.
6. Ciocca G, Robilotta A, Fontanesi L, Sansone A, D'Antuono L, Limoncin E, et al. Sexological aspects related to Tinder use: A comprehensive review of the literature. *Sex Med Rev*. 2020; 8(3):367-78.
7. Echevarria SG, Peterson R, Woerner J. College Students' Experiences of Dating App Facilitated Sexual Violence and Associations with Mental Health Symptoms and Well-Being. *J Sex Res*. 2023; 60:8, 1193-1205.
8. Dai M. Examine the associations between smartphone hookup application uses and sexual health and relationship outcomes among college students. *J Am College Hea*. 2023; 71:2, 554-561
9. Dai M. The Demographic and Psychological Moderators to the Associations Between Geosocial Networking Apps (GSNA) Use and Risky Sexual Behaviors Among US Young Adults. *Sex Res Soc Policy*. 2023; 20, 664–675.
10. Chin K, Edelstein RS, Vernon PA. Attached to dating apps: Attachment orientations and preferences for dating apps. *Mob Media Commun*. 2019; 7(1):41-59.
11. Choi EPH, Wong JYH, Fong DYT. The use of social networking applications of smartphone and associated sexual risks in lesbian, gay, bisexual, and transgender populations: a systematic review. *AIDS care*. 2017; 29(2):145-155.
12. Bonilla-Zorita G, Griffiths MD, Kuss DJ. Online Dating and Problematic Use: A Systematic Review. *Int J Ment Health Addiction*. 2021; 19, 2245–2278.
13. Hermosa-Bosano C, Paz C, Hidalgo-Andrade P, Aguayo-Romero R. Sexual behaviors and HIV/STI prevention strategies among sexual minority men in Ecuador who use geosocial networking apps. *Arch Sex Behav*. 2021; 50:3011–3021.

14. Hill AO, Bavinton BR, Armstrong G. Prevalence and correlates of lifetime and recent HIV testing among men who have sex with men (MSM) who use mobile geo-social networking applications in Greater Tokyo. *PLoS One* 2019; 14:e0209933.
15. Martinez EZ, Morigi TZ, Galdino G, McFarland W, Zucoloto ML. Sex-seeking mobile application use and risk behavior among men who have sex with men in Brazil. *Int J STD AIDS*. 2020; 31(12):1161-68.
16. Tavares MKB, de Melo RL, Rocha BFD, Andrade DJ, Evangelista DR, Peres, MCTS, et al. Dating Applications, Sexual Behaviors, and Attitudes of College Students in Brazil's Legal Amazon. *Int J Environ Res Public Health*. 2020; 17(20):7494.
17. Gräf DD, Mesenburg MA, Fassa AG. Risky sexual behavior and associated factors in undergraduate students in a city in Southern Brazil. *Rev Saude Publica*. 2020; 54:41.
18. Sumter SR, Vandenbosch L, Ligtenberg L. Love me Tinder: Untangling emerging adults' motivations for using the dating application Tinder. *Telemat Informat*. 2017; 34(1):67-78.
19. Galvan FH, Liu H, Brooks RA, Chen YT, Lepe RM. Using social and sexual networking mobile applications to promote HIV testing, medical care and prevention services among Latino men who have sex with men in Los Angeles County, California, USA. *PLoS One*. 2022; 17(5):e0268406.
20. Kesten JM, Dias K, Burns F, Crook P, Howarth A, Mercer CH, et al. Acceptability and potential impact of delivering sexual health promotion information through social media and dating apps to MSM in England: a qualitative study. *BMC Public Health*. 2019; 19(1):1236.
21. Sawyer AN, Smith ER, Benotsch EG. Dating application use and sexual risk behavior among young adults. *Sex Res Soc Policy*. 2018; 15(2):183-191.