Original Article

Sex education and vulnerability of application users, comparisons based on sexual orientation

Educação sexual e vulnerabilidade de usuários de aplicativos, comparações a partir da orientação sexual

Educación sexual y vulnerabilidad de usuarios de aplicaciones, comparaciones a partir de la orientación sexual

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How to cite:
Tavares MK, Melo RL, Evangelista DR, Silva JB. Sex education and vulnerability of application users, comparisons based on sexual orientation. Acta Paul Enferm. 2022;35:eAPE01397.

DOI
http://dx.doi.org/10.37689/acta-ape/2022AO013977

Keywords
Mobile applications; Risk-taking; Sexual behavior; Sex education; Sexual health

Descritores
Aplicativos móveis; Assunção de riscos; Comportamento sexual; Educação sexual; Saúde sexual

Descriptores
Aplicaciones móviles; Asunción de riesgos; Conducta sexual; Educación sexual; Salud sexual

Submitted
May 27, 2021

Accepted
April 11, 2022

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Associate Editor (Peer review process):
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Abstract

Objective: To analyze sex education, risk behaviors and attitudes of college students who use dating applications, considering their sexual orientation.

Methods: This is a quantitative, cross-sectional and descriptive study, with a non-probabilistic convenience sample, consisting of 359 college students from northern Brazil. A questionnaire was used with information on sociodemographic data, use of dating applications, sources of information on protected sex, risk behaviors and attitudes. Bivariate analyzes and analysis of variance with Bonferroni's post-hoc tests were performed.

Results: Homosexuals (92.3%) and bisexuals (84.9%) reported using applications and meeting with casual partners ($p<0.05$). Tinder was the application accessed by 93.58% of users. There was no difference for sexual practice, unprotected sex and multiple sexual partners. Information about protected sex and sexually transmitted infections through the applications was reported by homosexuals (61.1%) ($p<0.05$). Bisexuals (22.2%) experienced sex education in scientific events and heterosexuals (38.2%) turned to college friends ($p<0.05$). Homosexuals (88.9%) accessed the Testing and Counseling Center service and 72.4% were tested for sexually transmitted infections after having sex with a casual partner ($p<0.05$). Positive attitudes towards sexual health were observed in heterosexual non-dating application users.

Conclusion: Vulnerability of dating application users was not associated with sexual orientation. Interventions through sex education that stimulate self-knowledge and the risks of unprotected sexual practice are required in view of access to technologies for casual dates.

Resumo

Objetivo: Analisar a educação sexual, comportamentos de risco e atitudes de universitários usuários de aplicativos de encontros, considerando a orientação sexual.

Métodos: Trata-se de um estudo de natureza quantitativa, transversal e descritivo, com uma amostra não probabilística de conveniência, constituída por 359 universitários da região norte do Brasil. Utilizou-se um questionário com informações sobre dados sociodemográficos, uso de aplicativos de encontros, fontes de informações sobre sexo seguro, comportamentos de risco e atitudes. Foram realizadas análises bivariadas e análise de variância com testes post-hoc de Bonferroni.

Resultados: Homossexuais (92,3%) e bissexuais (84,9%) reportaram o uso de aplicativos e tiveram encontro com parceiro casual ($p<0,05$). O Tinder foi o aplicativo acessado por 93,58% dos usuários. Não houve diferença para a prática sexual, sexo desprotegido e múltiplos parceiros sexuais. Informações sobre sexo seguro e infecções sexualmente transmissíveis por meio dos aplicativos foi reportada por homossexuais (61,1%) ($p<0,05$). Bissexuais (22,2%) vivenciaram a educação sexual nos eventos científicos e heterossexuais

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Conflicts of interest: nothing to declare.

(38,2%) recorreram aos amigos universitários (p<0,05). Homossexuais (88,9%) acessaram o serviço do Centro de Testagem e Aconselhamento e 72,4% realizaram a testagem para infecções sexualmente transmissíveis após a prática sexual com parceiro casual (p<0,05). As atitudes positivas para a saúde sexual foram observadas nos heterossexuais não usuários de aplicativos de encontros.

Conclusão: A vulnerabilidade dos usuários de aplicativos de encontros não esteve associada com a orientação sexual. Intervenções por meio da educação sexual que estimulem o autoconhecimento e os riscos da prática sexual desprotegida são requeridas frente ao acesso às tecnologias para encontros casuais.

Resumen

Objetivo: Analizar la educación sexual, comportamientos de riesgo y actitudes de estudiantes universitarios usuarios de aplicaciones de citas, considerando la orientación sexual.

Métodos: Se trata de un estudio de naturaleza cuantitativa, transversal y descriptiva, con una muestra no probabilística de conveniencia, constituida por 359 estudiantes universitarios de la región norte de Brasil. Se utilizó un cuestionario con información sobre datos sociodemográficos, uso de aplicaciones de citas, fuentes de información sobre sexo seguro, comportamientos de riesgo y actitudes. Se realizaron análisis bivariados y análisis de varianza con ensayos post-hoc de Bonferroni.

Resultados: Homosexuales (92,3 %) y bisexuales (84,9 %) refirieron el uso de aplicaciones y tuvieron citas con pareja casual (p<0,05). Tinder fue la aplicación a la que el 93,58 % de los usuarios accedió. No hubo diferencias en la práctica sexual, sexo desprotegido y múltiples parejas sexuales. Información sobre sexo seguro y sobre infecciones de transmisión sexual por medio de las aplicaciones fue reportada por homosexuales (61,1 %) (p<0,05). Bisexuales (22,2 %) vivieron la educación sexual en los eventos científicos, y heterosexuales (38,2 %) recurrieron a sus amigos de la universidad (p<0,05). Homosexuales (88,9 %) accedieron al servicio del Centro de Testeo y de Consejo, y el 72,4 % realizó el testeo de infecciones sexualmente transmisibles después de la práctica sexual con pareja casual (p<0,05). Se observaron actitudes positivas hacia la salud sexual en los heterosexuales no usuarios de aplicaciones de citas.

Conclusión: La vulnerabilidad de los usuarios de aplicaciones de citas no estuvo asociada con la orientación sexual. Son necesarias intervenciones por medio de la educación sexual que estimulen el autoconocimiento y los riesgos de la práctica sexual desprotegida ante el acceso a las tecnologías para citas casuales.

Introduction

The creation of dating applications based on geolocation has enabled the virtual and physical interaction of its users. These electronic tools have become a convenient and accessible avenue, facilitating contact with potential casual partners for sexual purposes.[1] These applications allow users to create a profile, disclose personal information, connect with other users, send instant messages, share photos, videos, location and inform sexual preferences.[2]

Despite the advancement of technologies, each human being continues to live his life in his own unique way, with due fragility or power, alone or through interpersonal relationships, with the community and with those who cross paths repeatedly or sporadically.[3] The concept of vulnerability was introduced in the health area during the emergence of the Acquired Immunodeficiency Syndrome epidemic. Although the concept of vulnerability in health is in the process of expansion and understanding, for Florêncio and Moreira (2021), its definition is related to the interaction between the social subject and the power relations that can result in conditions of precariousness or risk, dialoguing with the exposure and susceptibility to the disease and its evolution and the possibility of having the quality of life and mental health impacted. These precariousness are associated with cultural aspects, gender, violence, ecosystem, family context, socioeconomic and demographic conditions.[4]

In the context of human sexuality, dating application users are vulnerable in health, as they access multiple partners, have unprotected sex, suffer sexual abuse, violence and maintain compulsive sexual behavior.[5-7] Vulnerable individuals include those who follow heteronormative patterns, but also those belonging to the group of sexual minorities – gays, lesbians and bisexuals.[8]

Brazilian studies that include sexual minorities who use dating applications are particularly focused on men who have sex with men (MSM). [9-11] However, the understanding of the circumstances that lead to risky sexual behavior among young Brazilians, college students and users of these applications is scarce.[12] This approach is necessary as the use of mobile technology is virtually universal among college students.[13] Moreover, sexual health education can be a counterpoint that mitigates risk behaviors, improving knowledge and directing support for positive attitudes towards sexual health.[14]

The revolutionary process of digital technology that has become part of every individual's everyday life has significant implications for our understand-

ing of what constitutes sexual health, considering the integration of sex education accessed during life, vulnerability and healthy attitudes. This theme is important since the use of dating applications has been associated with the growth in the number of cases of sexually transmitted infections (STIs) in young people.[15]

The investigation of these variables in sexual minorities in relation to heterosexuals is limited in Brazil. Examining the behaviors of these populations can provide elements for the development of interventions that are supported in a society that experiences a previously mentioned digital environment. Relying on the possibility that the individual has control over his life, and that decisions can lead to a better health condition, i.e., less vulnerability,[4] this study had the following guiding question: Are there differences between unprotected sexual practice, access to sex education and positive attitudes towards sexual health among dating application users, considering sexual orientation? Thus, in view of the questioning, the study aimed to analyze sexual education, risk behaviors and attitudes of college students who use dating applications, considering sexual orientation.

Methods

This is a descriptive, cross-sectional study carried out between August 2018 and April 2019, designed in accordance with the Strengthening the reporting of observational studies in epidemiology (STROBE) recommendations.[16] Students were invited to participate in the epidemiological survey entitled "*Aplicativos geossociais e condutas de risco: sexo desprotegido e consumo de álcool entre acadêmicos da cidade de Palmas, Tocantins*", held at the *Universidade Federal do Tocantins* (UFT), Palmas, Brazil.

In this study, participant recruitment took place in the common areas of the institution on a full-time basis. Each participant was invited individually to a room and answered a self-administered, anonymous questionnaire with the variables of interest. The ballot box technique was used to ensure the confidentiality of responses, improve reliability and avoid desirability bias.[17]

In the study, male and female students of the institution in question were eligible and included, aged 18 years or older, and who used or did not use dating applications. Individuals who were in the institutional environment, but were not college students, and those who gave up answering the questionnaire were excluded. Questionnaires lacking more than 50% of responses, age, gender and/or responses related to the use of dating applications were also excluded. Participants were informed that they could skip questions they did not want to answer. A conventional sample of 412 students responded to the questionnaire. After applying the exclusion criteria, 53 (12.86%) questionnaires were disregarded for analysis. The final sample consisted of 359 students.

The survey instrument included demographic, economic, sociocultural issues, a section that addressed dating application use, sexual behaviors, and attitudes toward sexual health. Exposure variables were biological sex (female, male), age (categorized in the analysis as 18-19 years, 20-24 years and >25 years), skin color (yellow, white, brown, black, I don't want to declare), sexual orientation (heterosexual, homosexual, bisexual), marital status (single, married, widowed, stable union), relationship status (I am in a relationship, I have casual dates, not dating and without casual dates), smoking (no, yes), alcohol consumption (no, yes).[17]

The sexual behaviors of dating application users were assessed with questions adapted from previous studies:[13,18,19] Was there sexual intercourse with the partner in the casual date (yes/no)? Protected sex (yes/no)? How many sexual partners in the last month and in the last three months? Have you been tested for STIs after intercourse? Do you know the Testing and Counseling Center (TCC) provided by the Unified Health System (SUS – *Sistema Único de Saúde*)?; if yes, did you use the service offered by the TCC?

Sources of student information about safer sex prior to college entry included parents, other family members, the media (e.g., television, radio, newspapers), sexual partner, colleague/

friend, internet, teacher, healthcare professional, religious community (e.g., priest, pastor, religious group) and specialized books. In the academic context, sources were mediated classes, higher education books, seminar/conversation, theatrical exhibition/presentation, scientific event, college colleague/friend.

Positive attitudes towards sexual health were evaluated through 7 items, considering a Likert-type scale with 3 points (0 - not at all important; 1 - important; 2 - very important), they are: health promotion policies at college; thinking about protected sex before finding a casual partner; using condoms in all sexual relations with a steady partner; consulting a specialist professional for information on safer sex/STI/testing; talking about STIs with the partner; knowing the partner's sexual past and health status; refusing unprotected sex.[17]

Categorical variables were expressed as relative and absolute frequencies. Participants were divided into three groups according to sexual orientation. To investigate the association of sexual orientation with other categorical variables, Pearson's chi-square test was performed. Then, a factor analysis of variance (ANOVA) with a post-hoc Bonferroni test was used to verify differences in attitudes towards sexual health in the application use and sexual practice groups. In this case, sexual orientation, use of dating applications, casual dates with partners, sexual practice and protected sex were categorized as independent variables, and the sum of all attitude values was considered the dependent variable. Central tendency (mean) and dispersion (standard deviation) statistics were used. Data were analyzed using Statistical Package for the Social Sciences (SPSS) version 25.0, with a significance level of $p \leq 0.05$ and a 95% confidence interval.

The study protocol was approved by the Research Ethics Committee of the *Universidade Federal do Tocantins* (CAAE (*Certificado de Apresentação para Apreciação Ética* - Certificate of Presentation for Ethical Consideration) 90803918.5.0000.5519). Participants voluntarily signed a Free and Informed Consent Term, after being informed about the objectives of the study.

Results

Table 1 shows that, of the 359 participants, 267 (74.3%) were heterosexual, 39 (10.8%) were homosexual, and 53 (14.7%) were bisexual. Most homosexuals were male and had a family income of up to 03 minimum wages ($p<0.05$). Most women identified themselves as heterosexual or bisexual ($p<0.05$). In relation to alcohol consumption, smoking, and use of dating applications, the intra-group frequency was higher for bisexuals and homosexuals ($p<0.05$). Tinder was the most used application among sexual orientations.

Table 1. Bivariate analysis of professors' sociodemographic characteristics (n=359)

Variables	Sexual orientation			p-value
	Heterosexual n(%)	Homosexual n(%)	Bisexual n(%)	
Sex				<0.001
Male	127(47.6)	33(84.6)	26(49.1)	
Female	140(52.4)	6(15.4)	27(50,9)	
Income				0.028
Up to 3 wages	98(36.7)	23(59.0)	20(37.7)	
> 3 wages	169(63.3)	16(41.0)	33(62.3)	
Age				0.633
18-19	86(32.2)	12(30.8)	15(28.3)	
20-24	144(53.9)	21(53.8)	34(64.2)	
>24	37(13.9)	6(15.4)	4(7.5)	
Skin color*				0.277
White/yellow	83(31.6)	13(33.3)	13(24.5)	
Brown	139(52.9)	16(41.0)	27(50.9)	
Black	41(15.6)	10(25.6)	13(24.5)	
Marital status				0.277
Single	249(93.2)	39(100.0)	50(94.3)	
Married	17(6.4)	-(-)	2(3.8)	
Divorced	1(0.4)	-(-)	1(1.9)	
Relationship status*				0.400
In a relationship	101(37.8)	11(28.2)	17(32.1)	
I have casual dates	70(26.2)	16(41)	20(37.7)	
Not in a relationship and no casual dates	94(35.2)	12(30.8)	16(30.2)	
Alcohol consumption				<0.001
No	122(45.7)	11(28.2)	11(20.8)	
Yes	145(54.3)	28(71.8)	42(79.2)	
Smoker*				0.008
No	228(85.7)	26(70.3)	38(71.7)	
Yes	38(14.3)	11(29.7)	15(28.3)	
Dating applications				<0.001
No	110(41.2)	3(7.7)	8(15.1)	
Yes	157(58.8)	36(92.3)	45(84.9)	
Tinder				0.055
No	12(7.6)	6(16.7)	1(2.2)	
Yes	145(92.4)	30(83.3)	44(97.8)	

*Absence of answers for the variables: skin color (n=4); relationship status (n=2); and smoker (n=3)

The risky sexual behaviors of dating application users are presented in Table 2. Most homosexuals, followed by bisexuals, had dates when compared to heterosexuals ($p<0.05$). Sexual practice, unpro-

tected sex, and having multiple sexual partners did not differ between groups. Homosexuals reported information about protected sex and STIs through dating applications and testing after meeting with a casual partner (p<0.05). Knowledge and use of the service offered by the TCC were mostly reported in this group (p<0.05) (Table 2). Participants aged 20 years or older reported testing for STIs (87.3%) and were aware of the TCC (79.8%) (p<0.05).

Table 2. Quantitative analysis of dating application users associated with casual date and sexual behavior by self-identified sexual orientation (n=238)

Variables	Sexual orientation			p-value
	Heterosexual n(%)	Homosexual n(%)	Bisexual n(%)	
Date through application				0.011
No	49(31.2)	3(8.3)	9(20.0)	
Yes	108(68.8)	33(91.7)	36(80.0)	
Sex on the date				0.246
No	27(25.0)	3(9.1)	9(25.0)	
Yes	81(75.0)	30(90.9)	27(75.0)	
Protected sex				0.623
No	25(30.9)	12(40.0)	10(37.0)	
Yes	56(69.1)	18(60.0)	17(63.0)	
Multiple partners (01 month)				0.354
No	69(85.2)	22(73.3)	22(81.5)	
Yes	12(14.8)	8(26.7)	5(18.5)	
Multiple partners (03 months)				0.246
No	52(64.2)	15(50.0)	19(70.4)	
Yes	29(35.8)	15(50.0)	8(29.6)	
Information on protected sex and STIs				<0.001
No	143(91.1)	14(38.9)	38(84.4)	
Yes	14(8.9)	22(61.1)	7(15.6)	
STI testing				0.002
No	53(65.4)	8(27.6)	14(50.0)	
Yes	28(34.6)	21(72.4)	14(50.0)	
Know the TCC				<0.001
No	119(76.3)	16(48.7)	29(54.7)	
Yes	37(23.7)	20(51.3)	24(45.3)	
Used TCC				0.001
No	23(63.9)	2(11.1)	12(52.2)	
Yes	13(36.1)	16(88.9)	11(47.80)	
Sources about sex education for protected sex obtained by dating application users				
Internet				0.029
No	64(40.8)	8(22.2)	11(24.4)	
Yes	93(59.2)	28(77.8)	34(75.6)	
Scientific events				0.031
No	138(87.9)	35(97.2)	35(77.8)	
Yes	19(12.1)	1(2.8)	10(22.2)	
College friends				0.035
No	97(61.8)	17(47.2)	19(42.2)	
Yes	60(38.2)	19(52.8)	26(57.8)	

Regarding the information about protected sex experienced by students, it was found that heterosexuals received information through the internet (59.2%), college friends (38.2%) and scientific events (12.1%). On the other hand, the internet and interpersonal relationships with friends were reported by homosexuals and bisexuals (p<0.05) (Table 2). There was no statistically significant difference for the other variables investigated, highlighting the similarity between the groups. In the analysis of protective attitudes towards the sexual health of dating application users, it was observed that health promotion policies at college, reflecting on protected sex before finding a casual partner, refusing unprotected sex and consulting a specialist for information about protected sex/STI/testing were considered important and very important by more than 90% of participants. Conversely, conversation about STIs with a partner was reported as not important by 1.9% and 8.9% of heterosexuals and bisexuals, respectively (p=0.005). Of the bisexuals, 17.8% reported not being important to know their partners' sexual history and health status. Finally, 15.3% of heterosexuals considered it not important to use condoms in all sexual relations with a steady partner. Sexual orientation had no statistically significant interaction with the use of dating applications ($F(2; 348) = 0.29$; $p = 0.75$, casual date ($F(2; 235) = 0.57$; $p = 0.57$), sexual intercourse ($F(2; 174) = 0.26$; $p = 0.77$) and protected sex ($F(2; 135) = 0.89$; $p = 0.41$) when it came to changes in attitude towards sexual health. The analysis of variance followed by the Bonferroni test showed that protective attitudes towards sexual health were verified in heterosexuals who did not use dating applications, who did not meet through applications or sexual intercourse, constituting a higher mean of attitudes (p<0.05). There was no statistical difference between homosexuals and bisexuals (Table 3).

Discussion

This study did not show differences between groups, when finding vulnerability both in heterosexual dating application users and in those inserted in sexual minorities. The importance of the theme was highlighted due to the technological advance and the popularization of virtual interaction with changes in human behavior in the search for even-

Table 3. Analysis of attitude towards sexual health and use of dating applications, casual date with partner, sex practice and protected sex

Sexual health attitude and use of dating applications		Heterosexual		Homosexual		Bisexual	
		Mean (SD)	95% CI	Mean (SD)	95% CI	Mean (SD)	95% CI
Dating application user	No	11.78[a] (1.88)	11.41-12.14	12.67[a] (1.53)	8.87-16.46	11.43[a] (1.81)	8.57-13.10
	Yes	11.20[b] (2.35)	10.83-11.58	11.60[a] (2.12)	10.87-12.32	11.44[a] (2.09)	10.81-12.07
Casual date	No	11.75[a] (2.15)	11.41-12.14	11.00[a] (2.64)	4.42-17.57	11.78[a] (1.98)	10.25-13.30
	Yes	10.95[b] (2.40)	10.49-11.41	11.66[a] (2.10)	10.90-12.41	11.36[a] (2.14)	10.63-12.08
Sexual intercourse	No	11.89[a] (1.69)	11.21-12.55	12.33[a] (1.15)	9.46-15.20	11.78[a] (2.04)	10.20-13.35
	Yes	10.63[b] (2.53)	10.07-11.20	11.59[a] (2.18)	10.76-12.41	11.22[a] (2.19)	10.35-12.09
Protected sex	No	10.56[a] (2.63)	9.47-11.64	11.00[a] (2.93)	9.14-12.86	11.70[a] (2.31)	10.04-13.35
	Yes	10.67[a] (2.51)	9.99-11.35	12.00[a] (1.41)	11.27-12.72	10.94[a] (2.13)	9.84-12.03

There were no simple effects and interaction of sexual orientation and the use of dating applications, casual date with their partner, sexual intercourse and protected sex in protective attitudes towards sexual health. Different letters represent statistically significant differences between the means.

tual sexual partners. The vulnerable individual may not suffer harm, but will be susceptible to disadvantage. Although the term vulnerability presents inaccuracies in the evolutionary process in the construction of its concepts,[20] advances in the discussions enabled the intertwining between the individual, social and programmatic aspects.[21] In this context, the present study pointed out that being exposed to risks in unprotected sexual practice can make individuals susceptible to infections and diseases. On the other hand, it showed that quality sex education can be a mediating resource in the individual and collective protection of risks.

Thus, unprotected sex, multiple sexual partners, limited access to information on protected sex and STIs mediated by educational sources and/or dating applications, non-use of services offered by the TCC and low frequency of testing for STIs were factors that contributed to the risk exposure of the study population. The relevance of these findings is based on gaps found in Brazilian studies that focused only on sexual risk behaviors of the MSM population using dating applications.[9,11] However, the increasing availability of technology has allowed the general population to use dating applications. In this context, studies on the young, college and heterosexual population were concentrated in the United States of America.[18,22]

Regarding the characteristics of dating application users, this study found that most homosexuals and bisexuals accessed these digital tools. These data corroborated previous studies that found an influence of sexual orientation on access to dating applications.[7,23] Furthermore, 58.8% of heterosexuals reported using the applications. Tinder was reported in its entirety by participants. As it is an application not restricted to users of a specific sexual orientation, evidence indicated that Tinder has impacted individuals' sexual behavior. Heterosexual women were attracted to heterosexual men, and considered bisexual men less masculine and less attractive.[24] Men from sexual minority groups used Tinder to have romantic relationships,[25] but were also victims of discrimination and violence when they accessed dating applications.[26] Although Tinder is associated with having multiple sexual partners, risky sexual behaviors and the possibility of contracting STIs were not exclusive to its users and can be found in other dating applications.[27]

Participants, regardless of sexual orientation, were engaged in casual dates. This factor was not a key characteristic for sexual practice, unprotected sex and multiple partners. This evidence demonstrated that college dating application users were vulnerable to risky sexual behaviors, in contrast to the data reported by Liu et al.[28] who identified groups of sexual minorities most vulnerable to risky sexual behaviors and venereal symptoms of STIs. The present study revealed the need to develop proposals for effective interventions not only to encourage protected sexual practice by key populations that may present behaviors and sociability, increasing their vulnerability to STIs.

On the other hand, protective behaviors such as accessing the TCC were observed in minority groups, especially homosexuals, who were more likely to undergo tests for STIs. Although college students are less likely to undergo testing to know their serological status for STIs,[29] individuals in the minority groups and dating application users investigated and tested for HIV.[8] The TCC is an essential service for prevention and mediation between the diagnosis of an STI and therapeutic assistance based on health promotion, whose environment al-

lows an approximation with the young population, and may be a traveling model, within the college geographic space, for educational actions in relation to individuals' sexuality.[30]

In relation to obtaining information about protected sex and STIs, homosexuals accessed content through dating applications. The Internet and college friends were preferences among the groups. Scientific events, although to a lesser extent, were reported by heterosexuals and bisexuals. Charest et al.[31] reported that heterosexuals obtained information about sexual health in the school environment and that they used the internet less as a knowledge resource, being characteristic of sexual minorities. On the other hand, the present study showed that only heterosexuals who accessed the internet as a source of sexual information presented risky sexual behavior in unprotected sexual intercourse (41.3%) in relation to those who did not use this tool (17.1%) (p=0.02). The internet, which is part of daily life, is a tool that can make young people vulnerable to STIs, due to the wide possibility of inadequate knowledge. Thus, sexual education in the family and school environment can play an important role in the construction of individuals' sexuality, contributing to the awareness of assertive sexual practice and avoiding risky actions.

This study demonstrated that there is a lack of educational interventions in the college environment and throughout life that can curb recklessness and neglect during sexual intercourse. In fact, knowledge about positive conduct in sexual activity does not guarantee the most appropriate choices of young college students.[32] The search for partnerships with professional sex educators, who rely on cultural evidence, may be an alternative to guide students in the institutional environment. These actors have considered sex education valuable, which cannot be restricted only to scientific and medical facts, but with a holistic and integrative view important in sexual decision-making in the context of casual relationships or dates.[32,33]

Not least, it was found that heterosexuals not using dating applications showed positive attitudes towards sexual health. Sexual minorities are consistently more liberal than heterosexuals, but the change in socio-sexuality can make attitudes less distinct.[34] Thus, the use of devices that allow access to sexual content has contributed to unprotected sex with male, homosexual and bisexual partners, but also an unprotected relationship with female partners between heterosexual and bisexual men.[35]

The limitations of this study included the research site, reflecting a part of northern Brazil and a group of college students inserted in a specific institution. According to the non-performance of a pretest to verify the understanding of questions. Third, the study design that considered biological sex and sexual orientation as variables, which limited the analysis from the perspective of gender identity as a specific variable, which includes the transgender and transvestite population. Finally, not verifying how long users used the dating application and associating sexual vulnerability was considered a limitation.

Future studies are needed to understand the behavior of this population to improve sexual health campaigns. We encourage researchers to replicate this study in other higher education institutions so that it can be evidenced to a greater extent how dating applications influence young college students' risk behaviors.

Conclusion

The risky sexual behaviors were similar in college students using dating applications, regardless of sexual orientation, evidencing unprotected sex and negative attitudes to sexual health. It was observed that the main sources of sexual information are not those mediated by trained professionals. Protective behaviors such as accessing the TCC and testing for STIs were verified in the groups of sexual minorities. Health promotion policies are necessary for the academic population, considering appropriate interventions for sex education that stimulate the subject's self-knowledge and reduce the negative impacts in relation to the stereotype of diversity around sexuality, in the face of the growing evolution of digital technology.

Acknowledgments

This study was carried out with the support of UFT. To the Institutional Scientific Initiation Scholarship Program (PIBIC (*Programa Institucional de Bolsas de Iniciação Científica*)/UFT; scientific initiation scholarship granted for MKBT).

Collaborations

Tavares MKB, Melo RLP, Evangelista DR, Silva JBNF contributed to the project conception, data analysis and interpretation, article writing, critical review of the intellectual content and final approval of the version to be published.

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