

## Knowledge about HIV/AIDS and implications of establishing partnerships among Hornet® users

*Conhecimento sobre HIV/aids e implicações no estabelecimento de parcerias entre usuários do Hornet®*  
*Conocimiento sobre el VIH/SIDA y sus implicaciones en el establecimiento de relaciones entre usuarios del Hornet®*

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### ABSTRACT

**Objective:** To evaluate the knowledge of men, who have sex with men who use geolocation-based dating software, about HIV/AIDS, and the implications of establishing partnerships. **Method:** Descriptive study with 30 Hornet® users. The statements generated had statistical treatment in the IRaMuTeQ software, analyzed through the Descending Hierarchical Classification. **Results:** The sexual frequency in the last 30 days was 2.9 partners, of which 2.1 were found by the application, of which 63.3% reported having sex without condoms. There were four classes: Knowledge about HIV/AIDS prevention measures; PrEP/truvada as a measure of HIV/AIDS prevention; Risky behaviors in relation to HIV infection; Establishment of sexual partnerships through applications. **Conclusion:** Hornet users have insufficient knowledge about HIV prevention measures, especially when discarding the male condom. The relationships established through the application are permeated by high individual vulnerability and behaviors that have potential exposure to the risk of HIV infection. **Descriptors:** Male Homosexuality; HIV; Acquired Immunodeficiency Syndrome; Sexual Behavior; Mobile Applications.

### RESUMO

**Objetivo:** avaliar o conhecimento de homens que fazem sexo com homens usuários de aplicativo de encontro baseado em geolocalização, sobre o HIV/aids e implicações no estabelecimento de parcerias. **Método:** estudo descritivo, com 30 usuários do Hornet®. Os depoimentos gerados tiveram tratamento estatístico no software IRaMuTeQ, analisados pela Classificação Hierárquica Descendente. **Resultados:** A frequência sexual nos últimos 30 dias foi de 2,9 parceiros, sendo 2,1 conhecidos pelo aplicativo, dos quais 63,3% relataram sexo sem camisinha. Obtiveram-se quatro classes: Conhecimento sobre medidas de prevenção do HIV/aids; PrEP/truvada como medida de prevenção do HIV/aids; Comportamentos vulneráveis em relação à infecção pelo HIV; Estabelecimento de parcerias sexuais pelos aplicativos. **Conclusão:** Usuários do Hornet® possuem conhecimento insuficiente sobre medidas de prevenção do HIV, principalmente quando se descarta o preservativo masculino. As relações estabelecidas pelo aplicativo são permeadas por alta vulnerabilidade individual e comportamentos que têm potencial de exposição ao risco de infecção pelo HIV. **Descritores:** Homossexualidade Masculina; HIV; Síndrome de Imunodeficiência Adquirida; Comportamento Sexual; Aplicativos Móveis.

### RESUMEN

**Objetivo:** Evaluar el conocimiento que tienen los hombres que practican sexo con hombres, usuarios de la aplicación de encuentros con base en la geolocalización, sobre el VIH/SIDA y sus implicaciones en el establecimiento de relaciones. **Método:** Estudio descriptivo, con treinta usuarios del Hornet. Los relatos fueron tratados estadísticamente en software IRAMUTEQ y evaluados con la Clasificación Jerárquica Descendente. **Resultados:** La frecuencia sexual en los últimos treinta días fue de 2,9 compañeros, siendo que 2,1 fueron conocidos mediante la aplicación, de los cuales 63,3% practicaron sexo sin condón. Se obtuvieron cuatro categorías: Conocimiento sobre las medidas de prevención del VIH/SIDA; PrEP/Truvada como medida de prevención del VIH/SIDA; Conductas vulnerables a infección por el VIH; Establecimiento de relaciones sexuales mediante las aplicaciones. **Conclusión:** Los usuarios del Hornet tienen conocimiento insuficiente sobre las medidas de prevención del VIH,

especialmente cuando no utilizan condón masculino. Las relaciones establecidas mediante esta aplicación están construidas de alta vulnerabilidad individual y de conductas que exponen riesgos a infección por el VIH.

**Descripciones:** Homosexualidad Masculina; VIH; Síndrome de Inmunodeficiencia Adquirida; Conducta Sexual; Aplicaciones Móviles.

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## INTRODUCTION

When analyzing the HIV/AIDS situation worldwide it is noticeable that it is no longer a problem restricted to population groups but a pandemic that can affect, almost indiscriminately, everyone. Despite heterogeneity in the world population, recent studies indicate groups of key populations within this global epidemic, which includes men who have sex with men (MSM)<sup>(1-4)</sup>.

The prevalence in this population is disproportionately higher than in the general population, and this can be attributed to specific vulnerabilities (sexual orientation, discrimination, stigma, difficulty in accessing education and health services) and certain sexual practices (insertive and receptive anal sex). The need to understand these vulnerabilities and to track the new behaviors justifies the importance of investigating the use of the Internet, especially mobile social networks, to establish sexual partnerships<sup>(2)</sup>.

Among the range of current resources offered by the Internet, the applications that are configured as social networks for relationships outstand, especially those focused exclusively on the MSM population. The sex facilitated by the help of these social media occurs, almost always, in a casual, fast, unscheduled, circumstantial way and on early age. Sometimes the partners dispense with the condom and there is high exchange of partners, since these relationships are casual, in addition to the possibilities of group sexual practices<sup>(2-5)</sup>.

## OBJECTIVE

To evaluate the knowledge of men who have sex with men, using a geolocation-based dating application, regarding HIV/AIDS and its implications of partnering.

## METHOD

### Ethical Aspects

The study was approved by an ethics committee in human research and it rigorously followed all national and international ethical precepts. Aiming at anonymity, participants' names were encoded using the alphanumeric system (User 01).

### Study type

This is a descriptive and exploratory research developed exclusively online in a geolocation-based dating application. The Hornet® is one of the most popular applications aimed at meeting men who have sex with men and it has around nine million users worldwide, with Brazil as one of its main consumer markets<sup>(6)</sup>.

### Methodological procedures

The study was conducted with 30 MSM who are users of this application, selected through accidental sampling. Thus, MSM that were online at the time of collection were contemplated. For

recruitment, a modified time-location sampling (TLS) technique<sup>(7)</sup> was adapted to virtual reality, which allowed the development of a user sampling chart.

To be included in the research, the participants should meet the following inclusion criteria: age equal to or greater than 18, living in Teresina, Piauí, Brazil, or Ribeirão Preto, São Paulo, Brazil; having an active account in the application and being online at the time of collection, in addition to filling out the "Know Your Status" (KYS) section, available exclusively in this application. The choice of the two cities was defined in order to limit the sampling chart of participants, due to the large number of users in Brazil. In addition, both cities have a similar population in terms of the number of inhabitants and the young adult population.

### Collection and organization of data

The data collection was provided by the TLS technique modified for virtual reality, in order to enable the simultaneous collection in the two cities without the displacement of the researchers, who used their own application settings to change their geographical position and allocate the users that wanted access, by city at the desired moment.

In the data collection, the Computer-Assisted Interview technique (CASI)<sup>(8)</sup> was used, in which subjects approached through the application itself were invited to answer the study questions. Participants were presented to the research objectives and, after consent, were invited to answer the questions, which included: sociodemographic data, knowledge about HIV, forms of prevention, sexual behaviors and use of the application. The collection was conducted by two male researchers, older than 18, with expertise in the studied subject and who registered in the application to have access to the users, using a public profile.

The first online users who registered, in their profile, the current serological status for HIV/AIDS were approached. When the participant expressed disinterest in the research, the researchers moved on to the next user.

At the end of the interview, the users were asked if they had any questions about the subject and all were immediately answered by the researchers as well as conceptual misconceptions reported in their statements. When it was necessary, the researchers sent the addresses of the Testing and Counseling Centers of the city where the participant resided.

### Data analysis

The users' reports were grouped in a corpus, with statistical treatment by the software IRaMuTeQ (acronym of *Interface of R pour les Analyses Multidimensionnelles de Textes et de Questionnaires*)<sup>(9)</sup>. This software uses statements to perform sophisticated lexical analyses and it has been highlighted in qualitative researches in the health area<sup>(10-11)</sup>. The authors emphasize that the use of software is not an absolute data analysis

method, but a procedural tool that facilitates the analysis. Thus, the researcher is responsible for interpretation and conclusion based on their view of the findings<sup>(12)</sup>.

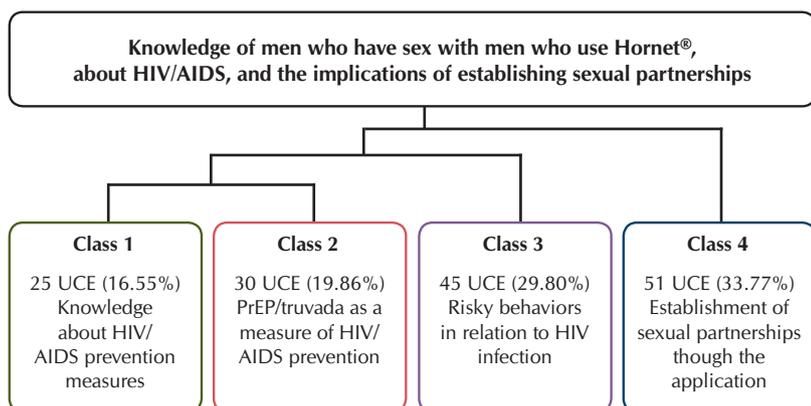
The data obtained were analyzed based on the Descending Hierarchical Classification (DHC)<sup>(9)</sup>, according to which the texts are arranged considering their respective vocabularies, whose set is divided by the frequency of the reduced forms. This classification enabled the researchers to obtain classes of segments of text with vocabulary that is similar to each other and at the same time different from the segments of text of the other classes. The DHC result was presented in a dendrogram.

## RESULTS

In this study, the young-adult age group corresponded to the majority of the participants (71.3%), with ages between 18 and 25, with secondary education (52.3%) and without own income (67.5%). Still, 90% of the participants reported not being in a relationship at the time and 83.3% identified themselves as homosexuals. All participants (100%) reported using other dating applications, in addition to Hornet®.

The mean of sexual intercourses in the last 30 days was 2.9 (minimum: 01, maximum: 16), of which 2.1 were arranged through Hornet®. Also, the distribution of the means by city was of 3.4 and 2.4 among the users in Ribeirão Preto (SP) and Teresina (PI), respectively. Still, 63.3% of the participants reported sex without condoms in the last 30 days and, although all of them reported knowing their serological status, only 46.6% had had a confirmatory test.

Regarding the participants' statements, through IRaMuTeQ, the separation of the *corpus* was recognized in 151 Elementary Context Units (UCE), from 30 Initial Context Units (UCI). There were 8,166 occurrences, using 71.6% of the initial *corpus*. Based on the Descending Hierarchical Classification the textual domains were identified and analyzed. From the identification of the most significant words (chi-square values) and interpretation of the meanings attributed to them, the collective construct was grouped, according to their respective meanings, into classes, shown in Figure 1.



Note: PrEP – Pre-exposure Prophylaxis; UCE – Elementary Context Units

**Figure 1** – Thematic structure of knowledge-related content of men who have sex with men through Hornet®, regarding HIV/AIDS and the implications of the establishment of sexual partnerships

During processing, the *corpus* underwent an initial partition resulting in two subgroups, related to knowledge about HIV/AIDS (classes 1 and 2), and vulnerabilities and sexual behaviors that facilitate exposure to HIV through Hornet® (class 3). Class 4 originated from a second partition, encompassing the others and it is related to the establishment of sexual partnerships through the application.

### Class 1: Knowledge about HIV/AIDS prevention measures

The content of this class is related to knowledge about HIV/AIDS prevention. The words grouped in it portray the low knowledge of the participants concerning the subject, as it is limited and sometimes wrong. This knowledge does not seem to have accompanied the technological advances in the area, limiting itself to the male condom.

*Basically, I wear a condom.* (User 12)

*There is the condom, and a few gels that you place inside the condom to kill the virus, but I've never tested them.* (User 23)

*For women, there are a lot of things, but for men, there aren't so many options, just the condom.* (User 30)

The low percentage of terms attributed to this class by the software is mainly due to the low variety of different words in the participants' statements, reflecting the lack of deepening on the catalogued biomedical forms of HIV/AIDS prevention.

### Class 2: PrEP/truvada as a measure of HIV/AIDS prevention

This class is closely related to the former one (class 1). The subjects attempted to list other biomedical forms of HIV/AIDS prevention, which leads them to discuss PrEP. However, the discussion about PrEP was previously stimulated by the researcher seeking to sensitize the participants to the subject and, thus, to seek representations about this object. The statements, however, evidenced the difficulty of the users in listing forms of protection beyond the male condom.

*Is PrEP the same thing as truvada? It is a medicine that porn actors use to have bareback sex?* (User 01)

*To be honest, I've never heard of this [PrEP]; is it a medicine?* (User 12)

Despite the stimulus, most of the participants' statements contained misconceptions regarding the subject. In the following statements, PrEP is confused with the post-exposure prophylaxis (PEP) which is already consolidated and implemented in Brazil.

*PrEP is a medicine that you take after a risky sexual intercourse, in order to decrease the chances of contracting the HIV virus and, thus, not getting infected.* (User 22)

*PrEP is that medicine you take for about 30 days after you are exposed to a risky situation? I've even taken it before.* (User 04)

*If I'm not wrong, it is a medicine for accidents? When something goes wrong, like a ripped condom, sexual assault, this kind of things. (User 07)*

Little knowledge has a high potential to expose these subjects to risky situations, since it makes them vulnerable, with limited options for protection and negotiation of safe sex practices. HIV prevention measures have been limited to physical barriers that, when unavailable, facilitate unprotected sex, by the absence of another form of protection.

### **Class 3: Vulnerable behaviors in relation to HIV infection**

The contents seized in this class relate to the behaviors and individual vulnerability of the users of the application, mainly due to the use of the application as a tool to obtain sexual partnerships.

The interclass relation is notorious, since the lack of knowledge about the prevention measures, evidenced in the previous classes (1 and 2), can potentialize situations of vulnerability, while the combination of biomedical forms of protection could facilitate protection.

Among risky behaviors, the high exchange of sexual partners, unprotected anal sex (bareback), lack of knowledge about the serological status, use of psychoactive substances during sexual intercourse and group sex are highlighted.

*I had five partners this week... so, in the last 30 days, it was about 16, I think... (User 14)*

*I had relations with my boyfriend, and about 4 others... usually it is the "quick-fuck"... We have sex and we only call the guy again if he performed well. (User 12)*

*I had intercourse with ten guys... but that doesn't mean I had sex ten times, you know? It happened more with the same guy. (User 03)*

*I only have condomless sex with my boyfriend, it is always "bareback," even if it is a threesome. (User 08)*

*No... I had condomless sex only once when I had drunk and smoked pot. It happened with two guys who had also smoked pot, so it was quite intense... it was in his house. (User 10)*

*I met all of them through the application, it is like a menu from a restaurant, it has what you want, on any day you want it. (User 17)*

Although the high exchange of sexual partners, unprotected anal sex and group sex are frequent practices among the participants of the research, HIV testing is not. Some of them do not know their serological status, while other users do not have a regular testing frequency.

*No... I've never been tested, but I don't have condomless sex, only oral sex. (User 11)*

*No... but I think I'm negative, because my boyfriend is always tested... since he doesn't have it, I don't think I have it either, because I only have sex with him. (User 09)*

*I had condomless sex sometimes when I was in a relationship with three people. I wore a condom with the girl more regularly because she could get pregnant... (User 23)*

*Condomless? I do it only with guys, with girls, I'm afraid they are going to get pregnant. I'm afraid of it, I don't want to run this risk... (User 19)*

*I only got tested when I donated blood, but, when I say I have sex with other guys, the lady doesn't let me donate blood; so I stopped donating and getting tested. (User 27)*

### **Class 4: Establishment of sexual partnerships through the application**

Little knowledge about HIV prevention measures directly influences the establishment of sexual partnerships through the application. In this environment, users adapt to the "search system" based on practicality, speed, little dialogue, exchange of intimate photos and fast sexual decisions, providing greater exposure to risky situations.

*[What I look for in the application is] someone nice to have fun with, and see what happens. (User 29)*

*[What I look for in the application is] someone hot to enjoy the night. I don't want relationships, no, I only want to have fun, really. (User 14)*

*Sex! I think everybody is looking for sex in there. Some people talk about friendship, but if the person is in shape and has a nice face, it is sex, really. (User 10)*

Thus, the establishment of partnerships is a product of the particular characteristics that permeate relations through the application, that are extremely based on the physical-sexual interest, which does not allow for a negotiation that impairs the image of the body that is displayed and offered to the others.

*[...] in Hornet® it is very fast, you don't have time to look for these things, you see the face, some nudes and then you arrange it, preferably, for the same day. (User 24)*

*When you meet someone, you are not very influenced, because this is the kind of thing that ruins the mood, to talk about diseases... so, nobody is going to ask about it. (User 14)*

When the researchers asked about the importance of information about prevention measures in the applications, about knowing the partner's serological status prior to sex or the use of PrEP as an additional HIV protection measure, the users issued widely divergent opinions. However, most of them seemed resolute about the ineffectiveness of such measures due to the characteristics of the relationships in the application.

*I believe that people are not very familiar with the means of HIV prophylaxis. So the risk in the Hornet is very high, because it is very used for sex without commitment, just to satisfy one's desire... (User 02)*

*No, that would be something else! I would not stop fucking a pretty guy because he's on PrEP... if he has HIV and uses*

[PrEP], then I'd think about investigating and analyzing it.  
(User 27)

## DISCUSSION

The users of Hornet have insufficient knowledge about HIV/AIDS prevention measures, especially when the male condom is discarded. The relationships established by the application are permeated by high individual vulnerability and behaviors that have a potential to expose the users to the HIV infection, potentialized by the particular characteristics that permeate the relationships originated from the application.

The use of geo-social dating applications as facilitator and mediator of sexual encounters has been gradually reported in the literature, explored predominantly in developed countries. Most of them address issues related to describing users' profiles or risky behaviors. In this sense, this research is a pioneer in addressing the description of this profile alongside the identification of risky behaviors in relation to HIV infection and its influence in the establishment of partnerships in a developing country.

The predominant age group of young and young-adults has been associated with a higher frequency of use of the dating applications. This intensified use of the applications generates greater sex-seeking, more sexual partners<sup>(13-15)</sup>, and higher chances of acquiring sexually transmitted infections (STIs)<sup>(13-18)</sup>. The reasons for this phenomenon seem to be related to the fact that these young people relate the applications to the ideals of practicality, anonymity and convenience, thus, approaching other partners with more security and avoiding possible stigmas and prejudices, managing and revealing their sexual identity in a personalized way.

The ability to manage aspects related to sexuality, provided by application features such as the display of intimate photos and sexual preferences, coupled with the high efficiency of finding the "ideal partner," explains the fact that most participants use the applications purely for sexual purposes.

Expressing sexual preferences and filtering other potential partners from the applications enables the users to pursue different sexual activities (bisexual or group sex, bareback and orgies) without necessarily entailing emotional involvement with the participants. The encounters are usually unique and may include the fixed partner, suggesting that MSM users of the application view their sexual and affective needs differently<sup>(5,13)</sup>.

Furthermore, the analogy between in-app profiles and meals on a menu can be understood as a reflection of how quick these relationships are, in which users see their peers objectifying them as something to be consumed. This finding regarding the high exchange of sexual partners in the last month corroborates this idea and is reported in other studies that approached this object of research<sup>(17,19)</sup>.

Analyzing knowledge about HIV/AIDS prevention among MSM Hornet users is not common in the literature. In this study, this knowledge was extremely limited and restricted to the male condom. The connection of HIV protection limited to the presence of a physical barrier, which can be used only during sex, ignores prevention options that can be used before (PrEP) or after the sexual intercourse (PEP) and significantly reduces the negotiation options when condom use is not feasible or preferable<sup>(14-17)</sup>.

The Brazilian health policies, regarding the prevention of sexually transmitted infections, mainly aimed at the LGBT population, are slowly advancing. They are still limited and focused almost exclusively on a heterosexual model of condom use, despite the existing behavioral or pharmacological options<sup>(17,19-21)</sup>.

As demonstrated in the statements, the sexual encounters facilitated by the application are quickly initiated and concluded, without time for preparation, which can lead to the inconsistent use of the condom. Among current biomedical prevention strategies against HIV infection, PrEP has been highlighted due to its high efficacy presented in clinical trials<sup>(22-23)</sup>, and it is particularly recommended for MSM in situations of vulnerability. Although its use has not yet been regularized in Brazil, a study<sup>(24)</sup> already indicates the use of Truvada (commercial name of the drug), through the purchase of other countries.

In a social context, Brazil is marked by the contrast between the image of a tolerant and open society, coupled with growing manifestations of prejudices and discrimination against homosexuals as well as the censorship of their practices and affective-sexual preferences<sup>(25)</sup>. This limitation against the expression of sexuality in its multiplicity directly affects the construction of knowledge about sexual health, especially the prevention of STIs. Thus, the exchange of experiences and doubts about sexual practices, especially among younger individuals, is impaired. They end up reproducing, in homosexual practices, knowledge about prevention, built for heterosexual practices<sup>(19,21,25)</sup>.

The lack of risk perception and/or misinformation about the importance of the knowledge about the serological condition directly influences the willingness to test for STIs such as HIV/AIDS. The literature provides evidence that young MSM who have recently been exposed to anal sex without a condom are more likely to be tested. However, recognition of the situation of exposure is crucial for this to occur. Therefore, users should be properly sensitized and welcomed<sup>(26)</sup>.

Insufficient or misleading knowledge about HIV prevention measures, in addition to potentializing situations of exposure due to the low perception of risk, directly influences the establishment of partnerships. Once in the applications, users are likely to follow and replicate their trends. The establishment of partnerships is marked by high exchange and sometimes multiplicity of partners, unprotected anal sex, use of psychoactive substance during the sexual intercourse and group sex<sup>(5,13,16,27)</sup>.

As they seize social spaces, LGBT people are breaking free from the bonds and social norms imposed on the model of heterosexual relationship, creating and molding norms that are more adequate to their experiences, needs and desires. Understanding these particularities is necessary for the construction of a comprehensive and better developed care. It is important to understand how the details and specificities described affect the practices and behaviors of the LGBT community, in order to propose viable measures of protection and prevention focused on this reality<sup>(20,27-29)</sup>.

### Study limitations

The main limitation of this research is the fact that the results are based on self-reported information, especially regarding HIV testing and HIV status. In addition, conducting interviews that require a lot of subjectivity at a distance can bring compromise,

as long as they are not properly conducted. However, the researchers responsible for data collection have expertise in this type of approach aimed at this population.

The researchers believe that using mobile applications as a tool for sampling allocation is an innovative, fast and inexpensive tool. Hence, access to “difficult” groups, such as the one studied, is less expensive for researchers as well as for participants. Furthermore, research involving diseases, such as HIV/AIDS, or behaviors that are susceptible to judgment, criticism or social stigma tend to have higher reliability when performed by the Computer-Assisted Interview technique<sup>(8,30)</sup>.

### Contributions to the fields of nursing, health or public policies

The scenario presented in this study exposes a panorama, so far unprecedented in Brazil, which involves the interface of new communication technologies and vulnerability to HIV infection. Describing this reality from a Brazilian perspective puts the country in dialogue with international science. Non-heterosexual populations are notoriously discriminated and receive less attention in scientific studies; bringing details about

their behaviors, knowledge and attitudes empowers professionals and strengthens public policies that can actually impact the lives of these subjects.

The researchers believe that further research, especially comparative, is necessary, since this study describes users of a specific application (establishing partnerships), which does not enable one to generalize the results for the entire population of men who have sex with men in Brazil.

### CONCLUSION

Men who have sex with men and use dating software have high risky behaviors for HIV infection, which is associated with high individual vulnerability and low knowledge of HIV/AIDS prevention measures, in particular Pre-exposure Prophylaxis (PrEP). The relationships originated from the application are permeated by these characteristics that potentialize the possibility of acquiring the virus. These characteristics expose them to a higher risk of acquiring HIV and other STIs and place them as a key population in controlling the epidemic in Brazil.

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