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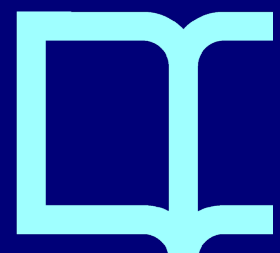
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Research Letter

Title:

ATTACHMENT STYLES, CONDOMLESS SEX AND DRUGS IN HIV-POSITIVE GAY AND BISEXUAL MEN

Running head:

Attachment and health care in HIV-positive gay men

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Abstract

This study evaluated whether attachment styles might be related to condomless sex, use of drugs and adherence to antiretroviral treatment (ART) in 400 HIV-positive gay and bisexual men (GBM). With the Relationship Questionnaire, 160 men were classified as secure attached and 240 as insecure attached (88 **dismissive**, 79 preoccupied and 73 fearful). Insecure attached GBM had more condomless sex ($p=0.04$), and used more cocaine ($p=0.001$), ecstasy ($p=0.03$), GHB ($p=0.04$) and ketamine ($p=0.04$). No differences were observed in adherence to ART. **Dismissive** attached GBM reported more condomless sex and use of drugs than preoccupied and fearful attached GBM. The perspective of attachment might enrich the interventions to promote health care in GBM.

The number of gay and bisexual men (GBM) living with HIV infection who have condomless sex is very high at the moment. A recent study conducted in a sample of 742 Spanish HIV-positive men showed that 62% of them had been diagnosed with a sexually transmitted infection, 60% had had condomless sex, and 29% reported recent sexualized drug use (injected in 16% of cases) (González-Baeza *et al*; 2018). In recent years, two events have produced significant changes in the sexuality of GBM: the first being the message that “HIV undetectable = HIV untransmittable” after the results of PARTNER study, and the second being the successful implementation of pre-exposure prophylaxis (PrEP). Although these events are undoubtedly positive for the GBM community, some studies have alerted that PrEP might lead to an increase in condomless sex with casual partners (Barreiro; 2018; Hoornenborg *et al*; 2018). Also, GBM may use disclosure of PrEP and undetectable viral load to calculate risks of HIV transmission and to decide to have condomless sex (Newcomb, Mongrella, Weis, McMillen, Mustanski; 2016).

Engaging in sex while high on drugs and having multiple sexual partners are factors associated with increased condomless sexual behavior in sexual and gender minority young adults (Ristuccia, LoSchiavo, Halkitis, Kapadia; 2018). In HIV-positive GBM, a history of substance abuse, multiple sex partners, younger age, and known STIs is linked with a greater incidence of condomless sexual intercourse and STIs (Esser, Krotzek, Dirks, Scherbaum, Schadendorf; 2017). GBM who engage in condomless sex may often keep a good adherence to their antiretroviral treatment (ART) and self-reported non-adherence seems not to be associated with engaging in condomless sex (Durham *et al*; 2018).

Although there is clear evidence that when the HIV-positive person is on virally suppressive ART the risk of HIV transmission is zero, condomless sex increases the chances of contracting hepatitis C virus and other sexually transmitted infections. In addition, the consequences of drug intake lead to an increased possibility of health, behavioral and social problems (disability, loss of job, domestic violence, among others). This makes it necessary to detect all the factors that may contribute to this behavior.

Several psychological variables have been described related to condom use and drug intake, such as the existence of depressive symptoms and the individual's attachment style, among others. Attachment theory is a framework for organizing beliefs related to one's acceptability to socially important others as well as beliefs about the potential availability of socially important others (Bowlby; 1988). Attachment related beliefs are influenced by early interactions with primary caregivers. However, these beliefs continue to be open to revision and movement throughout adult life if interactions with close others challenge these beliefs about the availability of love and support.

The mechanisms underlying the relationship between attachment and condom use include adaptability, trust, emotional and stress regulation, intimacy and management of perceived partner rejection, among others (Damani *et al*; 2009; MacDonald, McKenna, Mouck; 2016). A hypothesized model linked adult attachment to condomless sex through communication skills and condom expectancies. Anxious attachment, self-perceived mate value, and emotional communication predicted the belief that condoms interfere with intimacy. Also, assertive communication skills mediated a link between avoidant attachment and the belief that condoms interfere with sexual pleasure (Starks, Castro, Castiblanco, Millar; 2017). Regarding drug use, for those individuals with insecure attachment styles, the substance may be seen as a dysfunctional way of

compensating for feelings of insecurity and a replacement for secure relationships. In addition, drugs are predictable and can be an attempt to replace the lack of safety and security. Drug use can also help to cope with stress rather than **seeking other healthier** coping mechanisms, such as confiding in a loved one (Borhani; 2013).

Few studies have analyzed the sexual behavior of GBM with the perspective of attachment theory and most of them have been developed in HIV-negative men.

Insecure attachment has been related to a greater number of recent same-sex partners (Elizur & Mintzer; 2003). Also, both avoidant and ambivalent attachment are associated with diminished sexual communication. Avoidant attachment is associated with an increased number of casual condomless anal sex partners and having an avoidant attached partner is also related to an increase in the number of condomless sex partners reported. Securely attached individuals report the highest levels of sexual communication (Starks & Parsons; 2014). **However**, another study did not find differences in avoidant attachment for GBM in open versus monogamous relationships (Ramirez & Brown; 2010).

Regarding HIV-positive GBM, one study found that insecure attachment styles (particularly negative attachment representations of self and fearful attachment) were associated with having multiple sexual partners, including HIV-negative partners (Ciesla, Roberts, Hewitt; 2006). **Although**, to our knowledge, no **further** studies have been developed about attachment and sexual behavior in HIV-positive GBM. Thus, we aimed to explore whether different attachment styles could be related to more or less condomless sex in this population. We also evaluated the possible impact of attachment styles on the use of drugs and adherence to ART. Following our clinical experience and previous literature, our hypothesis was that GBM with insecure attachment styles would

exhibit a worse profile of health care than GBM with secure attachment style in all the health care areas assessed, with the exception of adherence to ART.

Method

Site of Study

The HIV-sex male study aimed to evaluate the sexual activity of men living with HIV in Spain. Previous data from the study regarding the presence of erectile dysfunction and factors associated is published elsewhere (Fumaz *et al*; 2017). This cross-sectional 4-month observational study was developed in a sample of men attending an HIV Unit in Badalona (Barcelona, Spain). Eligibility criteria included male birth sex, age ≥ 18 years and documented HIV infection. Concomitant pathologies or treatments were not exclusion criteria. All men who attended the HIV Unit for their regular medical visits were approached in the waiting room. The procedures and objectives of the study were explained verbally and written information was given. The men who agreed to participate provided their written consent and completed the study questionnaires. The study was managed by the Lluita contra la SIDA Foundation (<http://www.fl sida.org>). All study procedures were conducted in accordance with the 1964 Declaration of Helsinki (fourth revision, 1996) and Good Clinical Practice guidelines. The study was approved by the Research Ethics Committee of Germans Trias i Pujol University Hospital (*project code*: PI-13-067). Data were collected from November 2013 to March 2014.

Measurements

Demographic variables were self-reported and collected with a form developed ad hoc for the study. Data included age, country of birth, marital status, serologic status of stable partner (if applicable), number of casual sex partners in the past 2 months, use of

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erectile dysfunction (ED) medications (such as Viagra, Cialis, and similar pro-erection drugs), alcohol and drugs in the past 15 days. Drugs included cannabis, cocaine, poppers (nitrite), ecstasy (MDMA), mephedrone, GHB, ketamine, crystal methamphetamine, benzodiazepines, speed (amphetamine), heroin, and acid/LSD/magic mushrooms. Clinical variables were retrieved from medical records and clinical databases and included time since HIV diagnosis, being on ART (yes/no), current CD4 cell count, nadir CD4 cell count, current HIV-RNA viral load and highest HIV-RNA viral load.

In order to evaluate the rate of condomless sex among our study group, the form included the following question created ad hoc for the study: Have you had insertive and/or receptive condomless anal sex during the past 15 days?

Attachment was evaluated with the Relationship Questionnaire (RQ). This is a single item measurement made up of four short paragraphs, each describing a prototypical attachment pattern as it applies in close adult peer relationships (Bartholomew & Horowitz; 1991; Bartholomew & Shaver; 1998). Participants are asked to rate their degree of correspondence to each prototype on a 7-point scale. These ratings provide a profile of an individual's attachment feelings and behaviour. The RQ can either be worded in terms of general orientations to close relationships, orientations to romantic relationships, or orientations to a specific relationship (or some combination of the above). The patterns or styles that are obtained in the questionnaire are: secure (a person with high self-worth, who believes that others are responsible, comfortable with autonomy and in forming close relationships with others), preoccupied (a person with a sense of self-worth that is dependent on gaining the approval and acceptance of others), **dismissive** (a person with an overly positive self-view, who denies feelings of subjective distress and dismisses the importance of close relationships) and fearful (a

person with a negative self-view, lack of trust in others, subsequent apprehension about close relationships and high levels of distress).

To assess adherence to ART, participants were asked how many doses of treatment they had skipped in the last 15 days. The percentages of adherence were calculated on the basis of the following formula: $(\text{total number of dosage units prescribed} - \text{total number of times reported}) / (\text{total number of dosage units prescribed}) \times 100$.

Emotional status was evaluated in terms of depression and anxiety symptoms, both of which were assessed using the Hospital Anxiety and Depression Scale (HADS) (Snaith; 2003; Herrero et al; 2003).

Statistical Analyses

Continuous variables were analyzed using the Kolmogorov-Smirnov test to assess for normal distribution. Due to the fact that these variables did not follow a normal distribution, they were expressed as median and interquartile range. Categorical variables were described by number of participants and percentages. Individuals with **dismissive**, preoccupied and fearful attachment styles were grouped as insecure attached individuals to make comparisons with secure attached individuals.

Comparisons were also made between the styles considered as insecure. Nonparametric data were compared using the Mann-Whitney or Kruskal-Wallis test according to the number of categories. Categorical variables were assessed using the chi-square test or likelihood ratio. Statistical significance was set at a P value of less than 0.05. The statistical analyses were performed using SPSS 15.0 for Windows (SPSS Inc., Chicago, IL, USA), assuming a 95% confidence level and two-tailed tests.

Results

The HIV-sex male study included 501 men originally. For the purpose of this analysis we considered only the GBM that formed part of the study (405 men, 80%). Since 5 GBM men were excluded from the data analysis because their surveys were incomplete, the final sample comprised 400 participants.

According to the RQ, 160 (40%) men reported having a secure attachment style and 240 (60%) an insecure attachment style. In the group of insecure attached GBM, 88 (37%) reported a **dismissive** style, 79 (33%) a preoccupied style and 73 (30%) a fearful style.

Table I shows the characteristics of the two groups of GBM, with secure and insecure attachment styles. As seen, the number of individuals that were married or had a stable relationship was significantly higher in the secure attached group ($p=0.04$), as well as the number of men with a partner who was also infected with HIV ($p=0.004$). Men with insecure attachment style had been living with the HIV infection longer ($p=0.01$) and more men in this group had had more than 10 casual sex partners in the past 2 months ($p=0.002$).

In the group with insecure attachment style, 84 (35%) GBM referred to have had condomless sex during the last 15 days versus (vs) 41 (25%) secure attached individuals ($p=0.04$). Also, more men with insecure attachment styles had taken cocaine ($p=0.001$), MDMA ($p=0.03$), GHB ($p=0.04$) and ketamine ($p=0.04$) in the last 15 days.

When the study was performed, 375 (94%) participants were taking ART. Among the 25 patients who were not taking ART the reasons were: being a viremic controller (12

individuals), having received the HIV diagnosis recently and not having started treatment yet (8 individuals), and not wanting to take ART (5 individuals). Comparing secure and insecure attached individuals, no differences were observed with regard to the number of patients reporting adherence $\geq 95\%$ to ART in the last 15 days ($p=0.8$).

Men with insecure attachment styles scored higher in HAD total ($p<0.001$), and also in the sub-dimensions of HAD anxiety ($p<0.001$) and HAD depression ($p<0.001$).

According to Odds Ratio (OR) values, taking cocaine, MDMA, GHB and ketamine had a larger association with having an insecure attachment style (see Table 1).

When insecure attachment styles were compared, some differences arose. In comparison with preoccupied attached GBM, **dismissive** attached men reported more condomless sex (43% vs 28%; $p=0.039$), more use of cannabis (40% vs 15%; $p<0.001$), GHB (17% vs 6%; $p=0.03$), methamphetamine (7% vs 0%; $p=0.05$), and ED medication (30% vs 15%; $p=0.02$). Preoccupied attached GBM had higher scores than **dismissive** attached men in HADS total (median 14 (IQR: 9, 17) vs 9 (6, 13); $p<0.001$), HADS anxiety (9 (6, 11) vs 6 (4, 9); $p<0.001$) and HADS depression (5 (2, 8) vs 3 (1, 6); $p<0.001$).

Dismissive attached GBM had been living with HIV infection longer than fearful attached men (7 (3, 16) vs 5 (2, 9); $p=0.02$), had taken more cocaine (37% vs 20%; $p=0.01$), GHB (17% vs 5%; $p=0.02$) methamphetamine (7% vs 0%; $p=0.05$), and ketamine (17% vs 4%; $p=0.01$). Fearful attached GBM had higher scores than **dismissive** attached men in HADS total (14 (7, 21) vs 9 (6, 13); $p=0.002$), HADS anxiety (9 (5, 12) vs 6 (4, 9); $p<0.001$) and HADS depression (5 (2, 9) vs 3 (1, 6); $p=0.04$).

Preoccupied and fearful attached individuals showed no statistically significant differences between them in any of the variables assessed.

Discussion

In our study, insecure attached GBM reported more condomless sex and higher use of certain recreational drugs, while keeping a good adherence to their ART. Individuals with a **dismissive** attached style showed a worse profile of health care and less emotional affectation when they were compared with preoccupied and fearful attached individuals.

Our findings coincide with previous studies developed with HIV-negative GBM. In the past, it has been reported that men with insecure attached styles had more condomless sex, more casual sex partners and less capacity to have a good sexual communication (Elizur & Mintzer; 2003; Starks & Parsons; 2014). Therefore, communication seems to be a key factor when negotiating how to practice safe sex.

Despite condomless sex being reported more by insecure attached men, it is important to highlight that the percentage of men with secure attached style and condomless sex was 25%. This important rate is still below what has been reported recently (González-Baeza et al; 2018).

In this study, insecure attached GBM took more drugs than secure attached individuals, specifically cocaine, ecstasy, GHB and ketamine. Our results agree with previous literature. In HIV-negative gay individuals, anxious adult attachment was associated indirectly with drug use through sexual expectancies of substance use among gay and bisexual men (Starks, Millar, Tuck, Wells; 2015). Moreover, anxious and avoidant attachment were associated with higher sexual expectancies of substance use (Starks et al; 2015).

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As we hypothesized, almost all the participants who took ART had a good adherence to their treatment. We did not observe differences regarding adherence between insecure and secure styles. This high level of adherence is consistent with what we observe in our daily clinical practice. Patients often have to take only one pill once a day and side effects are minimal. Also, in the era of treatment as prevention, maintaining adherence can be seen as a factor that facilitates condomless sex (Card et al; 2018).

Neither secure nor insecure attached individuals had symptoms of anxiety and/or depression according to the questionnaire used for the study. However, when we considered the different styles of insecure attachment we observed that preoccupied and fearful attached individuals had mild anxiety symptoms, and preoccupied men had a global score that suggested moderate anxiety symptoms. **Dismissive** attached people are characterized by a denial of their negative emotions while preoccupied and fearful people suffer from more stress and focus more on their own emotions and others.

Preoccupied and fearful attached individuals seem to have more generalized anxiety disorder (Marganska, Gallagher, Miranda; 2013). The negative self-perception about the ability to handle stress in preoccupied and fearful individuals serves to heighten anxiety and remain vigilant to potential threats (Marganska et al; 2013). Regarding depressive symptoms, a recent meta-analysis showed that insecure-preoccupied individuals but not insecure-**dismissive** individuals exhibited more depressive symptoms than secure individuals (Dagan, Facompré, Bernard; 2018). In our study, preoccupied and fearful attached GBM did not have depressive symptoms, but their scores were higher in this dimension than **dismissive** attached individuals.

These findings must be viewed in light of a number of considerations; firstly, one of the long-standing debates in the study of adult attachment is if individual differences are best captured using categorical or continuous models. Recent research has proposed a

dimensional model rather than a categorical one, although categorical models continue to be widely used in empirical literature. We decided to categorize the participants in different attachment styles because we wanted to identify groups of individuals that might be at higher risk in their health care. To solve the limitations that this categorization might provoke, the questionnaire used recommends that in those cases where two or more prototypes are rated equally high responders have to be asked to choose a single best fitting attachment pattern. In this study it was not necessary in any case since all the participants chose clearly a style that defined them. A second limitation is the fact that our data was collected in a different scenario for the sexuality of GBM. We are now in the era of treatment as prevention and the use of PreP, and chemsex has become a public health issue. We collected information about condomless sex and drugs use, but we did not evaluate the reasons for not using condoms and whether the drugs had the final purpose of being taken while looking for or practicing sex. Further research should include these points, taking into consideration the different attachment profiles, so we can get a better portrait to understand this increase in condomless sex and drug use among GBM. A third limitation is the fact that being on ART was not an inclusion criterion in the study. A small proportion of patients were not taking ART when the study was performed and we don't know how this absence of ART may have affected the behaviour regarding other areas of health care. However, we consider that this lack of data does not affect the final results since the number of patients not taking ART was low.

In summary, the results from this study suggest that attachment styles are related to areas of health care, including sex and drug use. Understanding how attachment style may contribute is crucial for clinicians and relationship experts helping individuals to take better care of their health. Detecting particular behaviors and underlying

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expectations and assumptions which go along with sexual and relationship difficulties for avoidant and anxious attachment styles provides targets for modification. Thus, the inclusion of the perspective of attachment theory might enrich the interventions designed to promote positive outcomes in the health self-care of GBM.

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Table 1. Characteristics of patients with secure and non-secure attachment styles

| Variables | Secure style (n=160) | Insecure style (n=240) | P value between groups comparisons | OR (95% CI) |
|---|----------------------|------------------------|------------------------------------|------------------|
| Age, years | 40 (33, 47) | 40 (33, 47) | 0.71 | 1 (0.98-1.02) |
| Country of birth: Spain, n (%) | 108 (67.5) | 169 (70.4) | 0.53 | 1.15 (0.75-1.76) |
| Marital status: married or partner, n (%) | 80 (50) | 96 (40) | 0.04 | 1.5 (1-2.24) |
| Partner infected with HIV, n (%) | 44 (27.5) | 38 (15.8) | 0.004 | 1.5 (1.39-3.84) |
| > 10 sexual partners past 2 mo, n (%) | 8 (5) | 35 (14.5) | 0.002 | 1.5 (1.21-3.12) |
| Time since HIV diagnosis, years | 4.3 (1.6, 10.9) | 6 (3, 14.1) | 0.01 | 1.02 (0.99-1.05) |
| On ART, n (%) | 144 (90) | 221 (92.1) | 0.47 | 1.29 (0.64-2.59) |
| CD4 cell count, cells/ μ L | 629 (480, 832) | 618 (475, 845) | 0.98 | 1 (0.99-1.05) |
| Nadir CD4 cell count, cells/ μ L | 336 (236, 477) | 312 (217, 419) | 0.09 | 0.99 (0.98-1) |
| Highest viral load, log ₁₀ copies/mL | 4.8 (4, 5.3) | 4.8 (4.1, 5.3) | 0.91 | 1 (1-1) |
| Undetectable viral load, n (%) ^a | 122 (76.3) | 178 (74.2) | 0.56 | 0.87 (0.54-1.39) |
| Adherence to ART, n (%) ^b | 142 (98.6) | 217 (98.1) | 0.81 | 2.61 (0.29-3.65) |
| Condomless sex, n (%) ^c | 41 (25.6) | 84 (35) | 0.04 | 1.56 (1-2.43) |
| Use of, n (%) | | | | |
| Alcohol | 119 (74.4) | 167 (69.6) | 0.29 | 0.79 (0.51-1.23) |

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| | | | | |
|------------------------------|-------------|------------|-------------------|------------------|
| Cannabis | 43 (26.9) | 67 (27.9) | 0.81 | 1.05 (0.67-1.65) |
| Cocaine | 23 (14.4) | 68 (28.3) | 0.001 | 2.36 (1.39-3.97) |
| Amyl nitrite | 37 (23.1) | 68 (28.3) | 0.24 | 1.31 (0.82-2.08) |
| MDMA | 11 (6.9) | 33 (13.8) | 0.03 | 2.16 (1.05-4.41) |
| Mephedrone | 2 (1.3) | 8 (3.3) | 0.19 | 2.72 (0.57-12.9) |
| GHB | 8 (5) | 26 (10.8) | 0.04 | 2.11 (0.92-4.82) |
| Ketamine | 8 (5) | 26 (10.8) | 0.04 | 2.11(0.92-4.82) |
| Metamphetamine | 2 (1.2) | 6 (2.5) | 0.60 | 1.16 (0.92-2.21) |
| Other ^d | 5 (3.1) | 5 (2.1) | 0.51 | 0.66 (0.18-2.31) |
| Use of ED medications, n (%) | 28 (17.5) | 54 (22.5) | 0.22 | 1.37 (0.82-2.27) |
| HAD total | 8 (4.2, 13) | 12 (7, 17) | <0.001 | 1.08 (1.05-1.12) |
| HAD Anxiety | 6 (3, 8) | 7 (5, 11) | < 0.001 | 1.12 (1.06-1.18) |
| HAD Depression | 2 (1, 4) | 4 (2, 7) | < 0.001 | 1.19 (1.11-1.27) |

Data expressed as median (interquartile range), except when indicated otherwise.

Abbreviations: OR, Odds ratio; ART, antiretroviral therapy; ED, erectile dysfunction; HAD, hospital anxiety and depression.

^a Undetectable at ≤ 50 copies/mL level; ^b Number of patients reporting $\geq 95\%$ of ART medication intake in the last 15 days; ^c Condomless insertive or receptive anal sex; ^d Benzodiazepines, amphetamines, heroin and LSD.