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## Financial Hardship, Condomless Anal Intercourse and HIV Risk Among Men Who Have Sex with Men

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### Abstract

The objective of this study was to examine the association between financial hardship, condomless anal intercourse and HIV risk among a sample of men who have sex with men (MSM). Users of a popular geosocial networking application in Paris were shown an advertisement with text encouraging them to complete a anonymous web-based survey ( $n = 580$ ). In adjusted multivariate models, high financial hardship (compared to low financial hardship) was associated with engagement in condomless anal intercourse (aRR 1.28; 95% CI 1.08–1.52), engagement in condomless receptive anal intercourse (aRR 1.34; 95% CI 1.07–1.67), engagement in condomless insertive anal intercourse (aRR 1.30; 95% CI 1.01–1.67), engagement in transactional sex (aRR 2.36; 95% CI 1.47–3.79) and infection with non-HIV STIs (aRR 1.50; 95% CI 1.07–2.10). This study suggests that interventions to reduce financial hardships (e.g., income-based strategies to ensure meeting of basic necessities) could decrease sexual risk behaviors in MSM.

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#### Conflicts of interest

Authors Dustin T. Duncan, Su Hyun Park, John A. Schneider, Yazan A. Al-Ajlouni, William C. Goedel, Brian Elbel, Jace G. Morganstein, Yusuf Ransome, and Kenneth H. Mayer declare that they have no conflict of interest.

**Ethical Approval** All procedures performed in studies involving human participants were in accordance with the ethical standards of our institutional research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

**Informed Consent** Informed consent was obtained from all individual participants included in this study.

## Keywords

Social epidemiology; Financial hardship; Condomless anal intercourse; Sexually transmitted infections; Sexual health; Gay men's health; Men who have sex with men (MSM); Health disparities; Paris France

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## Introduction

Men who have sex with men (MSM) continue to be the group at greatest risk of HIV infection in Western Europe and the United States [1, 2]. Between 2004 and 2013, HIV prevalence among European MSM increased by 33% [3]. In France, similar trends have been observed, as MSM are increasingly predominant among newly diagnosed HIV cases, where the incidence for MSM is 200 times higher than among French heterosexuals [4, 5]. The reasons for this health disparity are complex and involve biological, behavioral and social/structural factors [6]. For decades, resources have been invested in behavioral research and specifically targeted prevention programs directed at the individual-level factors, but there remains a pronounced lack of socio-contextual observational research for HIV prevention among MSM [7], including investigation of the role of various socioeconomic factors (e.g., access to material resources, food security). The dearth of comprehensive programs to address social welfare needs in this population may explain the persistence of health disparities in HIV risk and condomless sex among MSM.

Emerging research shows that financial hardship (defined as conditions in which one has insufficient financial resources to adequately meet their household's needs) can play an important role in determining population-level health outcomes, including self-rated health, disease, and mortality [8-12]. However, very few studies examined financial hardship among sexual minority populations, including gay, bisexual, and other MSM, who may experience high levels of financial hardship due to their experiences of marginalization and discrimination in education, housing, and the workplace [13, 14]. Experiences of marginalization, in combination with a lack of protections from discrimination, has an impact on the health of MSM [15], but also may have an impact on their financial well-being. Recent research has shown that gay men in Paris experience a wage penalty of 6.3% compared to their heterosexual counterparts [16], suggesting the salience of social marginalization in determining the financial stability of MSM.

Financial hardship, along with other forms of socioeconomic disadvantage, may increase an individual's exposure to stressors and/or limit their access to resources to buffer against these stressors. In line with the reserve capacity model [17], individuals experiencing financial hardship and socioeconomic disadvantage may utilize their limited cognitive coping resources in dealing with these excess stressors, especially in the absence of social support, leading to engagement in maladaptive coping behaviors, such as engagement in condomless sexual behaviors and engagement in transactional sex (that is, sexual behavior done in exchange for money, drugs, food, and shelter, among other goods), that place individuals at risk for adverse health outcomes, such as HIV infection. Despite these conceptual linkages between financial hardship and poor health, there is little evidence in the literature regarding the potential associations between the experience of financial hardship

with engagement in condomless anal intercourse, engagement in transactional sex, and HIV infection, particularly among MSM and especially from samples in European countries.

Despite recent reports of increasing economic growth in Western Europe [18], it has been reported that approximately six million jobs were lost and gaps in income inequality had widened since 2012 [19]. These economic circumstances, in combination with the effects of the so-called “Great Recession,” may continue to induce financial hardship among vulnerable groups and potentially exacerbate its effects as gaps in income become wider. Given this, the economy in Western Europe in general and France specifically face a very challenging issue of social instability in the long-term [19], which can directly influence the funding available for social welfare programs and may indirectly influence population-level health outcomes. Consequently, it is extremely important to consider the impact of financial hardship, specifically in areas where economic difficulties are present, on various health outcomes among marginalized vulnerable populations (such as MSM), to be able to direct policymakers to create effective intervention strategies to ameliorate the circumstances of those experiencing financial hardship and approach levels of income equality so that health equity can be achieved.

As such, the objective of this study was to examine the association between the experience of varying levels of financial hardship, engagement in condomless anal intercourse, involvement in transactional sex, and infection with HIV and other STIs among a sample of MSM in the Paris (France) metropolitan area, who were recruited from a popular geosocial networking application for MSM. We hypothesized that high levels of financial hardship will be related to increased risk of engagement in condomless anal intercourse and transaction sex and increased risk for infection with HIV and other STIs among MSM after controlling for demographic covariates.

## Methods

### Study Sample

Broadcast advertisements were posted on a popular geosocial-networking smartphone application for MSM to users in the Paris (France) metropolitan area in October 2016. These Parisian users were shown an advertisement with text encouraging them to click through the advertisement to complete an anonymous web-based survey, which is consistent with previous research [20-22]. To encourage participation and consistent with prior research in diverse geographic locations [22-24], the advertisement described that users who completed the survey were entered in a raffle to win €65, which is approximately \$70. The advertisement was placed during three consecutive 24 h weekday periods. Precautions were taken to avoid and eliminate duplicate responses, including using of the “Prevent Ballot Box Stuffing” feature on Qualtrics [20] as well as reviewing the IP addresses associated with each response after data collection, in order to identify multiple responses associated with the same IP address; none were apparent. That is, there were no apparent duplicate responses in our dataset. The survey included 52 items and was translated from English into French using an adaptation of the Translate, Review, Adjudicate, Pretest, Document translation (TRAPD) protocol [25]. In brief, the survey was translated to French by three native French speakers, and then reviewed and adjudicated by an additional native French

speaker. The survey was then back-translation by a fifth French-speaker who is a physician and health researcher. The survey took an average of 11.4 min for users to complete, and was offered in French and English. The vast majority (94.3%) took the survey in French. At the end of the recruitment period, 5206 users had clicked on the advertisement and reached the landing page of the survey, 935 users provided informed consent and began the survey, and 580 users provided informed consent and completed the survey, which represents a completion rate of 62.0% and an overall completion rate of 11.1%. All protocols and procedures were approved by the New York University School of Medicine Institutional Review Board prior to data collection.

### **Financial Hardship**

The predictor variable for this study was financial hardship. We assessed financial hardship with the question, “How difficult is it for you to meet monthly payments on bills?” [26]. Response options included: “Not at all difficult”; “Not very difficult”; “Somewhat difficult”; “Very difficult”; and “Extremely difficult”. Consistent with previous research [26], we dichotomized this variable into high financial hardship (“Somewhat difficult”; “Very difficult”; and “Extremely difficult”) and low financial hardship (“Not at all difficult” and “Not very difficult”). Further, we created a trichotomous financial hardship variable, which included high financial hardship (“Very difficult” and “Extremely difficult”), medium financial hardship (“Somewhat difficult”), and low financial hardship (“Not at all difficult” and “Not very difficult”).

### **Condomless Anal Intercourse**

Participants indicated the total number of partners with whom they had had condomless insertive anal intercourse and condomless receptive anal intercourse in the preceding 3 months. These count variables were transformed into categorical variables with two categories (0 partners and 1 or more partners). The study assessed condomless insertive anal intercourse, condomless receptive anal intercourse, and any condomless anal intercourse including condomless insertive anal intercourse or condomless receptive anal intercourse.

### **Transactional Sex**

Engagement in transactional sex was assessed with the question “Have you ever exchanged sex for money, drugs, food or shelter using a smartphone app?” Response options were “Yes” and “No.” There were four “Yes” options (which we grouped): (1) yes, I did so in the last three months, but I did not use a smartphone app; (2) yes, I did so in the last three months and I used a smartphone app; (3) yes, I did so without a smartphone app, but more than 3 months ago; and (4) yes, I did so with a smartphone app, but more than 3 months ago.

### **HIV and Other Sexually Transmitted Infections**

Participants were asked to self-report their HIV status with one item reading “What is your HIV status?” with three response options (negative, positive, and unknown). HIV status was recoded into a dichotomous (negative and positive). “Unknown” responses (12.4%) were recoded as “Missing”. Additionally, participants were asked, “In the past year, have you been diagnosed with any of the following?” Participants were asked to select from a list of

six common sexually transmitted infections (STIs), i.e. gonorrhea, chlamydia, syphilis, herpes simplex virus (HSV), human papillomavirus (HPV), and hepatitis C (HCV). Each STI was examined separately, and a composite variable was created to indicate any recent STI diagnosis (yes, no).

### Socio-Demographic Variables

Participants were asked to report their age in years (categorized into five groups 18–24, 25–29, 30–39, 40–49, 50 years and older), sexual orientation (gay, bisexual, straight, other), whether or not they had been born in France (yes, no), employment status (employed, unemployed, student, retired), and current relationship status (single, relationship with a man, relationship with a woman).

### Statistical Analysis

Descriptive and bivariate analyses were conducted to describe the socio-demographic and HIV risk by financial hardship using Chi square test. Next, the log-binomial model (using the glm- command with a log link) was used to assess association between financial hardship, condomless anal intercourse, engagement in transactional sex, and infection with HIV as well as infection with other STIs, with adjustment for socio-demographics. The adjusted risk ratio (aRR) with 95% confidence intervals (CIs) were calculated. The *p* value for trend for trichotomous measure of financial hardship in multivariate associations was computed. All analyses were conducted using Stata 14.1 (StataCorp, College Station, TX). Statistical significance was determined by 95% confidence intervals (CIs) and *p* values less than 0.05.

### Results

The participants were 18–50 years old, with most participants being under 40 (63.3%) (Table 1). Most participants reported being gay (84.0%), being born in France (77.6%) and being employed (66.9%). About two-thirds reported currently being single (65.2%).

Approximately half (45.5%) reported high financial hardships, when using the dichotomous variable (31.6% of whom reported experiencing medium financial hardships). Age, employment status, any condomless anal intercourse, condomless receptive anal intercourse, engagement in transactional sex and infection with STIs other than HIV were statistically different between those experiencing high and low financial hardships (Table 1). In multivariate models, controlling for socio-demographic variables, high financial hardship (compared to low financial hardship) was associated with engagement in any condomless anal intercourse (aRR 1.28; 95% CI 1.08–1.52), engagement in condomless receptive anal intercourse (aRR 1.34; 95% CI 1.07–1.67), engagement in condomless insertive anal intercourse (aRR 1.30; 95% CI 1.01–1.67), engagement in transactional sex (aRR 2.36; 95% CI 1.47–3.79), and infection with STIs other than HIV (aRR 1.50; 95% CI 1.07–2.10) (Table 2). A significant association was particularly found between financial hardship and chlamydia (aRR 2.40; 95% CI 1.31–4.39) (results not shown). Financial hardship was not associated with being HIV-infected in bivariate or multivariate models. Furthermore, in multivariable analyses with the trichotomous classification of financial hardship, we found

significant associations between high financial hardship and engagement in any condomless anal intercourse, engagement in condomless receptive and insertive anal intercourse, engagement in transactional sex and infection with other STIs, usually in a dose–response fashion. With the trichotomous classification of financial hardship, a significant association was particularly found between high financial hardship and chlamydia (aRR 2.91; 95% CI 1.23–6.88) (results not shown).

## Discussion

The purpose of the current study was to examine the association between the experience of varying levels of financial hardships, engagement in condomless anal intercourse, engagement in transactional sex, and infection with HIV and other STIs among a sample of MSM in the Paris (France) metropolitan area. This study is one of the few that has examined financial hardship among a sample of MSM. In this study, approximately half of the sample (46%) reported high levels of financial hardship, which is consistent with previous research [13, 14]. This study found that experiencing high levels of financial hardship was associated with engagement in condomless anal intercourse, engagement in transactional sex, and infection with STIs other than HIV. With increased power, perhaps we may be able to detect significant associations between financial hardship and HIV positivity. Of note, past research has suggested that financial hardship causes psychological distress due to the lack of access to health-promoting resources [27, 28]. The minority stress theory, as articulated by Meyer [29], would argue that stress would be an especially salient pathway through which financial circumstances may influence health, as MSM experience prejudice and discrimination, potentially leading to financial hardship, social stress, and other forms of socioeconomic disadvantage, which in turn can lead to negative health outcomes [30], including HIV-related outcomes. This is particularly relevant to the study sample as it is often reported that minority individuals who report financial hardship are more likely to report experiences of racism, homophobia, and harassment [31], suggesting a link between financial hardship and minority stressors. Individuals with limited financial resources may be less worried about using condoms than about purchasing food, for example. It is also possible that MSM experiencing high levels of financial hardship lack the monetary resources to purchase condoms. MSM with fewer financial resources may experience high levels of psychosocial distress, utilize their limited cognitive coping resources more quickly than their advantage peers, and, as a result, be more likely to report depressive distress [32] and/or use behaviorally-disinhibiting substances, (e.g. alcohol, tobacco, and other drugs) to cope. The co-existence and interaction of social and behavioral health problems within a single population has been referred to as a “syndemic,” (a “synergistic epidemic”). The experience of social marginalization and discrimination, along with mental health problems and substance use, has been previously described as being associated with infection with HIV and others STIs [33-37]. Additionally, it is possible that MSM could also be engaging in survival sex for basic life resources, where they may be unable to negotiate condom use effectively or may receive more money or goods for condomless sex acts. However, the specific pathway(s) in which financial hardship influences health outcomes such as STIs is yet not fully understood.

Our study is consistent with previous studies in the literature that have shown a negative association between financial hardship and various health outcomes and behaviors in different populations, with most of the existing research focusing on heterosexual populations and/or not considering sexual orientation of participants [8-12]. Of relevance to the current study is emerging research on financial hardship among MSM in the United States and China [13, 14]. A study that examined financial hardship on HIV-related risk behaviors among a sample of Latino and Black MSM (n = 2235) in three cities in the United States found that the experience of financial hardship was associated with engagement condomless anal intercourse in bivariate analyses [14]. In addition, another study among a sample of MSM (n = 477) recruited in Shanghai, China found that the experience of financial hardship was associated with engagement in condomless anal intercourse with male partners [13]. The current study, therefore, is the first to examine a sample of European MSM, confirming previous research regarding financial hardship that has largely focused on populations and MSM from the United States and elsewhere. Despite the significant differences in living styles and environments between MSM in the United States and in Europe, the association between financial hardship and sexual risk behavior has been documented among MSM across geographies. This suggests that resource allocation for intervention should be reconsidered. Resources to reduce sexual risk behaviors are currently focused on enacting individual-level behavior change through population-level awareness campaigns, but this study suggests resources should also be invested in structural interventions to combat financial hardship and other forms of socioeconomic disadvantage among MSM. These structural interventions can, in turn, create contexts where MSM can be enabled to enact their protective intentions against infection with HIV and other STIs rather than be disempowered by their socioeconomic contexts.

Future research should continue to examine financial hardship among sexual and gender minorities, including MSM and other sub-populations, such as transgender populations. Although typically conflated into a single population with MSM, transgender women face particularly high rates of marginalization and discrimination, so conducting financial hardship research might be especially salient for this population separately from MSM. This research should include larger and more representative samples, including probability samples to better estimate the prevalence of financial hardship among MSM. These studies can also utilize qualitative methodologies as well as quantitative designs that permit causal inference as well as examine potential effect modification by nationality and religion and to examine the experiences of individuals at intersection of multiple forms of marginalization and discrimination in French society, including MSM who immigrated to France from Northern Africa and Muslim MSM. In addition, further research should examine the experience of financial hardship more comprehensively and focus on understanding the pathways through which the experience of high levels of financial hardship may influence one's propensity to engage in condomless anal intercourse or transactional sex or one's risk for infection with HIV and other STIs.

### Limitations

This study has limitations that are important to note. First, the use of a single item to examine financial hardship is a limitation to the study, as financial hardship may manifest in

different forms for different individuals. Some previous financial hardship research has examined a range of hardships, including difficulty paying rents and bills for housing and difficulty purchasing adequate supplies of food and clothing [38]. Indeed, multiple items could be used to measure the experience financial hardship to better capture the diversity of experiences within this population [38]. Use of an objective indicator of financial hardship could have been useful. Self-report may also be an issue as recall bias can be a concern as well as social desirability bias, which can influence the response of the participants in our sample. Same-source bias can be a concern as this study exposure and outcomes were both measured via self-report [39]. Despite that we examined several STIs as the health outcomes of concern to this study, other STIs were not examined, due to the limited number of items in the survey. In addition, there was a difference in recall period for our exposure and outcomes. Some questions asked in the past 3 months, other questions asked about past year and lifetime, but the financial hardship question was not bounded by time, so we do not know if it is financial hardship currently, last week, last month, last year, or in one's lifetime. Our incentive could be implicated in selection bias, including perhaps that MSM with lower incomes who may have been more likely to participate in the study. This study is a cross-sectional study, thus we cannot provide evidence for a causal relationship between financial hardship and the studied health outcomes and behaviors. Reverse causality is also possible given the cross-sectional design used in this study. Furthermore, residual confounding is a potential concern. Finally, generalizability is a concern, as our study focused on MSM in Western Europe (and in particular MSM in the Paris metropolitan area) who used a single geosocial networking smartphone application.

## Conclusions

Financial hardship was associated with engagement in condomless anal intercourse and in transactional sex, as well as infection with STIs other than HIV among MSM in Paris (France) metropolitan area. This study suggests that interventions to reduce levels of financial hardship or eliminate the experience of financial hardship, such as income-based strategies to ensure basic needs are met, could decrease engagement in sexual risk behaviors in this population.

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**Table 1**

Socio-demographic characteristics of respondents by financial hardship, Paris France (n = 580)

	Total	Financial hardship		p value <sup>a</sup>
		Low (n = 297)	High (n = 264)	
Age				<b>0.001</b>
18–24	84 (14.5)	46 (54.8)	38 (45.2)	
25–29	103 (17.8)	48 (46.6)	55 (53.4)	
30–39	180 (31.0)	86 (47.8)	93 (51.7)	
40–49	139 (24.0)	74 (53.2)	64 (46.0)	
50	54 (9.3)	43 (79.6)	11 (20.4)	
Sexual orientation				0.070
Gay	487 (84.0)	262 (53.8)	220 (45.2)	
Bisexual	69 (11.9)	29 (42.0)	39 (56.5)	
Born in France				0.862
Yes	450 (77.6)	238 (52.9)	210 (46.7)	
No	113 (19.5)	59 (52.2)	54 (47.8)	
Employment status				<b>&lt;0.0001</b>
Employed	388 (66.9)	236 (60.8)	152 (39.2)	
Unemployed	84 (14.5)	18 (21.4)	64 (76.2)	
Student	81 (14.0)	36 (44.4)	45 (55.6)	
Current relationship				0.575
Single	378 (65.2)	198 (52.4)	178 (47.1)	
In a relationship with a man	172 (29.7)	95 (55.2)	77 (44.8)	
HIV status				0.421
Negative	444 (76.6)	235 (52.9)	202 (45.5)	
Positive	58 (10.0)	25 (43.1)	31 (53.5)	
Unknown	72 (12.4)	37 (51.4)	31 (43.1)	
STI status				<b>0.030</b>
Yes	129 (22.2)	56 (43.4)	70 (54.3)	
No	451 (77.8)	241 (53.4)	194 (43.0)	
Condomless receptive anal intercourse				<b>0.004</b>
0 partner	340 (58.6)	191 (56.2)	139 (40.9)	
1 partner	226 (39.0)	101 (44.7)	122 (54.0)	
Condomless insertive anal intercourse				0.082
0 partner	371 (64.0)	204 (55.0)	159 (42.9)	
1 partner	193 (33.3)	91 (47.2)	97 (50.3)	
Any condomless anal intercourse				<b>0.003</b>
0 partner	269 (46.4)	157 (58.4)	106 (39.4)	
1 partner	289 (49.8)	133 (46.0)	150 (51.9)	
Engagement in transactional sex				<b>&lt;0.0001</b>
Yes	81 (14.0)	27 (33.3)	53 (65.4)	
No	493 (85.0)	269 (54.6)	211 (42.8)	

Bold values indicate significance which is based on the variable distribution

Values are n (%)

<sup>a</sup>Chi square test

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**Table 2**

Multivariate association (aRRs) between financial hardship, condomless anal intercourse, transactional sex, STI infection and HIV infection

	Condomless receptive anal intercourse (n = 226) aRR (95% CI)	Condomless insertive anal intercourse (n = 193) aRR (95% CI)	Any condomless anal intercourse (n = 289) aRR (95% CI)	Engagement in transactional sex (n = 81) aRR (95% CI)	Infection with other STIs (n = 129) aRR (95% CI)	HIV infection (n = 58) aRR (95% CI)
Financial hardship						
Model 1						
Low	Referent	Referent	Referent	Referent	Referent	Referent
High	1.34 (1.07–1.67) *	1.30 (1.01–1.67) *	1.28 (1.08–1.52) **	2.36 (1.47–3.79) **	1.50 (1.07–2.10) *	1.61 (0.93–2.78)
Model 2						
Low	Referent	Referent	Referent	Referent	Referent	Referent
Medium	1.31 (1.03–1.65) *	1.26 (0.96–1.65)	1.26 (1.05–1.51) *	2.38 (1.45–3.90) **	1.51 (1.05–2.16) *	1.51 (0.83–2.77)
High	1.42 (1.06–1.92) *	1.43 (1.01–2.01) *	1.35 (1.07–1.72) *	2.29 (1.22–4.27) *	1.48 (0.94–2.35)	1.81 (0.90–3.63)
Test for trend	<i>p</i> = 0.009	<i>p</i> = 0.043	<i>p</i> = 0.005	<i>p</i> = 0.001	<i>p</i> = 0.026	<i>p</i> = 0.075

Adjusted for age, sexual orientation, origin (born in France), employment and relationship status

Model 1 high financial hardship (somewhat difficult; very difficult; and extremely difficult) and low financial hardship (not at all difficult and not very difficult)

Model 2 high financial hardship (very difficult and extremely difficult), medium financial hardship (somewhat difficult), and low medium financial hardship (not at all and not very difficult)

aRR adjusted risk ratio, CI confidence intervals, STIs sexually transmitted infections

\* *p* < 0.05;

\*\* *p* < 0.01