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Depressive symptoms and unprotected sex in St. Petersburg, Russia

Weihai Zhan, Ph.D.¹, Alla V. Shaboltas, Ph.D.², Roman V. Skochilov, Ph.D.², Andrei P. Kozlov, Ph.D., Dr. Sci.², Tatiana V. Krasnoselskikh, M.D., Ph.D.², and Nadia Abdala, Ph.D.⁴

¹Wesleyan University, 117 Allbritton Center, 207 High Street, Middletown, CT, 06459, USA

²Saint Petersburg, State University, 7/9 Universitetskaya nab, St Petersburg, 199034, Russian Federation

³Pavlov State Medical University, 6/8 Leo Tolstoy Str., St Petersburg, 197022, Russian Federation

⁴Yale School of Public Health, 60 College Street, New Haven, CT, 06520, USA

Abstract

Objective—Growing evidence indicates that emotional distress such as depression may have the potential to increase the risk for HIV and other sexually transmitted infections (STIs). This study investigated the association between depressive symptoms and unprotected sex among STI clinic patients in Russia.

Methods—We used pre-intervention data collected between 2009 and 2010 among 307 participants who were enrolled in a randomized intervention trial conducted in a STI clinic in St. Petersburg, Russia. The 10-item Center for Epidemiological Studies Depression Scale was used to identify depressive symptoms and two indicators were used to measure unprotected sex. Logistic regression models were applied for the analysis and controlled for the following potential confounders: demographic characteristics, being a commercial sex worker, history of drug injection and alcohol misuse.

Results—Of the participants, 20.2% were classified as having depressive symptoms. About 59.6% of the participants did not use a condom during the last sexual intercourse and 24.4% never used condoms in the past three months. Depressive symptoms were significantly associated with both indicators of unprotected sex in two different models: odds ratio (OR) = 2.36, 95% confidence interval (CI), 1.24–4.48 for unprotected sex in the last sexual intercourse; and OR = 2.71, 95% CI, 1.43–5.11 for unprotected sex in the past three months.

Conclusion—Depressive symptoms were common and were strongly associated with unprotected sex among study participants in St. Petersburg, Russia. Efforts to promote condom use should address lack of condom use due to depressive symptoms.

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Corresponding author: Nadia Abdala, Yale School of Public Health, 60 College St, New Haven CT 06520-8034, United States, Phone: +1-203-785-2747; Fax: +1-203-785-3260, nadia.abdala@yale.edu.

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Keywords

Condom; Depression; Depressive symptoms; Russia; Unprotected sex; STI clinic patients; alcohol misuse; drug injection; commercial sex work

Introduction

Growing evidence indicates that emotional distress such as depression may have the potential to increase the risk for HIV and other sexually transmitted infections (STIs) [1–8]. A case-control study conducted among gay and bisexual men revealed that individuals with recent HIV infection reported more stressful life events before their first HIV-positive test than controls [2]. Although the precise mechanisms need more investigation, several hypotheses have been proposed to explain these findings. One hypothesis is that emotional distress may be associated with biologic mechanisms, such as the release of certain neurotransmitters, that decrease the activity of the immune system and elevate an individual's susceptibility to infection [6,9].

Another hypothesis is that, when attempting to cope with or alleviate negative mental states, people with emotional distress may increase behaviors (e.g., unprotected sex and substance use) that expose them to infection [1,10,11]. Some models propose that emotional distress by itself may partly disrupt self-regulatory processes, leading for example, to a decreased ability to perceive the necessity of safe sex or the ability to negotiate condom use [4,10]. Social cognitive models of depression suggest that the thoughts and beliefs of an individual with depression are often negatively biased, which may result in negative views about condom use [12].

Past studies, however, have also produced inconsistent findings regarding the association between emotional distress and sexual risk behaviors. A meta-analytic review of the findings from 27 studies failed to support the hypothesis that emotional distress was associated with greater risk of HIV sexual risk behaviors [10]. Besides the possibility that the two variables may not have been truly associated, the authors also argued that null associations may have been caused by methodological and conceptual limitations of these studies. For example, these variables might have had an inverted U-shaped relationship in some studies, but few studies examined this type of association [10]. In an inverted U-shaped relationship, risk behaviors increase with greater depressive symptoms, however individuals with depressive symptoms, because they have little interest in sex, may display low rates of risk behaviors compared to those without severe depressive symptoms. Because such information may have implications for the design of interventions to reduce sexual risk behaviors, it is important that more studies be conducted in this area.

Particularly in Russia, depression seems to be both under-investigated and undertreated [13]. Although depression has been observed to be associated with unprotected sex in other countries [5,7], to the best of our knowledge, no such association has been investigated in Russia. Given that an estimated 980,000 people were living with HIV in Russia in 2009 and that the HIV epidemic continues to grow despite efforts to control it [14,15], there is a need to explore factors that may lead people to place themselves at risk for HIV. More specifically, considering that condom use is the most efficient and available tool to prevent sexual transmission of HIV, and that unprotected sex in Russia is common even in high risk population [14], it is important to identify potential barriers to condom use. Since the coping theory and cognitive models link depression to unprotected sex, we hypothesized that individuals with depressive symptoms would be more likely to have unprotected sex than those without depressive symptoms. In the present study, we examined the prevalence of

depressive symptoms and their association with unprotected sex. We used pre-intervention data collected between July 2009 and November 2010 from 307 participants who were enrolled in a randomized intervention trial in St. Petersburg, Russia.

Methods

Study participants and data collection

The present study used pre-intervention data from an ongoing behavior intervention study, which was designed to examine whether a brief intervention program can reduce HIV-related risk behaviors as well as improve knowledge and attitudes to HIV/AIDS. The behavior intervention study was conducted in a public STI clinic in St. Petersburg, Russia which provides services free of charge or for a nominal fee, to between 3,000 and 5,000 patients annually. Both of the institutional review boards (the Biomedical Center in St. Petersburg, Russia and Yale University in Connecticut, United States) approved the study.

Patients with a need for STI services were screened for participation in the behavior intervention study. The eligibility criteria included having two or more sexual partners, or at least one casual partner in the three months prior to the interview, and being 18 years or older. Potential participants were informed of the purpose of the study and were assured that the study was confidential and voluntary. Among 470 patients approached, 338 met the study entry criteria and were invited to participate. In total, 31 patients refused to participate. Signed informed consent was obtained for 307 patients who agreed to participate in the baseline assessment of the behavior intervention study from July 2009 to November 2010.

Data were collected by using a self-administered questionnaire which included demographics, alcohol use, drug use, knowledge of and attitude toward HIV/AIDS, sexual risk behaviors, and psychological assessment. Demographic variables were age, sex, marital status, education level, employment status, and monthly income.

Measures

The ten-item Center for Epidemiological Studies Depression Scale (CES-D-10) was used to identify self-reported symptoms associated with depression in the two weeks prior to the study [16]. This is a shorter version of the 20-item CES-D which is one of the most common screening tests for depression [17]. The CES-D-10 consists of ten statements of four options each. The options are “not at all or less than 1 day”, “several days”, “more than half of the days”, and “nearly every day” and are given a score of 0, 1, 2 and 3, respectively. A total score of 10 or more is classified as having depressive symptoms. The CES-D-10 has demonstrated good predictive accuracy to screen depression compared to the full version of CES-D [16]. In order to assess whether there was an inverted U-shaped relationship or a dose-response effect, the CES-D-10 score was also divided into four ordinal categories (0–4, 5–9, 10–14, and 15 or more) because of the skewed distribution of the CES-D-10 score.

Alcohol Use Disorders Identification Test (AUDIT) was used to identify alcohol misuse, that is, an individual's level of risk for developing an alcohol use disorder [18]. Participants were asked 10 questions from three domains: quantity and frequency of alcohol use, dependence symptoms, and other alcohol-related problems. A score of less than 8 was considered low-level alcohol use; between 8 and 20 was considered mild to moderate alcohol misuse; and 20 or more considered severe alcohol misuse. AUDIT has been widely accepted as a practical and valid screening test for alcohol misuse [18]. The status of injection drug use (IDU) was determined according to the question, “Have you ever injected illicit drugs?”

Two indicators were used to measure unprotected sex. The first indicator is based on the question, “when I had sex last time, I used condoms”. An answer of “no” was defined as unprotected sex for indicator 1. The second indicator was based on the calculation of the proportion of condom use during the past three months. Participants were asked the following: 1) the number of vaginal and anal sexual intercourses with a condom in the past three months, and 2) the number of vaginal and anal sexual intercourses without a condom in the past three months. We then calculated the proportion of condom use by dividing the total number of vaginal and anal sexual intercourses with a condom by the total number of vaginal and anal sexual intercourses that they had during that time period. We defined a proportion of zero as unprotected sex for indicator 2. The main reason we chose two indicators is because different indicators may have different time-varying properties and different degrees of recall bias. For example, the first indicator usually is more accurate, while it may occur after the appearance of depression and only measure one pair of partnerships (more likely to be regular partnerships). The second indicator measures condom use among all pairs of partnership that a participant had during the past three months. However, such a measure may be subject to potential recall bias.

Statistical analysis

Mantel-Haenszel Chi-square test was used to examine if there was a linear relationship between the intensity level of depression and unprotected sex. Multivariate logistic regression was used to determine whether depression was associated with unprotected sex. The covariates were age, gender, marital status, education, monthly income, employment status, reason to visit the clinic, history of STI, number of sexual partners, history of being commercial sex worker, history of IDU and alcohol misuse. These covariates were included in the initial model building process because they may be confounders of the relationship between depression and unprotected sex. For example, substance use has been associated with both depression and unprotected sex and results may be biased if the potential cofounder had not been taken into account. Although sexual orientation and HIV status may be confounders, we did not include them as covariates because 1) only 6 of 220 men (2.7%) had sex with men in the past three months, and of these 6 men, 3 also had sex with women, 2) no women had sex with women, and 3) only 1 of 264 patients who had been tested for HIV had a positive result. Backward selection was used to eliminate nonsignificant covariates and only significant covariates were included in the final models. Significance level was defined as $p < 0.05$ and data were analyzed by using SAS software (version 9.1, SAS Institute Inc., Cary, NC).

Results

The participants' ages ranged from 18 to 56 years, with a mean and median of 26.9 and 25.0 years respectively (Table 1). The majority of the participants were male (71.7%) and unmarried (79.1%). About half of the participants had full-time jobs.

Participants had three main reasons for visiting the STI clinic, including having genitourinary complaints/symptoms (36.8%), wanting a genitourinary checkup for preventive purposes (38.1%), and having had a sexual contact with a person who might have an STI (15.3%). About one-third of the participants had previously had an STI. The majority of the participants reported multiple partners in the past three months (30.3% reporting two, and 42.0% reporting three or more partners) and the remaining had a casual sex partner. Only a small proportion of the participants reported having ever injected drugs (3.6%) and having ever engaged in commercial sex work (3.6%). The percentages of the participants reporting low-level alcohol use, mild-to-moderate alcohol misuse, and severe alcohol misuse were 27.0%, 60.6%, and 12.4%, respectively.

Nearly 60% of the participants did not use a condom during their last sexual intercourse, and one-fourth of the participants never used a condom at all during the past three months. The mean and median values of CES-D-10 score were 6.1 and 5.0 respectively, and 20.2% of the participants had depressive symptoms.

There was a significant linear trend for the association between CES-D-10 score and both indicators of unprotected sex (Table 2). The percentages of participants who did not use condom during the last sexual intercourse were 51.5%, 60.0%, 74.4%, and 78.9% for participants with a CES-D-10 score 0–4, 5–9, 10–14, and 15 or more, respectively. The p-value for Mantel-Haenszel Chi-square test was 0.002. The percentages of participants who never used condoms during the past three months were 20.8%, 20.0%, 41.9% and 36.8% for participants with a CES-D-10 score 0–4, 5–9, 10–14, and 15 or more, respectively. The p-value for the Mantel-Haenszel Chi-square test was 0.01.

In the multivariate logistic regression model, with unprotected sex during the last sexual intercourse as the outcome, depressive symptoms were significantly associated with this outcome (odds ratio (OR), 2.36; 95% confidence interval (CI), 1.24–4.48), adjusting for alcohol misuse (Table 3). In the other multivariate logistic regression model, with unprotected sex in the past three months as the outcome, depressive symptoms were also significantly associated with this outcome (OR, 2.71; 95% CI, 1.43–5.11), adjusting for significant covariates including injection drug use and number of sex partners in the past three months.

Discussion

Our results demonstrate that depressive symptoms were significantly associated with unprotected sex, adding new evidence for the association between emotional distress and sexual risk behaviors in Russia. This association has been observed in other countries such as United States and South Africa [5,7,19]. A study conducted among 403 young women aged 14–25 years in Pennsylvania found that young women with depression were half as likely to always use condoms as those without depression [5]. Another recent study, conducted in Cape Town, South Africa, found that women with depression were 1.53 times as likely to engage in unprotected sexual intercourse that those without depression [7]. Depression is also reported to be associated with negative attitudes toward using condoms among 250 adult women in the United States [20].

The association between depressive symptoms and unprotected sex observed in the present study is robust and is maintained after controlling potential confounders including demographic characteristics, alcohol misuse (or risk for having an alcohol use disorder), injection drug use, STI history, number of sexual partners, engagement in commercial sex, and reasons to visit the clinic. Although we could not use a continuous score to examine the relationship due to the skewed distribution of this variable, evidence of a dose-response relationship was observed. For example, the percentages of participants who did not use a condom during their last sexual intercourse increased with the advancement of the depression score level, and the p-value for the linear trend was less than 0.01. Our findings did not support an inverted U-shaped relationship which is inconsistent with hypothesis proposed by Crepaz and Marks [10]. In addition, we noticed that depressive symptoms were the only significant predictor of both indicators of unprotected sex. Besides depressive symptoms, the other predictor of unprotected sex in the last sexual intercourse was alcohol misuse, while the other predictors of unprotected sex in the past three months were the number of sex partners in the past three months and injection drug use. The different predictors may be explained, in part, by the fact that the two indicators may be measuring

different dynamics that lead to unprotected sex. Future studies that use event level strategies should explore the possible different dynamics for engagement in unprotected sex.

Depressive symptoms were common, accounting for approximately one-fifth of the study participants. The prevalence is close to the rate of 20.7% observed among the 323 adult inpatients in Izhevsk, Russia by using the Russian version of Mini International Neuropsychiatric Interview 5.0.0 and to the rate of 24.4% observed among 10,541 adult patients from 35 cities in Russia by using the CES-D scale [21,22]. International studies show that, despite its high prevalence, most depression cases are undiagnosed, untreated or under-treated around the world [22–24]. It has been reported that 35.5% to 50.3% of the cases with serious mental disorders in developed countries and 76.3% to 85.4% in less-developed countries did not receive any treatment during the past year before the interview [23].

Our findings have particularly important implications for HIV prevention in Russia. Given the high prevalence of depressive symptoms and their strong association with unprotected sex, our findings suggest that there may be a need to screen and address depressive symptoms among STI clinic patients. This could include provision of treatment or referrals for treatment. A previous HIV risk reduction trial demonstrated that participants in a four-session enhanced motivation intervention group with distress management content incorporated had more reduction in both depressive symptoms and sexual risk behavior [25]. Thus, future HIV prevention programs may benefit from incorporating psychological content into the intervention.

Study results need to be considered in light of several limitations. First, although the CES-D-10 has a high sensitivity, it measured depressive symptoms during the past two weeks. This did not allow us to investigate whether depression with longer durations was associated with higher odds of unprotected sex. Second, our study sample, as already stated, was highly selective and thus the findings may not be generalized to other patient populations. For example, since our study sample consisted of patients receiving services at an STI clinic and who therefore were likely to report higher rates of sexual risk behaviors, our findings may apply to this particularly high risk patient group and not to patient populations of other types of clinics or with other types of disease risks. Third, our data were based on self-reports of sensitive activities (e.g., history of STI, number of sexual partners and condom use), which may have introduced social desirability bias and recall bias. Lastly, the cross-sectional methodology does not allow us to examine the causality of the observed association, and thus we could not exclude the possibility that recently engaging in sexual risk behavior and needing to be treated by an STI clinic might have caused an increase in depressive symptoms.

In conclusion, both depression and unprotected sex were common among study participants in St. Petersburg, Russia. Furthermore, depression was strongly associated with unprotected sex. Findings from this study suggest that efforts to promote condom use should incorporate emotional distress contents. Future longitudinal studies conducted among general populations and people at risk for HIV may provide more helpful insights into the link between depression and unprotected sex.

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Table 1

Characteristics of study participants in St. Petersburg, Russia (n = 307)

Characteristics	Percentage (%)
Age (25 years or less) ^a	54.4
Being male	71.7
Being married	20.9
At least having some higher education	50.5
Monthly income < 15,000 rubles	42.7
Full time employment	51.8
Reason to visit the STI ^b clinic	
Had genitourinary complaints/symptoms	36.8
A genitourinary checkup	38.1
Had sexual contact with a person who might have an STI	15.3
Others	9.8
Ever having had a STI	35.5
Number of sex partner in the past 3 months	
1	27.7
2	30.3
3 or more	42.0
Ever engaged in commercial sex	3.6
Ever injection drug use	3.6
Alcohol misuse identified by AUDIT score ^c	
low-level alcohol use	27.0
Mild/moderate alcohol misuse	60.6
Severe alcohol misuse	12.4
No condom use at last sexual intercourse	59.6
Never used condoms in the past 3 months	24.4
CES-D-10 score ^d	
0 – 4	42.3
5 – 9	37.5
10–14	14.0
15 or above	6.2

^aMean and median age were 26.9 and 25.0 years respectively; ranging from 18–56 years.^bSTI: sexually transmitted infections^cAUDIT: the Alcohol Use Disorders Identification Test^dCES-D: Center for Epidemiologic Studies Depression Scale. The mean and median of CES-D-10 score were 6.1 and 5.0 respectively. A CES-D-10 score of 10 or more is classified as having depressive symptoms.

Table 2Percentage of unprotected sex by scales of CES-D-10 in St. Petersburg, Russia (n = 307)^a

CES-D-10 score	No condom use at last sexual intercourse	Never used condoms in the past 3 months
0 – 4	51.5	20.8
5 – 9	60.0	20.0
10–14	74.4	41.9
15 or above	78.9	36.8
P-value ^b	0.002	0.01

^aCES-D: Center for Epidemiologic Studies Depression Scale.^bBased on Mantel-Haenszel Chi-Square Test for a linear association.

Table 3

Association between depressive symptoms and unprotected sex in St. Petersburg, Russia (n = 307)

Characteristics	No condom use at last sexual intercourse		Never used condoms in the past 3 months	
	Unadjusted OR	Adjusted OR	Unadjusted OR	Adjusted OR
Age (25 years or less)	0.74 (0.47–1.17)	—	0.58 (0.34–0.97)	—
Being male	0.99 (0.60–1.64)	—	0.62 (0.36–1.08)	—
Being married	1.27 (0.72–2.24)	—	2.06 (1.14–3.74)	—
At least having some higher education	0.93 (0.59–1.46)	—	1.16 (0.69–1.96)	—
Monthly income < 15,000 rubles	0.80 (0.50–1.26)	—	0.93 (0.55–1.58)	—
Full time employment	1.33 (0.84–2.10)	—	1.55 (0.92–2.64)	—
Reason to visit the STI ^a clinic				
Having health complaints or symptoms	Reference	—	Reference	—
Getting a check up for prevention purposes	0.99 (0.58–1.67)	—	1.34 (0.73–2.46)	—
Having had a sexual contact with a person who might have a STI	1.80 (0.86–3.77)	—	1.13 (0.50–2.55)	—
Others	0.53 (0.23–1.19)	—	1.59 (0.65–3.92)	—
Ever having a STI	0.94 (0.59–1.52)	—	0.81 (0.47–1.42)	—
Number of sex partner in the past 3 months				
1	Reference	—	Reference	Reference
2	1.28 (0.70–2.33)	—	0.71 (0.38–1.33)	0.67 (0.35–1.28)
3 or more	1.14 (0.66–1.99)	—	0.22 (0.11–0.44)	0.20 (0.10–0.41)
Engaged in commercial sex	1.19 (0.34–4.17)	—	1.81 (0.52–6.37)	—
Ever injection drug use	1.84 (0.48–7.09)	—	3.95 (1.17–13.33)	4.16 (1.10–15.71)
Alcohol misuse				
low-level alcohol use	Reference	Reference	Reference	—
Mild/moderate alcohol misuse	0.93 (0.55–1.56)	0.96 (0.56–1.63)	0.89 (0.49–1.62)	—
Severe alcohol misuse	3.23 (1.28–8.17)	3.07 (1.20–7.85)	1.20 (0.51–2.84)	—
Depressive symptoms ^b	2.51 (1.33–4.73)	2.36 (1.24–4.48)	2.64 (1.45–4.78)	2.71 (1.43–5.11)

^aSTI: sexually transmitted infections^bIdentified by CES-D-10 (Center for Epidemiologic Studies Depression Scale) with a cutoff point at 10.