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Association between HIV and violence among female commercial sex workers in Ukraine: analysis of bio-behavioral surveillance conducted in 2015-2016

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Association between HIV and Violence among Female Commercial Sex Workers in Ukraine:
Analysis of Bio-Behavioral Surveillance Conducted in 2015-2016

by

Ganna Momotyuk

a Thesis

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Abstract

A cross-sectional analysis investigated the association between HIV and violence in female commercial sex workers (FCSW) in Ukraine between 10/2015 and 01/2016. Methods: 3,885 FCSW from a total of 4,300 were questioned about behavioral and social demographics and tested for HIV in mobile testing van. Results: of the 3,885 respondents, 5.89% were HIV positive, and 47.00% had experienced violence. We tested for and found that drug use was an effect modifier for the association between HIV and violence. Analyses were stratified by injecting drug use and no injecting drug use. High risk for HIV was found in the non-IDU stratum among those FCSW who experienced violence (OR 1.99, CI95% 1.457, 2.724) adjusting for age, income and employment status. In the IDU stratum the effect of violence on HIV was reduced close to null (OR 1.07, CI95% 0.664, 1.751) adjusting for income and employment status, condom use and sex with foreigners. The potential confounders and effect modifier were verified by literature and statistical analyses. Conclusion: association between HIV status and violence was established. The research showed different effect of violence on HIV in IDU and non-IDU populations.

Key Words: female commercial sex workers, condom use, drug use, HIV, prevention, IDU, effect modification, age, income, Ukraine, violence.

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1. Chapter 1. Background

1.1. Problem Outline

Female commercial sex workers (FCSW) experience worldwide “substantial barriers in accessing prevention, treatment, and care services driven by stigma, discrimination, and criminalization in the societies in which they live.” (Das & Horton, 2015, p. 5). These conditions, in turn, may increase the risk of sexually transmitted diseases among FCSW, including HIV. In addition, the political and social insecurity in Ukrainian society during the last few years further hinders access to medical care and preventive services in FCSW.

Critical reviews have shown that violence can be an important additional factor associated with an increased risk of HIV in FCSW (Henderson, 2000). Numerous publications and programs have shown positive effects of reducing violence on health outcomes, HIV in particular (Beattie et al., 2010; Carlson et al., 2012).

1.2. Purpose and Major Goals of the Research

This study is aimed to determine the effect of violence on the risk of HIV in FCSW in Ukraine. The research question is “Is violence associated with higher HIV risk in the individuals engaged in female commercial sex activity in Ukraine?” We hypothesize that the odds of having HIV will be higher among FCSW who experienced violence than among those respondents who did not experience violence.

Understanding the links between violence against sex workers and their vulnerability (risk) to HIV will contribute to fundamental prevention and care interventions and may be applied in community mobilization programs. The research also may help to assess effectiveness of previous and existing programs working in the field of reducing violence in Ukraine. The
target audience of our research is policy makers and officials responsible for law enforcement, NGOs working in this field, health care organizations, and media.

Definitions. For violence, the World Health Organization definition is used: “the intentional use of physical force or power, threatened or actual, against oneself, another person, or against a group or community, that either results in or has a high likelihood of resulting in injury, death, psychological harm, maldevelopment or deprivation” (WHO, 2002).

Human immunodeficiency virus (HIV) is defined as a virus spread through certain body fluids that attacks the body's immune system, specifically the CD4 cells, often called T cells (CDC, 2017).

For FCSW we used UNAIDS definition: “female, male and transgender adults and young people who receive money or goods in exchange for sexual services, either regularly or occasionally…” (UNAIDS, 2002).

1.3. HIV in female sex workers

The prevalence of HIV among FCSWs is reported to be disproportionately large worldwide (Kate Shannon et al., 2015). In low- and middle-income countries, HIV prevalence among sex workers is an estimated 12%, however, there are differences between countries (Baral et al., 2012). In Western Europe the HIV prevalence among FSW is reported to be lower than in Eastern Europe, possibly as low in Western Europe as between 1% and 2%. In Eastern Europe, a higher prevalence of HIV in FSCW is estimated: between 2.5% and 7.6%.

In Ukraine, the rapid health and administrative deterioration of the infrastructure due to the armed conflict and change of country leadership inflamed the HIV/AIDS epidemic. Additionally, there are two cities which were among the most affected by HIV and which
appeared to be out of control of the Ukrainian government, limiting access for people living with HIV to treatment, care and support programs.

According to UNAIDS, an estimated 290,000 people in Ukraine live with HIV/AIDS, with 15,808 new cases registered in 2015, which keeps Ukraine in the leading position in Europe for HIV incidence. Since 2008 sexual transmission is the main cause of HIV infection, and after 2012 the proportion of sexual transmission exceeded 50%, with 60% in 2016. Along with this, reduced condom consumption by the population by almost 25% was documented in 2015 (PHC, 2017) HIV prevalence among female sex workers in Ukraine is 7.3%. (Ukraine Harmonized AIDS Response Progress Report 2012-2013, 2014). FCSW using injecting drugs have the highest HIV prevalence at 27.6%. (UNAIDS, 2014).

1.4. Violence in female sex workers

Criminalization of sex work and lack of legal protection may lead to increased exposure to violence among FCSW. High levels of exposure of FCSW to violence have been documented in many prior studies (Carmen, 1985; Dalla, 2002; Inciardi & Surratt, 2001; Maher et al., 2011; Miller & Schwartz, 1995; Teets, 1997). Surrate et al. pointed out that a violent subculture is a routine occurrence and accepted as the norm in communities of sex workers(H. L. Surratt, Inciardi, Kurtz, & Kiley, 2004). In a study of prostitution in five countries, Farley addressed sex work as violent and a human rights violation in itself (Farley & Barkan, 1998). Farley further assumed that initiation into sex work is, in most cases, associated with prior violence or economic pressure.

Violence prevalence among sex workers in Central and Southern Asia, Europe and North America varies from 40% to 70%, and includes many types of violence such as verbal harassment, physical violence, unpaid sex, rape, and others (Kate Shannon & Csete, 2010). In
Russia, involvement in drug use, alcohol and street work increased the odds of violence 8 times (Odinokova, Rusakova, Urada, Silverman, & Raj, 2014) (Data source: (Deering et al., 2014Table 1.)

Violence prevalence among FCSW in Ukraine was estimated at 39% was indicated by Deker et al., who assessed violence from police and clients (M. R. Decker, Wirtz, et al., 2013, p. 125). The First National Women’s Forum on HIV and AIDS with international participation mentioned the ubiquity of police abuse and institutional violence (physical, psychological, economic, denying access to health services) against women who are drug users, sex workers, and HIV positive in Ukraine (Resolution, 2015).

Among factors contributing to violence in FCSW, researchers named unsafe housing, street work, greater number of partners (by “partners” we understand both paid and unpaid clients, casual partners and intimate partners), and substance abuse (Baseman, Ross, & Williams, 1999; Falck, Wang, Carlson, & Siegal, 2001; L. Gilbert, El-Bassel, Rajah, Foleno, & Frye, 2001; Wenzel, Leake, & Gelberg, 2001). Violence itself was found to be a result of discrimination and gender inequality (Weitzer, 2000), which is especially evident in societies with masculine approaches to the relationship between men and women. Underreporting of the violence in FCSW, mostly due to criminalization and lack of legal protection, has been noted, for example, in South Africa (N. Romero-Daza, 1994b, 1995), and has been found to increase exposure to more abuse for FCSW (Pyett & Warr, 1997).

Other factors that increase risk for violence in FCSW include being never married or widowed, having more sexual partners and drinking (Chersich et al., 2007); low literacy (J. F. Blanchard et al., 2005); intravenous drug use; incarceration, poor communication with police and police abuse (Deering et al., 2014; El-Bassel, Witte, Wada, Gilbert, & Wallace, 2001); alcohol
consumption (Chersich et al., 2007; Go et al., 2011; Zhang et al., 2013), depression (Hong, Zhang, Li, Liu, & Zhou, 2013); imprisonment and nonpaying sex partners (Platt et al., 2011); high residential instability (Reed, Gupta, Biradavolu, Devireddy, & Blankenship, 2011); being in debt or low economic status; being homeless, street work (Church, Henderson, Barnard, & Hart, 2001; Reed, Gupta, Biradavolu, Devireddy, & Blankenship, 2010); low education, gender inequality and stigmatization; low power or self-esteem; and previous abuse in childhood (Deering et al., 2014).

Protective effects for reducing violence are reported to include higher self-esteem (A. K. Blanchard et al., 2013), working at home (J. F. Blanchard et al., 2005), participation in risk-reduction interventions (Carlson et al., 2012), sexual health knowledge (Choi, 2011), and talking to somebody about previous experiences of violence (Go et al., 2011).

According to the WHO, violence is associated with “psychological and behavioral problems, including depression, alcohol abuse, anxiety and suicidal behavior, as well as reproductive health problems such as unwanted pregnancy, sexually transmitted diseases and sexual dysfunction” (WHO, 2002, p. 16). Increasing evidence also suggests important consequences of violence for HIV risk and progression, including among FCSW.

1.5. HIV, violence, and drug use

Research has shown that violence can be an important factor associated with HIV prevalence in commercial sex workers (WHO, 2002). FCSW who experienced violence have been seen to be more vulnerable to higher HIV risks due to forced or unprotected sexual intercourse. As reported by Dekker and colleagues, violent actions from clients and police towards sex workers are overwhelming, and lead to increased risk for HIV (M. R. Decker, Wirtz, et al., 2013). Štulhofer and colleagues have also demonstrated that victimization of FCSW makes
them more vulnerable to infections (Stulhofer, Sinkovic, Bozic, & Bacak, 2017). Critical reviews indicate that the association between HIV and violence is especially prevalent in women (Dunkle et al., 2004; Gielen, O'Campo, Faden, & Eke, 1997; Maman, Campbell, Sweat, & Gielen, 2000; Wingood, DiClemente, & Raj, 2000; Wyatt et al., 2013). As was previously stated, criminalization of sex work and abuse of FSW from partners, police, clients and pimps results in isolation and violence and reduces the possibility of negotiating safe sex practices, while PTSD and risky behavior, resulting from abuse, increase the risk for STIs and HIV (Kate Shannon & Csete, 2010). There are not many publications dedicated to HIV and violence among FCSW in Eastern Europe, which still has a considerable burden of HIV in commercial sex workers compared to Western countries. Traditionally, we may find more research for Asia and Africa on this topic. Indeed, the obvious connection between HIV and violence has been documented in the US and many African countries (Maman et al., 2000).

Shannon and colleagues created a deterministic transmission model simulating the influence of different factors on potential HIV infections. Results from the study demonstrated that the elimination of sexual violence by clients, police, and strangers could decrease, in the next decade, 17% of HIV infections in Kenya and 20% of HIV infections in Canada, even with no condom use among FCSW and their clients (Kate Shannon et al., 2015, p. 55). Similarly, Deker et al. created a policy developing exercise for Ukraine which found that reducing violence against FCSW from 39% to 9% by 2016 would result in an estimated total reduction in new infections among FCSW of 25%, regardless of other interventions (M. R. Decker, Wirtz, et al., 2013, pp. 127, 128).

While violence cannot directly cause HIV, it is a trigger for multiple other factors which are associated with HIV risks, such as risky sex practices (Beattie et al., 2010; Maman et al.,
2000; Rhodes, Simic, Baros, Platt, & Zikic, 2008; Simić & Rhodes, 2009; Swain, Saggurti, Battala, Verma, & Jain, 2011) and injuries associated with forced sex or sexual violence (Adams, Girardin, & Faugno, 2001; Maguire, Goodall, & Moore, 2009; McLean, Roberts, White, & Paul, 2011). Choosing partners who may be at greater risk for HIV infection and drug use (M. R. Decker et al., 2009) may also lead to a greater risk of HIV infection (Klot, 2013). It should be mentioned that many studies focus on intimate partner violence. Due to genital injuries, partner violence may cause increased risk of STIs (Campbell & Soeken, 1999; Liebschutz, Feinman, Sullivan, Stein, & Samet, 2000; Wingood et al., 2000).

Drug use may add to the vulnerability of FCSW to HIV due to unsafe drug injecting and sharing needles. Drug use commonly co-occurs with violence exposure. Indeed, links between violence, HIV and drug use have been established in the US (Gielen et al., 2007). North & Rothenberg found that exposure to violence increases the risks both for HIV and substance abuse (North & Rothenberg 1993). HIV epidemics, drug abuse and rates of female victimization may vary across countries, but many authors have found that globally, the co-occurring epidemics of substance abuse, violence, and HIV/AIDS (SAVA syndemic) are expanding (Illangasekare, Burke, Chander, & Gielen, 2013; Meyer et al., 2011; Singer, 1994; Wyatt et al., 2013). The SAVA syndemic may be characterized by a bidirectional relationship between HIV and violence status, including in the United States (Meyer et al., 2011).

Violence can lead to depression and PTSD, which in turn affects the immune system, and may result in decreased red blood cell and T-cell function (Brokaw et al., 2002; Constantino, Sekula, Rabin, & Stone, 2000), and insufficient immune response to infections (Garcia-Linares, Sanchez-Lorente, Coe, & Martinez, 2004). Epidemics of substance abuse, violence, and HIV/AIDS (SAVA syndemic) also result in depression, especially in low-income urban women.
(Illangasekare et al., 2013). Depression in turn may lead to increased drug use and risky sexual behaviors.

Thus, violence is an important determinant for risky sexual and drug use behaviors, including sharing needles, which increases HIV risk. A number of longitudinal studies have tried to investigate temporality between drug abuse, partner violence and HIV risk (El-Bassel, Gilbert, Wu, Go, & Hill, 2005; Tucker, Wenzel, Elliott, Marshall, & Williamson, 2004), though the relationship between substance use as a risk for unsafe sexual behavior, and violence as one of the causes of substance use has not been studied comprehensively in low- and middle-income countries (Campbell, Lucea, Stockman, & Draughon, 2013; Campbell & Soeken, 1999).

1.6. Factors commonly associated with HIV and violence

1.6.1. Sex work

Most risks for HIV transmission reported in the literature relate to behavioral factors, including risky sexual behavior. It should be considered, though, that many of the behaviors may be provoked or mediated by external social, structural and cultural circumstances like violence, which are more difficult to study (Bolton & Singer, 1992; Carrier, 1989; Herdt, Leap, & Sovine, 1991; Richard Parker, 1987, 2001). In one study, sex work alone was not a risk factor for HIV transmission (Vanwesenbeeck, 2001, p. 245); most studies show, that in addition to behavioral correlates, there are other determinants for HIV such as the number of sexual partners, different sexual practices, and lifelong STIs experienced (Richard Parker, 2001, p. 164) which may make sex work a risk factor. Also, early age initiation to sex work was also associated with higher exposure to violence (Goldenberg et al., 2014; Richard Parker, 2001).

Patra and colleagues reported an association of violence with anal sex and HIV in FCSW (Patra, Mahapatra, Kovvali, Proddutoor, & Saggurti, 2012). In discussions of violence among
FCSW, from 30% to 70% reported having been exposed to violence from early childhood which might have shaped their choice for sex work later (Vanwesenbeeck, 2001, p. 244).

1.6.2. **Depression and PTSD**

Depression and post-traumatic stress disorder (PTSD) due to experiences of violence and abuse are common among sex workers and may reduce their ability to confront violence or gain power in negotiating safer sex. This in turn may lead to more risky behaviors with regard to HIV (Alegría et al., 1994). PTSD is common in FCSW according to Farley’s research and risky behaviors together with neglecting one’s health may increase the odds of having infections (Farley & Barkan, 1998).

In general, women tend to hide or reduce negative PTSD emotions resulting from having experienced violence by so-called counterphobic behavior such as sex work, risky sexual behaviors, injecting drugs or substance abuse, and reduced condom use, all of which may increase the odds of having HIV (Farley & Barkan, 1998; Vanwesenbeeck, 2001).

Wojcicki also emphasized that in sex workers “powerlessness and depression are big accelerators for risky life styles” (Wojcicki & Malala, 2001).

1.6.3. **Violence by police and previous imprisonment**

Violence by police was reported to influence HIV prevalence and reduce the effect of HIV prevention activities (M. R. Decker et al., 2014; Kate Shannon et al., 2015). Researchers have suggested the link between violence by police, previous incarceration and arrests (where we can assume contact with police and possible abuse) and increased HIV risks in FCSW (Estébanez et al., 1998; Rhodes et al., 2008; Simić & Rhodes, 2009; S. A. Strathdee et al., 2013; S. A. Strathdee et al., 2011).
Harassment from police itself towards FCSW is quite common (Kate Shannon & Csete, 2010, p. 573) and is usually underreported (Pyett, Haste, & Snow, 1996), mostly due to lack of legal support (Deering et al., 2014).

Apart from violent actions, due to poor communication with police and institutional stigmatization, FCSW do not seek assistance even from clients’ abuse from police. According to Church’s research, only 34% (52/153) of FCSW reported abuse by clients to the police (Church et al., 2001, p. 525).

1.6.4. Place of service and client pick up

Church, et al, reported that street sex workers are more exposed to physical violence (raped and/or being punched) from clients than FCSW who work indoors (Church et al., 2001, p. 524).

The work environment, or place of service providing to the client, can also be a catalyst for a client to be more abusive. According to Pyett, women working indoors felt more secure compared to women working in the streets and were less vulnerable towards HIV (Pyett et al., 1996). It has been generally understood that women working in hotels felt more secure and experienced less violence than women in the streets, though there may still be some violence exposure from hotel managers with regard to pressure to pay rent or other issues (Wojcicki & Malala, 2001). Some studies have shown the opposite results. For example, in Vancouver, a higher prevalence of HIV in FCSW was reported for women working in informal indoor premises such as saunas, hotels, and bars (20%), 12% HIV prevalence for FCSW working in the street, and a much lower HIV prevalence (3%) for women working in formal sex work establishments such as massage parlors (HIV in British Columbia: Annual Surveillance Report 2011, 2012; Kate Shannon et al., 2015).
1.6.5. Drug use

Drug use, both injection and other forms, is considered to be an important factor contributing to the risk of HIV, in part through risky behaviors like sharing needles (Chiasson et al., 1991). The association of HIV with sex work and drug injecting was reported by the European Centre for Disease Prevention and Control (HIV/AIDS surveillance in Europe 2011, 2012). Their research showed that FCWS who inject drugs have a concomitant increase in risky sexual behavior rates and higher HIV prevalence rates (Chiasson et al., 1991; Des Jarlais & Friedman, 1987; Jackson & et al., 1992; Paone, Cooper, Alperen, Shi, & Des Jarlais, 1999; Pyett et al., 1996; Tyndall et al., 2002).

Rhodes has assessed the prevalence of HIV in FCSW who inject drugs and in women from the general population who inject drugs but are not involved in sex work (Rhodes, Donoghoe, Hunter, & Stimson, 1994). The results showed that HIV prevalence was more highly associated with injecting drugs than with sex work. Estebanez, in his study, found differences in the prevalence of HIV among FCSW injection drug users (hereafter IDUs) as compared to FCSW non-IDUs (54.7% and 12.6% prevalence respectively) (Estébanez et al., 1998). Estebanez suggested that the prevalence of HIV among drug users in the general population was higher than among sex workers (Estébanez et al., 1998). These findings are also supported by research in the Netherlands (van Ameijden, van den Hoek, van Haastrecht, & Coutinho, 1994). HIV prevalence in Europe was reported to be low among non-IDU FCSW (<1%) (Platt et al., 2013). Interestingly, one study reported drug use as an entrance to sex work, but only for street sex workers (Vanwesenbeeck, 2001, p. 245).

Drug use is also influenced by exposure to violence and in turn influences risk for violence. Romero-Daza reported that poverty and low esteem increased risk of drug use and
that, in turn, drug addiction increased the potential of exposure to violence, thus increasing the risk of HIV infection (Nancy Romero-Daza, Himmelgreen, & Singer, 1998). Drug use has been seen as an important factor for both HIV and violence in several studies (Hong et al., 2013; H. Surratt, 2007; Ulibarri et al., 2011). In turn, violence has been found to be associated with alcohol use, drug use (Hong et al., 2013; H. Surratt, 2007; H. L. Surratt et al., 2004; Ulibarri et al., 2011), and injection drug use (Ulibarri et al., 2011). Drug use is also related to other confounders for the association between violence and higher HIV risks, such as higher numbers of partners (Sherman, Lilleston, & Reuben, 2011; H. Surratt, 2007; H. L. Surratt, Kurtz, Weaver, & Inciardi, 2005), reduced condom use (K. Shannon et al., 2015; H. Surratt, 2007) and STIs incidence (Couture et al., 2012; Kate Shannon et al., 2015; H. Surratt, 2007).

### 1.6.6. Number of partners

A higher number of sexual partners has also been reported as increasing the risk for HIV (Bogart et al., 2005) and being a trigger for violence towards FCSW (Go et al., 2011). For example, Moret discovered that HIV risks in FCSW are associated with number of sexual partners, and strong associations were reported between violence and increased number of sex partners (J. E. Draughon Moret et al., 2016).

### 1.6.7. Condom use

As per Decker and colleagues, unprotected sex is “the most proximal sexual risk pathway, and one that is well-supported by qualitative and quantitative evidence” for HIV transmission (M. R. Decker, Wirtz, et al., 2013, p. 124). One of the most common factors related to condom use was exposure to higher violence on the street (Vanwesenbeeck, 2001, p. 253). Client-perpetrated violence was found to be associated with unprotected sexual intercourse (Pyett & Warr, 1997; Kate Shannon et al., 2009). In turn, genital injuries after forced sex
increase HIV risks (Klot, 2013; McLean et al., 2011). Unprotected sex resulting from violent actions was also documented to be associated with higher odds of STIs/HIV in FCSW (Beattie et al., 2010; Michele R Decker et al., 2012; M. R. Decker, Wirtz, et al., 2013; Go et al., 2011; K. Shannon et al., 2015). Thus we can see that according to the literature, condom use is highly associated both with HIV and violence, mainly because violence reduces the possibility for FCSW to negotiate male condom use (Bharat, Mahapatra, Roy, & Saggurti, 2013; Kate Shannon et al., 2009). Pyett declared that in addition to greater exposure to abuse from clients and lower legal protection, social isolation and lack of support lowers the self-confidence in FCSW necessary to insist or negotiate for condom use (Pyett & Warr, 1997, p. 539). Wojcicki and Malala have emphasized that negotiation and condom use may make clients unsatisfied and may bring more violence (Wojcicki & Malala, 2001).

Condom use is traditionally lower in developing countries compared to Western Europe. However, low condom use in these settings is contradictorily combined with relatively high HIV knowledge (Vanwesenbeeck, 2001, pp. 251-252; Wojcicki & Malala, 2001). Thus, there may be other factors leading to lower condom use and risky behaviors than just HIV literacy among FCSW. One such suggested factor is the culture of social dominance of men and economic dependence of women on male partners in non-western countries (Dunkle et al., 2004). HIV knowledge appears to not have a valuable effect on condom use when compared to impediments to condom use such as price, forced sex, and higher payment for sex without condoms (Deering et al., 2013; N. Romero-Daza, 1994a; N. Romero-Daza, Weeks, & Singer, 2003). FCSW were also observed to use condoms more rarely with regular clients (Morris, Pramualratana, Podhisita, & Wawer, 1995).
1.6.8. Non-paying partners

Having an intimate non-paying partner was found in many studies to be associated with an increase in HIV prevalence among FCSW (Albert, Warner, & Hatcher, 1998; Fritz, 1998; Pyett et al., 1996; Taylor et al., 1993). One study found that physical and sexual violence by intimate or nonpaying partners ranged from 4% to 73% (Deering et al., 2014). Some sex-workers use condoms with clients only, not with non-paying partners (Varga, 1997). In research by Argento and colleagues, an association of unsafe sex and violence was reported for non-paying partners (Argento et al., 2014).

The Pyett et al. survey demonstrated that two thirds of the FCSW respondents did not use condoms with non-paying partners (Pyett et al., 1996). Lurie et al reported a link between levels of condom use, fear of experiencing violence and non-paying partners: 23% of FCSW feared violence from clients, while 74% reported the same fears about their non-paying partners (Lurie et al., 1995).

Thus, it appears that FCSW have higher regular condom use with clients than with a non-paying partner, although this is typical for developed western countries only, not for developing or low- and middle-income countries, where condom use with clients is quite low (Vanwesenbeeck, 2001, pp. 245, 247).

1.6.9. Socioeconomic status

Finally, attention should be paid to the disproportionate effect of poverty in women on the HIV epidemic (Meyer et al., 2011). Economic factors, in general, empower the spread of HIV (P. Farmer, Lindenbaum, & Good, 1993; Richard Parker, 2001). Poverty and political and economic hardships like war and local currency devaluations increase the enrollment of women into sex work and the lack of social and economic power exposes FCSW to HIV infection.
One of the most common factors related to the economic status of the sex worker is condom use, especially for developing countries, due to higher payment for unsafe sex and also due to unaffordable condom prices for economically disadvantaged populations (Wawer, Podhisita, Kanungsukkasem, Pramualratana, & McNamara, 1996; Wojcicki & Malala, 2001). Women more often agree to unprotected sex if they are offered more money, an extra incentive if they need to support a drug addiction (S. A. Strathdee et al., 2008). It is not surprising that higher HIV risks for Central and Eastern European countries were reported in FCSW who also injected drugs (Michele R Decker et al., 2012; Platt et al., 2013; Uuskula et al., 2008), with poverty and political or economic hardships as underlying factors for sex work and higher vulnerability to HIV infection (Rhodes et al., 2005).

Along with reduced affordability of protected sex, poverty in women leads to malnutrition, which affects the immune system and increases STIs and HIV susceptibility (Paul Farmer, 1999; Singer, 2009). Thus, along with SAVA syndemic some authors also mentioned poverty/malnutrition/HIV syndemic (Ostrach & Singer, 2012).

Low economic status disadvantages and political triggers for HIV epidemics are confounded by gender inequalities and power relationships, which increase low SES women’s vulnerability to infections (Paul Farmer, Connors, & Simmons, 1996; P. Farmer et al., 1993). Furthermore, poverty increases women’s risk of exposure to violence in general (Ostrach & Singer, 2012). Economic insecurity was shown to increase both exposure to violence and vulnerability to HIV in FCSW in India (Reed et al., 2010). Parker has introduced the concept of “structural violence” as a complex system of social factors such as poverty, economic and gender

Economic, gender and power inequalities influence female sex workers’ relationship with their partners and clients. FCSW experience more stigma and marginalization from society, thus are more vulnerable to HIV and less legally protected from violence. As noted in the Resolution of National Women’s Forum on HIV and AIDS in Ukraine 2015, institutional violence in Ukraine also involves medical staff refusal to provide health care and services to women, especially if they are FCSW, drug users or HIV-positive. Finally, and specific to the situation in Ukraine, sexual violence often occurs during armed conflicts (Gottschall, 2004), especially in FCSW communities (Cohen et al., 1995; Rylko-Bauer & Singer, 2011).

1.6.10. **Summarizing findings**

In summary, HIV, violence, and drug use are highly interrelated among FCSW, linked by a variety of mechanisms and environmental conditions. These relations will be explored further among a sample of FCSW in Ukraine.
Chapter 2. Article

BACKGROUND

FCSW worldwide experience “substantial barriers in accessing prevention, treatment, and care services driven by stigma, discrimination, and criminalization in the societies in which they live.” (Das & Horton, 2015, p. 3). These conditions, in turn, may increase the risk of sexually transmitted diseases, including HIV (Epele, 2002; Kalichman, Williams, Cherry, Belcher, & Nachimson, 1998; Maman et al., 2000). In Ukrainian society, the political and social insecurity during the last few years has further hindered access to medical care and preventive services in FCSW.

It has been noted, “physical violence is perhaps the greatest single threat to the health and wellbeing of commercial sex workers” (Spice, 2007, p. 323). High levels of exposure to violence among FCSW have been documented in many studies (Carmen, 1985; Dalla, 2002; Inciardi & Surratt, 2001; Maher et al., 2011; Miller & Schwartz, 1995; Teets, 1997). Violence prevalence globally is estimated from 40% to 70% (Kate Shannon & Csete, 2010). FCSW in Ukraine were often reported to be subject of violence by clients and police with weighted prevalence 39% (Ditmore, 2013b). A study by Decker and colleagues revealed that the experience of violence and threats of violence from clients and pimps increases risk of HIV almost three fold in FCSW (Michele R Decker et al., 2012). Other studies also found that violence increased vulnerability to HIV in FCSW (M. R. Decker, Pearson, Illangasekare, Clark, & Sherman, 2013).

In low- and middle-income countries, HIV prevalence among sex workers is an estimated 12%. However, there are significant variations between regions and countries (Baral et al.,
HIV prevalence among sex workers in Ukraine is about 7.3%. (Ukraine Harmonized AIDS Response Progress Report 2012-2013, 2014).

Numerous publications about intervention programs have shown positive effects of reducing violence on health outcomes, HIV in particular (Beattie et al., 2010; Carlson et al., 2012). Further understanding of the effect of violence on the health in FCSW would enhance the planning of cost effective and efficient interventions.

This study is intended to examine the effect of violence on increasing the risks of HIV in a cohort of FCSW in Ukraine. We posited that the odds of having HIV would be higher among FCSW who experienced violence than among those who did not experience violence.

METHODS

Data. Data were obtained from an integrated bio-behavioral survey (IBBS) conducted by International HIV/AIDS Alliance in Ukraine between October 2015 and January 2016. To qualify for the survey respondents had to be involved in sex services business during the last 6 months, be residents of one of the study cities, and agree to participate in all components of the research: interviewing, blood testing for HIV, Hepatitis B and C, and Syphilis (combo-tests), and dried blood spot sampling. Participation in the current round of the study more than once and alcohol or drug intoxication were criteria for exclusion from the survey.

Sampling. Respondents were recruited using respondent-driven sampling (RDS) and time-location sampling (TLS) methods. TSL method is based on the locations where the target group clusters and was the primary sampling method, RDS sampling technique is based on the secondary respondents enrolled by survey participants for reimbursement. RDS sampling was used in those cities where TLS method was not applicable.
Due to the armed conflict in the Eastern part of Ukraine it was not possible to comply with either the RDS or TLS approach, thus for two cities (Donetsk and Lugansk) key informant (KI) recruitment for the survey was used. The research represents all administrative regions of Ukraine. However, the Eastern region of Ukraine is represented only by one city Kharkov since two major cities in this region (Donetsk and Lugansk) had to be excluded.

Study design. A cross-sectional analysis of IBBS participants who were representative of FCSW aged 18 years and older from 25 cities that are regional centers in Ukraine was undertaken to examine the importance of violence in HIV prevalence among commercial sex workers in Ukraine.

Eligibility criteria. The sample was restricted to female sex workers aged more than 18 years old. Respondents from Donetsk and Luhansk cities were excluded from this research due to the different sampling techniques in both of these cities. Male sex workers were excluded because, biologically and by different social prerequisites, male and female respondents have different vulnerabilities to HIV and violence. The sample size for the research is 3,885 from total of 4,300 survey respondents.

Laboratory examinations. To assess HIV status, rapid combo-tests for HIV 1/2, Hepatitis B and C Syphilis tests were used. Blood samples were collected by medical staff trained in VCT (Voluntary HIV Counselling and Testing) according to the National VCT Protocols, at the mobile testing vans. Confirmatory HIV testing was done following the infection algorithm with two ELISAs. The respondents received pre- and post-testing counselling, and in the case of positive result were referred to the AIDS clinics for care and treatment.
**Interviews.** Evidence of violence as well as behavioral data was assessed through individual structured face-to-face interviews, based on the standardized questionnaire administered in Ukrainian and Russian languages and developed by International HIV/AIDS Alliance in Ukraine. Interviews were conducted at the points where sex workers search for clients or provide sex services (e.g. apartment, sauna, street or bar, rented apartment).

Violence increases vulnerability to HIV in FCSW. In this context we understand vulnerability as a component which “results from a range of factors that reduce the ability of individuals and communities to avoid HIV infection…. These factors, alone or in combination, may create or exacerbate individual vulnerability and, as a result, collective vulnerability to HIV”(UNAIDS, 1998, 2017).

The violence assessment was conducted during the interview, when the respondents were asked if they have experienced any form of violence, namely physical, psychological (threatening), verbal abuse, rape, forced unpaid sex, unconsented unnatural forms of sex, forced injecting drugs, forced alcohol use, or robbery, and other unspecified forms of violence. The question on who penetrated FCSW was comprised by clients, non-paying partners, casual partners, police, pimp, apartment manager, spouse, relative or other FCSW. The respondents were also asked if they have searched for any kind of help after being abused. About 18% of the respondents answered negatively to this question, and about 44% of the respondents found it difficult to answer, which clearly states there is a problem of addressing violence in this sample.

**Other covariates.** Based on a literature review, the following measures were included for statistical assessment as potential confounders: age, injecting drug use, education level, income level and employment status, place of client’s search, client’s social status and client’s residence
status, condom use, number of clients, having an intimate partner, region of residence, and number of sexual services per week. The effect of injecting drug use on the association between HIV and violence also was investigated.

**Statistical Analysis.** Univariate analysis was performed to derive descriptive analysis of the study sample. No variable was missing more than 10 percent in our sample. We conducted bivariate analyses with chi-square test using an alpha of 0.20. Logistic regression analyses were developed to identify potential confounders and effect modifiers. Given small sample size for the outcome, we set the levels of statistical significance at $p \leq 0.10$. Stratified logistic regression analyses with backward stepwise approach was used for final models using significant change in the Beta coefficients (10%) for potential confounders. The goodness of fit of the final models was assessed by using Hosmer-Lemeshov statistics. Confidence intervals for final and crude models were calculated at the 90% level.

**RESULTS**

Table 1 presents the distributions of socio-demographic characteristics of the sample, as well as HIV status and violence experience among FCSW in Ukraine. Of the 3,885 respondents, 229 (5.89%) were HIV positive, and 1,826 (47%) experienced violence. Chi-square statistics showed significant association both with HIV and violence for the following variables: age, injecting drug use, education level, income level and employment status, place of client’s search, client’s social status. Other important factors for HIV and violence were added into the model based on the literature: condom use, number of clients, having an intimate partner, number of sexual services per week and client’s residence status. The final choice of confounders to adjust for in the model was done by significant change in Beta coefficients.
An interaction between violence and drug use was statistically significant in the logistic regression model (p = 0.0745) as well as the Breslow-Day test (p = 0.0424). The sample was stratified by injecting drug use. After stratification, the effect of violence on HIV in the IDU stratum was lower than in the non-IDU stratum (adjusted OR (aOR) = 1.07 (90% CI 0.664, 1.751) and aOR = 1.99 (90% CI 1.457, 2.724) respectively).

In the IDU stratum, a higher odds of HIV was observed in those individuals who used condoms (aOR = 7.68, 90% CI 2.648, 33.808), were economically disadvantaged and worked only in sex business without any other job (aOR = 13.13, 90% CI 3.964, 62.225) (Table 2.). Sex with foreigners had a protective effect (aOR = 0.38, 90% CI 0.204, 0.673) on HIV risk in this group.

In the non-IDU stratum, the odds of HIV were higher in those individuals who were older (aOR for age 25-34 years = 4.27, 90% CI 2.567, 7.593, and aOR for age ≥ 35 years = 5.93, 90% CI 3.450, 10.826, both compared to those 18-24 years), who were economically disadvantaged and had some additional source of income other than sex business (aOR = 7.14, 90% CI 3.059, 19.922). (Table 2.).

We assessed two final models by goodness of fit statistics, which showed good results for the fit of both models. Specifically, the model among IDU showed P = 0.58 for Hosmer-Lemeshov statistic, P= 0.62 for Deviance statistics and P =0.67 for Pearson statistics; model without IDU demonstrated P = 0.23 for Hosmer-Lemeshov statistic, P= 0.04 for Deviance statistics and P =0.10 for Pearson statistics.

DISCUSSION
It can be seen from the above analysis that association between HIV and violence is shaped by multiple factors, and that injecting drug use may partially moderate this relationship. In light of this result we may ascertain a better understanding of why, compared to the FCSW IDU group, violence had a disproportionate effect on non-IDU population of FCSW.

Observed results are consistent with other studies. Ulibarri in his paper declared that “being an IDU may be a critical marker in identifying FCSW who are at increased risk for violence victimization and infection with HIV.” (Ulibarri et al., 2011, p. 183). This assumption was supported by Wechsberg and colleagues, whose study suggested that victimized FCSW may try to mask negative emotions and PTSD after being violated by engaging into more risky behaviors and drug use (N. Romero-Daza et al., 2003; Wechsberg, Luseno, & Lam, 2005).

Given these points it is important to realize that violence is ubiquitous in the life of FCSW-drug users and makes as much as 73.5% as compared to 43.99% in non-IDU stratum of our sample, and thus we find it justifiable to explore violence in regard to HIV in different strata, which may give us better understanding of important factors which shape this relationship, and further help us plan different strategies to address the problem.

Importantly, some researchers are strong proponents of the assumption that there is a SAVA syndemic (synergistic epidemics of substance abuse, violence, and HIV/AIDS), claiming that violence is a trigger for HIV among women using injecting drugs (Louisa Gilbert et al., 2015b; Illangasekare et al., 2013; Meyer et al., 2011; Singer, 1994; Wyatt et al., 2013). It was also admitted, that the comprehensive study on this issue is complicated in low and middle-income countries (Campbell et al., 2013). Results from the study conducted by Harris and colleagues, who investigated HIV and violence among women incarcerated for drug use, provide
a compelling evidence in support of our assumption that violence comprised the major part of respondents’ lives (women using substances had 8 times higher risks of experiencing violence) (Harris et al., 2003). Our research is in line with these interpretations. Criminalization of sex work and drug users results in underreporting of violence among these population groups (Pauw & Brener, 2003; Sanders & Campbell, 2007; Thukral, 2003) and may increase violence risk against sex workers who use drugs. A strong prevalence of different forms of victimization in sex workers who use drugs was also reported in Sierra Leone by Ditmore and colleagues (Ditmore, 2013a).

The results of our research showed different sets of confounders for the IDU and non-IDU strata. Unsafe sex practice and having sex with foreigners appeared to be confounders in the group of FCSW-injecting drug users as compared to non-drug user stratum. We may explain this by the fact that the drug users socialize differently, have different priorities and may assess risks differently than people who do not use drugs.

The observed protective effect of having foreign clients may be explained by traditionally higher culture of relationship between men and women in western countries, though there may still be a need for more profound analysis and interpretation of this effect. Also, there are quite a number of foreign citizens in Ukraine, who come not for sex tourism, but for business, education or cultural exchange purposes, and generally our assumption is that they may be less violent than local men which is supported by other studies for Eastern Europe (Simić & Rhodes, 2009). On the other hand, FCSW who provide services to foreigners in Ukraine are considered to be from higher level of so called “elite” prostitutes, who typically have higher education, knowledge of other languages, higher income and more prosperous clients, and thus may be less exposed to abusive clients.
Condom use demonstrated controversial results, showing increased risks of HIV instead of having a protective effect as was expected. This term was included into the analysis implicitly based on literature review (Klot, 2013; McLean et al., 2011; Kate Shannon et al., 2009). Furthermore, there was evidence, discussed below, that self-reported condom use with the last client is not a reliable measure.

Women of older age are more vulnerable to HIV in the non-IDU stratum, which is in line with other studies (Choi, 2011).

LIMITATIONS

It is important to note the limitations of our study that possibly may have biased the results. First of all, the cross-sectional design excluded the possibility to assess temporality and causality. The design though made it possible to assess behavioral data simultaneously with biological samples, which contributed to the analyses and overall goal. The sample size per regions was small, thus the data are not generalizable to particular regions separately. The non-Eastern regions are represented disproportionally due to armed conflict in Eastern Ukraine and difficulties with sampling. Mixing two sampling methods (RDS and TSL) allowed us to reach the desired sample size and cover more cities, but may have introduced some sampling bias into the research.

Though the unsafe sex practices term was included in the models based on previous research where it was shown to be an important factor both for violence (Kate Shannon et al., 2009) and HIV (M. R. Decker, Wirtz, et al., 2013), the question about condom use is highly sensitive, especially among HIV-positive sex workers, thus we cannot rely completely on this term. Condom use during sex with the last client has been shown to be one of the most unreliable
and least accurate measures to analyze due to residual confounding risk (Fewell, Davey Smith, & Sterne, 2007; Vasylyeva, Friedman, Gensburg, & Smyrnov, 2016). This approach is similar to the position from two more studies, where self-reported information for condom use was doubted to be valid (Wilson, 1999; Zenilman et al., 1995). Notwithstanding such criticism, the importance of condom use remains undiminished in regard to HIV and violence risks, and it was decided to use it in the models development.

Another limitation noticed was high multicollinearity among covariates. We addressed the issue by eliminating one of the covariates from the study (place of clients’ pick up) in favor of investigating the client’s social status role. This term consists of different client groups, including those working in transportation services who are presumed to pick up sex service in the streets, which is considered one of the most insecure places in terms of both HIV and violence risks for FCSW. The mentioned choice is supported by the position of Steffanie Strathdee and her research team, who considered client groups to shape the FCSW’ exposure both to HIV and to different forms of violence (Steffanie A. Strathdee et al., 2015) and by other studies suggesting that exposure to HIV and violence risks in FCSW may differ by the abuser (M. R. Decker, Pearson, et al., 2013).

In order to address another multicollinearity issue, two other highly correlated covariates (income level and having a permanent or temporary job) were combined into one term.

Self-reported data were used in the research, which may induce a recall or reporting bias. Given the sensitivity of questions about unsafe sex practices (93.58% respondents reported using the condom) and any form of abuse experience, the study may be exposed to underreporting. However, it should be noted that the 30-day time period for such questions is rather short, so problems with recall are unlikely to affect participant responses (Spice, 2007).
One more limitation may be induced when we did not specify the form of violence and made it more general. This was justified by the intention to maintain accuracy and adequate sample size. Such optimization made it difficult to observe the true effect of the exposure on the outcome. However, this position may contribute to the research, as most studies overlook psychological and verbal forms of abuse and focus mainly on physical violence, though psychological and verbal violence is also an important factor which may lead to PTSD, drug use and risky behaviors and increase vulnerability towards HIV (Louisa Gilbert et al., 2015a; R. Parker & Aggleton, 2003; Sanders, 2004).

CONCLUSIONS

Many prior studies have documented links between abuse, HIV risks and social factors like poverty, gender inequality, and age (Choi, 2011; Choi & Holroyd, 2007; K. Shannon et al., 2008; H. L. Surratt et al., 2005). This study showed that FCSW exposed to violence were more likely to have positive results for HIV testing in Ukraine. The results also suggest an interaction between violence and drug use for HIV risk.

Understanding the links between violence against sex workers and their vulnerability to HIV will contribute to fundamental prevention and care interventions as well as may be applied in community mobilization programs. The research also may help to assess the effectiveness of previous programs working in the field of reducing violence in Ukraine. The target audience of our research is policy makers and officials responsible for law enforcement, NGOs working in this field, health care organizations, and media.

FURTHER IMPLICATIONS
Violence is a significant trigger to increased HIV risk in FCSW because it reduces possibilities of safe sex practice like male condom use, increases injecting drug use and unsafe practices of drug use (needles sharing), increases risky intercourse (anal sex) and potentially increases other risky behaviors. The relationship between HIV and violence is very complex, reversible and is influenced by multiple factors (Dunkle & Decker, 2013; Dunkle et al., 2004), especially in FCSW. It is important to mention that often interventions are missing needs assessment, which is critical for our study population, considering above mentioned differences between FCSW IDUs and non-IDUs.

We would suggest that planned interventions which address such issues as psychological assistance, training in opposing violence, drop-in clinics, and exit strategies with integration of FCSW into labor market may have positive effects. It is better to include a harm reduction component for drug users into all these strategies as well. Positive effects from the interventions may be communicated to community leaders and decision makers for further policy changes regarding drug use and sex work decriminalization.

ATTACHMENTS (tables with analysis)
### Table 1. Demographic distributions of HIV and violence in the study population (CSW), Ukraine, N = 3885 from total N 4300, restricted to women older than 18 years, excluded Donetsk and Luhansk cities **

<table>
<thead>
<tr>
<th>Description of study population</th>
<th>HIV test result</th>
<th>Violence (N 1826, 47 %)</th>
<th>HIV status (229, 5.89 %)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n, %</td>
<td>n, violence, %</td>
<td>n, violence, %</td>
</tr>
<tr>
<td>HIV test result</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>229, 5.89</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative</td>
<td>3656, 94.11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experience of violence</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>1826, 47.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>2059, 53.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18-24 years</td>
<td>1136, 29.24</td>
<td>439, 38.64</td>
<td>14, 1.23</td>
</tr>
<tr>
<td>25-34 years</td>
<td>1946, 50.09</td>
<td>934, 48.00</td>
<td>120, 6.17</td>
</tr>
<tr>
<td>35 + years</td>
<td>803, 20.67</td>
<td>453, 56.41</td>
<td>95, 11.83</td>
</tr>
<tr>
<td>Using drugs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Active IDU</td>
<td>400, 10.30</td>
<td>293, 73.25</td>
<td>87, 21.75</td>
</tr>
<tr>
<td>No IDU</td>
<td>3485, 89.70</td>
<td>1533, 43.99</td>
<td>142, 4.07</td>
</tr>
<tr>
<td>Condom use</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Did not use condoms with last client</td>
<td>239, 6.15</td>
<td>119, 49.79</td>
<td>7, 2.93</td>
</tr>
<tr>
<td>Used condom with last client</td>
<td>3646, 93.85</td>
<td>1707, 46.82</td>
<td>222, 6.09</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low Education</td>
<td>2889, 74.55</td>
<td>1397, 48.36</td>
<td>183, 6.33</td>
</tr>
<tr>
<td>College or University</td>
<td>986, 25.45</td>
<td>425, 43.10</td>
<td>44, 4.46</td>
</tr>
<tr>
<td>Having intimate partner</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Has intimate partner</td>
<td>1193, 30.71</td>
<td>559, 46.86</td>
<td>79, 6.62</td>
</tr>
<tr>
<td>Single</td>
<td>2692, 69.29</td>
<td>1267, 47.07</td>
<td>150, 5.57</td>
</tr>
<tr>
<td>Income for the last 30 days</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low income &lt; 3,000 UAH</td>
<td>633, 17.09</td>
<td>221, 34.91</td>
<td>67, 10.58</td>
</tr>
<tr>
<td>Middle income 3,001–10,000 UAH</td>
<td>2223, 60.00</td>
<td>1040, 46.78</td>
<td>119, 5.35</td>
</tr>
<tr>
<td>High income 10 001–20,000 UAH</td>
<td>849, 22.91</td>
<td>460, 54.18</td>
<td>33, 3.89</td>
</tr>
<tr>
<td>Number of working days for the last week</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In the premises (café, bar, sauna, hotel, discotheque,</td>
<td>6-7</td>
<td>912, 23.69</td>
<td>547, 59.98</td>
</tr>
<tr>
<td>(N 1826, 47 %)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of clients for the last week</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>1332, 34.45</td>
<td>491, 36.86</td>
<td>73, 5.48</td>
</tr>
<tr>
<td>Single</td>
<td>1469, 38.00</td>
<td>713, 48.54</td>
<td>93, 6.33</td>
</tr>
<tr>
<td>Single</td>
<td>1065, 27.55</td>
<td>613, 57.56</td>
<td>62, 5.82</td>
</tr>
<tr>
<td>Client's Social status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Military, security</td>
<td>347, 9.46</td>
<td>152, 43.80</td>
<td>11, 3.17</td>
</tr>
<tr>
<td>Transport workers</td>
<td>1341, 36.56</td>
<td>717, 53.47</td>
<td>116, 8.65</td>
</tr>
<tr>
<td>Criminals and pimps</td>
<td>155, 4.23</td>
<td>79, 50.97</td>
<td>14, 9.03</td>
</tr>
<tr>
<td>Other</td>
<td>1825, 49.75</td>
<td>761, 41.70</td>
<td>71, 3.89</td>
</tr>
<tr>
<td>Clients' residence (foreigner)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>1384, 36.29</td>
<td>660, 47.69</td>
<td>54, 3.9</td>
</tr>
<tr>
<td>No</td>
<td>2430, 63.71</td>
<td>1132, 46.58</td>
<td>173, 7.12</td>
</tr>
<tr>
<td>Having job other than sex business</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>1199, 31.28</td>
<td>517, 43.12</td>
<td>64, 5.34</td>
</tr>
<tr>
<td>No</td>
<td>2634, 68.72</td>
<td>1291, 49.01</td>
<td>159, 6.04</td>
</tr>
<tr>
<td>Income level and having additional job</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low income with other job than sex business</td>
<td>218, 5.96</td>
<td>66, 30.28</td>
<td>23, 10.55</td>
</tr>
<tr>
<td>Low income without other job than sex business</td>
<td>402, 11.00</td>
<td>154, 38.31</td>
<td>42, 10.45</td>
</tr>
<tr>
<td>Middle income with other job than sex business</td>
<td>677, 18.52</td>
<td>289, 42.69</td>
<td>30, 4.43</td>
</tr>
<tr>
<td>Middle income without other job than sex business</td>
<td>1521, 41.64</td>
<td>741, 48.72</td>
<td>88, 5.79</td>
</tr>
<tr>
<td>High income with other job than sex business</td>
<td>265, 7.25</td>
<td>139, 52.45</td>
<td>6, 2.26</td>
</tr>
<tr>
<td>High income without other job than sex business</td>
<td>572, 15.65</td>
<td>314, 54.90</td>
<td>25, 4.37</td>
</tr>
<tr>
<td>Clients search place</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>On the street, highway, train/bus stations, beach</td>
<td>1520, 39.79</td>
<td>887, 58.36</td>
<td>129, 8.49</td>
</tr>
<tr>
<td>In the premises (café, bar, sauna, hotel, discotheque,</td>
<td>812, 21.26</td>
<td>322, 39.66</td>
<td>29, 3.57</td>
</tr>
<tr>
<td>(N 1826, 47 %)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Virtual dating (telephone, Internet) and via personal</td>
<td>845, 22.12</td>
<td>366, 43.31</td>
<td>40, 4.73</td>
</tr>
<tr>
<td>contacts</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permanent clients</td>
<td>643, 16.83</td>
<td>220, 34.21</td>
<td>26, 4.04</td>
</tr>
<tr>
<td>Regions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Central</td>
<td>820, 21.11</td>
<td>395, 48.17</td>
<td>74, 9.02</td>
</tr>
<tr>
<td>Western</td>
<td>1188, 30.58</td>
<td>484, 40.74</td>
<td>63, 5.3</td>
</tr>
<tr>
<td>Northern</td>
<td>729, 18.76</td>
<td>311, 42.66</td>
<td>29, 3.9</td>
</tr>
<tr>
<td>South-Eastern</td>
<td>1148, 29.55</td>
<td>636, 55.40</td>
<td>63, 5.49</td>
</tr>
</tbody>
</table>

**The data is from integrated bio-behavioral survey among commercial sex workers in Ukraine conducted between 10/26/2015 and 01/25/2016 with the questionnaire, elaborated by HIV/AIDS International Alliance in Ukraine

*χ² test statistics
Table 2. Odds ratios and 90% confidence intervals for association between HIV and violence, in cross-sectional study of female commercial sex workers in Ukraine, N = 3,885 from total N 4,300, restricted to women aged >18 years, excluded Donetsk and Luhansk cities

<table>
<thead>
<tr>
<th>Violence</th>
<th>Model 1. IDU Yes**</th>
<th>Model 2. IDU No***</th>
</tr>
</thead>
<tbody>
<tr>
<td>Did not experience violence</td>
<td>(referent)</td>
<td>(referent)</td>
</tr>
<tr>
<td>Experienced violence</td>
<td>1.02 (0.655; 1.620)</td>
<td>1.07 (0.664; 1.751)</td>
</tr>
</tbody>
</table>

** Income level and having additional job**

<table>
<thead>
<tr>
<th>Income level and having additional job</th>
<th>Model 1. IDU Yes**</th>
<th>Model 2. IDU No***</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low income with other job than sex business</td>
<td>5.20 (0.787, 34.805)</td>
<td>7.14 (3.059, 19.922)</td>
</tr>
<tr>
<td>Low income without other job than sex business</td>
<td>13.13 (3.964, 62.225)</td>
<td>5.05 (2.209, 13.910)</td>
</tr>
<tr>
<td>Middle income with other job than sex business</td>
<td>3.59 (1.088, 16.894)</td>
<td>1.8 (0.767, 5.027)</td>
</tr>
<tr>
<td>Middle income without other job than sex business</td>
<td>6.09 (2.038, 27.180)</td>
<td>2.28 (1.043, 6.100)</td>
</tr>
<tr>
<td>High income with other job than sex business</td>
<td>(referent)</td>
<td>(referent)</td>
</tr>
<tr>
<td>High income without other job than sex business</td>
<td>3.03 (0.944, 13.999)</td>
<td>1.45 (0.578, 4.212)</td>
</tr>
</tbody>
</table>

** Age**

<table>
<thead>
<tr>
<th>Age</th>
<th>Crude OR (90% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-24 years</td>
<td>(referent)</td>
</tr>
<tr>
<td>25-34 years</td>
<td>4.27 (2.567, 7.593)</td>
</tr>
<tr>
<td>35+ years</td>
<td>5.93 (3.450, 10.826)</td>
</tr>
</tbody>
</table>

** Condom use**

<table>
<thead>
<tr>
<th>Condom use</th>
<th>Crude OR (90% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Did not use condoms with last client</td>
<td>(referent)</td>
</tr>
<tr>
<td>Used condom with last client</td>
<td>7.68 (2.648, 33.808)</td>
</tr>
</tbody>
</table>

** Clients-foreigners**

<table>
<thead>
<tr>
<th>Clients-foreigners</th>
<th>Crude OR (90% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>0.38 (0.204, 0.673)</td>
</tr>
<tr>
<td>No</td>
<td>(referent)</td>
</tr>
</tbody>
</table>

* Stratified by injecting drug consumption
** Adjusted for income and employment status, condom use, and client’s residence status
*** Adjusted for income and employment status, age
Table 3.

Summary of Logistic Regression Analysis for Association between HIV and Violence in IDU (n = 400) and non-IDU (n = 3485) Stratum, Controlling for Background Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>β</th>
<th>SEβ</th>
<th>P</th>
<th>β</th>
<th>SE B</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Violence</td>
<td>0.0679</td>
<td>0.2939</td>
<td>0.8172</td>
<td>0.6865</td>
<td>0.1899</td>
<td>0.0003</td>
</tr>
<tr>
<td>Clients-foreigners</td>
<td>-0.9663</td>
<td>0.3610</td>
<td>0.0074</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Income</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low income with other job then sex business</td>
<td>1.6477</td>
<td>1.1079</td>
<td>0.1370</td>
<td>1.9662</td>
<td>0.5592</td>
<td>0.0004</td>
</tr>
<tr>
<td>Low income without other job then sex business</td>
<td>2.5751</td>
<td>0.8099</td>
<td>0.0015</td>
<td>1.6196</td>
<td>0.5491</td>
<td>0.0032</td>
</tr>
<tr>
<td>Middle income with other job than sex business</td>
<td>1.2792</td>
<td>0.8051</td>
<td>0.1121</td>
<td>0.5880</td>
<td>0.5607</td>
<td>0.2943</td>
</tr>
<tr>
<td>Middle income without other job than sex business</td>
<td>1.8058</td>
<td>0.7594</td>
<td>0.0174</td>
<td>0.8228</td>
<td>0.5269</td>
<td>0.1184</td>
</tr>
<tr>
<td>High income with other job than sex business</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High income without other job than sex business</td>
<td>1.1071</td>
<td>0.7911</td>
<td>0.1617</td>
<td>0.3735</td>
<td>0.5918</td>
<td>0.5280</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20-24 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25-34 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>35 + years</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Condom use</td>
<td>2.0379</td>
<td>0.7464</td>
<td>0.0063</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>-4.5458</td>
<td>1.0676</td>
<td>&lt;.0001</td>
<td>-</td>
<td>5.7522</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>$\chi^2$</td>
<td>31.7401</td>
<td></td>
<td></td>
<td>75.0966</td>
<td></td>
<td></td>
</tr>
<tr>
<td>df</td>
<td>8</td>
<td></td>
<td></td>
<td>8</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Adjusted for income and employment status, condom use, and client’s residence status

** Adjusted for income and employment status, age, and client’s residence status
Chapter 3. Epidemiological considerations

3.1. Data

This study is a cross-sectional analysis of secondary data from a bio-behavioral survey, covering 25 cities of Ukraine, with approximately 150 participants per each city and 200 participants from the biggest cities. The survey was conducted by International HIV/AIDS Alliance in Ukraine between 10/26/2015 and 01/25/2016, in the framework of HIV second generation surveillance as the component of the national system of monitoring and evaluation of the HIV response. The survey combined the epidemiological surveillance with a behavioral survey. Additionally to the biological component, the survey used behavioral components in order to investigate behavioral patterns and subcultural or social predispositions to increased HIV risk.

3.2. Covariates

We used binary coded variables for violence exposure (exposed coded as 1), condom use (no condom use coded as 0), employment status (having a job coded as 1), education (lower education coded as 1), injecting drug use (IDU coded as 1), residence status of the client (foreigner coded as 1), having intimate partner (single coded as 0), and categorized such covariates as income and employment status of the respondent (6 categories, high income and having permanent or temporary job as reference), social status of the client (4 categories, working in military and army sphere, transportation services, criminals and pimps, and “other” categories (blue collar, students, bank workers, private entrepreneurs), with “other” as reference), age (4 categories, 18-24, 25-34 and 35+ years old, with age 18-24 as reference), income (3 categories, low, average and above average, with “above average” income as reference), number of service days per week (3 categories, 0-3, 4-5, and 6-7 days, with 0-3 days
as reference), number of sexual partners (paying and non-paying clients, casual partners, intimate non-paying partners) (3 categories, 1-15 partners, 16-30 partners, and 31> partners, with 1-15 partners as reference), client’s pick-up place (4 categories, open space, premises, permanent or by referral data base, and blind dating (internet, TV, newspapers adds), with permanent clients data base as reference).

The outcome variable (HIV) was coded as 0 for HIV negative and as 1 for HIV positive result. The exposure variable (violence) was coded as 0 for no exposure, and as 1 for exposure.

3.3. Sampling techniques

First of all, it should be mentioned that though the whole sample contained both male and female sex workers aged ≥ 14 years, we have restricted our sample to women only, and the age of the participants was >18. This was done due to ethical considerations about involving children in this sensitive study, and also due to the fact that, both biologically and socially, men and women sex workers patterns in HIV and violence exposure and transmission have some differences. Since the number of excluded participants was relatively low, we decided it is better to make our sample more homogeneous in order to obtain more accurate results.

3.4. Limitations

As was indicated earlier, the measure of condom use was not considered to be reliable, as most of the respondents (93.58%) reported to use condom with the last client, which is reasonably doubtful, and various studies have doubted the validity of this term. During bivariate analysis this term showed extremely low significance both for HIV and violence. Though since the majority of studies in violence, HIV and sex work have considered condom use as an important factor, we decided to put it in our analysis, which led to contradictive results. Condom
use with the client appeared to be a risk factor for HIV. The majority of HIV positive clients reported they used condoms (95.88%). It is necessary to mention in regard to the result of condom use in drug users stratum, that some researchers claim it discussible to consider the effect of unsafe sex on HIV risks among FCSW who inject drugs, as there are many factors including violence, criminalization and street work, which alter the effect of drug use and condom use on exposure to HIV, and thus results about unsafe sex may be controversial (Maher et al., 2011; Patterson et al., 2008; S. A. Strathdee et al., 2008).

The question of using a condom with last client could be less statistically important in the studies, as it does not strongly imply consistent or not consistent condom use, therefore cannot be considered as critical, though we decided to account for it in the model building. The most significant condom use effect was assumed to be associated with using condoms with non-paying partners (Weir, Roddy, Zekeng, & Ryan, 1999) and in the result of violence (Lurie et al., 1995), which probably would be better to use in future assessments.

Another limitation which should be mentioned, is the small size of drug users after stratification, that may lead to less precise estimates.

We may have induced selection bias in our study, because the survey used mixed techniques for sampling. For major cities two types of sampling were used: RDS and TSL methods.

Due to the armed conflict, it was not possible to use RDS sampling in two cities located in the armed conflict zone of Eastern Ukraine which is out of the control of Ukrainian government. There were more frequent violence cases against sex workers in these cities, thus they become a more hidden, hard to reach group, without networking due to high mobility, especially in Donetsk, as even during 2013 formative assessment RDS method was not validated
in this city, no TSL sampling was possible (most venues were street based and are inactive, without updated information about current venues). That is why in order to enroll a sufficient sample for the original survey it was decided to use the KI (key informants) method of sampling in these two cities. For this reason these two cities were excluded from the current research.

3.5. Multicollinearity

During bivariate analysis we have identified several covariates which were related to each other and thus cause a multicollinearity problem. To avoid multicollinearity we addressed the issue by eliminating one of the covariates from the study (place of clients’ pick up), and by combining correlated covariates into one term.

Providing sex services for foreigners was not proved to have statistical power for HIV risks among FCSW INUs in Ukraine in previous research (Vasylyeva et al., 2016). However following the results of other studies it was included into the model. At first, our approach was that the perpetrators going into sex tourism may be more violent and more exposed to HIV risks, and will also take a chance to try illicit drugs. Despite this, surprisingly our study results demonstrated protective effect of having foreign clients. An explanation for the importance of looking at sex with foreigners in FCSW population may also be a long held perception of Ukraine as a destination often used for sex tourism, which was spread widely after European football championship (UEFA Euro 2012). Although later sex tourism experienced some decline due to armed conflict, when the perpetrators became afraid of chaos and potential danger, the consequences of sex tourism image are still visible and remain a growing problem (Antonova, 2012; Maheshwari, 2016).

While choosing between omitting place of clients’ search in favor of clients social status in our research, we based our choice on the considerations that identifying who caused the
violence (clients, police, or partners) is important for intervention planning because the impact of violence against FSWs on their HIV status can vary based on client’s social role. For example, during research in Moscow abuse from clients and police sexual abuse were associated with higher HIV and STI prevalence, while influence of abuse from pimps was indirect in the form of forcing FCSWs to serve more clients (M. R. Decker, Wirtz, et al., 2013, p. 129). According to the research, FCSW experience violence from a variety of people: clients, intimate partners, bosses, police, family, friends and strangers. Variability of HIV and violence by perpetrator was also showed in another study (M. R. Decker, Pearson, et al., 2013).

More violence was reported to be induced by non-regular sex clients compared to regular sex clients, which may be the result of a selective approach from the FCSW to repeat practice with more reliable clients and avoid those who were more violent (Jessica E. Draughon Moret et al., 2016).

Having evidence from previous research about differences in the distribution of violence among FCSW in different cities of Ukraine, we have created 4 geographical regions variable (Central, Western, Norther and Eastern), where we referred one eastern city to southern Ukraine, as per geographical and administrative division south-east of Ukraine is often mentioned. This step was due to the exclusion of two major eastern cities from the East from the research. This covariate though did not show any statistical significance, and we did not include it in our models.

We have also looked at alcohol abuse as a possible covariate, but the highest consumption question was drinking 21 and more times per month. From the wording of the question made we could not ascertain alcohol abuse. We decided not to include this covariate in our model.
3.6. Mediation

Additional attention should be drawn to the drug use variable, since its role in the model was contradictory. Both tests for interaction and for mediation (Sobel) showed significance. According to the statistical testing, GoodmanI and Sobel test for mediation, as well as Baron Kenny method, showed significance for paths a, b, and c (p<0.05) and demonstrated partial mediation with 43.05% of the total effect mediated, and 0.76 ratio of the indirect over the direct effect (Sobel statistics).

Since the border between modifier and mediator may be very thin, it is often difficult to make a precise distinction between these two effects. The hypothesis is that drug use is one of the factors through which the effect of violence is increasing the HIV risk, hence drug use may appear as an intermediate factor. We decided to operate with interactive term because of the previous studies evidence about strong associations and interaction between HIV, drug use and violence, forming a SAVA syndemic. Testing for interactive term between violence and drug use showed statistical significance in our sample. However, there is also evidence in the literature of the mediation effect of drug use on the association between HIV and violence (Ulibarri et al., 2011).

We stratified our models by interactive terms and assessed for the confounding. This was done considering the previous studies about SAVA syndemic, which means simultaneous occurrence of violence, drug use and HIV epidemics inducing complications in the research. Having this in mind, and also realizing that both FCSWs and drug users are quite different subcultures, each having its own factors leading to HIV, it was decided to look for the effect of violence on HIV in IDU and non-IDU groups of FCSW separately.
3.7. Further implications

Many programs and short interventions are focused on the education of FCSW on condom negotiation, reducing risky behaviors and increasing HIV knowledge.

Notably, programs aimed on increasing HIV knowledge or negotiating for condom use will not succeed much when women can receive more money for unprotected sex along with anticipation of violence for condom negotiation.

Teaching safe sex is not enough, as long as women are compromised economically or have drug addiction (Choi & Holroyd, 2007; Weeks, Grier, Romero-Daza, Puglisi-Vasquez, & Singer, 1998). That said, we would consider that to increase a program’s effectiveness, it is important not only to educate women to negotiate for condom use, but also to train them in opposing violence and to promote self-defense courses. It is also crucial to develop skills of negotiating condom use not only with clients, but with intimate partners as well.

The programs have to include components of increasing self-esteem for women, reducing stigma and enhancing legal support (Norton-Hawk, 2004; N. Romero-Daza et al., 2003; Spice, 2007).

Criminalization and lack of legal protection is one of the factors influencing violence in CSWs, as sex work is seen as criminal behavior by community members, which contributes to stigmatization and segregation of FCSW (Kate Shannon & Csete, 2010). There is evidence to suggest that decriminalization is a useful approach for sex work and for drug use. This approach may move street sex workers to venues which may make them less ‘hard-to-reach” and may enhance outreach work with FCSW to reduce their exposure to violence and illicit drug use simultaneously (Amaro et al., 2007; K. Shannon et al., 2008).
Some studies have revealed that intervention planning for FCSW does not include such important outreach services as professional psychological assistance, including addressing exposure to abuse (Spice, 2007; Wilson, 1999). We may suggest that scaling up access to services for FCSW including psychological assistance and free condoms, may reduce the negative impact of violence on HIV transmission. Among the implementation strategies researchers mention the effectiveness of drop-in clinics for FCSW, where numerous services including psychological and legal advising, screening for STIs and other coinfections, clean needles provision, and sexual health services are provided on an out-reach basis (Clark & Squires, 2005; Cooper, Kilvington, Day, Ziersch, & Ward, 2001; Donegan, Ward, & Day, 1996; Spice, 2007; Wilson, 1999).

As noted, interventions may also include such harm reduction components as “bad date” or “ugly mugs” lists, self-defense training, media and awareness campaigns, and information sharing (Ditmore, 2013b, p. 22).

Another effective way to deal with violence exposure is called “exit strategy”. It is intended to help CSWs who are exposed to pimp or client’s violence to exit the sex work business (Spice, 2007). Since a big proportion of FCSW who experience various kinds of abuse are in lower education and lower income level groups, we would suggest that an exit strategy may concentrate on FCSW victims of abuse by providing safe housing and legal advice, and help to socialize FCSW with lower education levels by providing to them free professional courses, employment and vocational training. If exiting FCSW are integrated into the labor market, this may empower their self-confidence to confront violence and provide an economic base to reject unsafe sex, which altogether may decrease their vulnerability to HIV.
One of the ways to deal with drug usage and its role in spreading HIV among FCSW, is to manage injecting drug addiction officially though supervised sites to insure control over needles sharing and other unsafe practices. Of course, in this case certain policy changes would be necessary towards decriminalization of the sex work and decriminalization of drug use. Although there are similar initiatives in United States, Canada and European countries such as Netherlands on drug use decriminalization, we can expect debates in society on this issue. Considering the high level of stigma and low tolerance to sex work and drug use problems, which is enhanced by higher sensitivity of the community due to the war conflict and poverty problems in Ukraine, we may expect this process may take at least several years. Also, marginalization of sex work and drug use will not make it easy to find political or public figures who are willing to stand for decriminalization of drugs and sex work.

There are some considerations which we think may be useful for future research. It would be interesting to conduct predictive analyses for HIV risks in FCSW sample stratified by drug use, as during our research it become clear that both strata might have different sets of predictors. Some authors mentioned the link between violence, depression/PTSD and HIV. Having this in mind we would advise to include assessment for depression in the questionnaire. It would be also useful to complement the section about unsafe sex of the questionnaire with a question if the condom was used consistently, as this question was claimed to be more reliable in the literature. Testing for mediation and running models, controlling for drug use, also can be applied in future research, as it may help us to identify to which extend and how drug use is mediating the relationship between violence and HIV in FCSW. Preliminary Sobel testing for mediation showed partial mediation with 43.05% of the total effect mediated and 0.76 ratio of the indirect over the direct effect. As far as Donetsk and Luhansk cities were excluded from the analyses, we
would recommend to analyze the data from these cities separately. We also consider it justifiable to include a question on institutional violence in IBBS, and to ask about abuse not only by the police, but also by medical personnel and social workers.
REFERENCES


Pauw, I., & Brener, L. (2003). ‘You are just whores—you can't be raped’: barriers to safer sex practices among women street sex workers in Cape Town. *Cult Health Sex, 5*(6), 465-481. doi:10.1080/136910501185198


equipment among female sex workers who inject drugs: results from a randomized controlled trial. *PLoS ONE, 8*(6), e65812. doi:10.1371/journal.pone.0065812


