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Partners and Clients of Female Sex Workers in an Informal Urban Settlement in Nairobi, Kenya

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Abstract

This paper compares and contrasts number of partners and condom use behaviour for female sex workers (FSWs) and a sample of women working in other economic activities, with both samples drawn from the large informal settlement of Kibera, Nairobi, Kenya. As expected, univariate analysis revealed much higher numbers of overall sexual partners and higher levels of condom use among FSWs compared to Kibera women in other occupations. An unexpected finding, however, was that FSWs with a romantic partner had significantly fewer sexual partners per unit time than FSWs without such a partner. This finding held for multivariate analysis, with negative binomial regression analyses showing that having a romantic partner was significantly associated with reductions in total number of both sexual partners overall and with sexual partners who did not use condoms. In contrast, HIV status, education, number of immediate family members, and levels of alcohol consumption were non-significant factors for both regression analyses. Results suggest that FSWs' romantic partners act as more than sources of possible HIV infection; rather, romantic partners appear to also have an important positive impact on health. We discuss this finding in light of possible harm reduction programmes focusing on FSWs and their romantic partners.

Keywords

Female sex workers; clients; romantic partners; HIV/AIDS; Kenya

Introduction

Female sex workers (FSWs) have long been recognized as important factors in the sub-Saharan African HIV epidemic because of their high number of sexual partners (D'Costa et al. 1985; Ngugi et al 1988). More recent research highlights the value of distinguishing sexual partners as either clients or romantic partners, with the latter represented by husbands and/or lovers. In this regard, Voeten et al. (2007) found that in Nyanza Province, Kenya, FSWs recorded a greater number of vaginal intercourse acts without a male condom with regular, or romantic, partners than with clients.

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However, the distinction between clients and romantic partners is often obscured in sub-Saharan Africa for at least four reasons. First, much sexual activity outside commercial sex entails sex-for-money exchange prescribed by social norms (Wojcicki 2002; Luke 2006; Swidler and Watkins 2007; Robinson and Yeh 2011). Second, sex work is often temporally fluid, as “[w]omen sometimes mix sex work with other economic activities and move in and out of it over time” (Ngugi et al. 1996:243). Third, recent research (Stoebenau 2009) indicates that FSWs distinguish different types of clients, with Kenyan FSWs identifying at least three different kinds of clients: a) helping clients, representing sexual partners to whom a FSW could go to for help or support if needed, b) regular clients, comprised of sexual partners with whom she frequently has sex for pay/economic reward, and c) casual clients, consisting of all other paying partners (Gallo et al. 2010). Finally, client relationships are also fluid, with studies from sub-Saharan Africa and other regions delineating FSWs clients’ temporal transition through multiple socio-economic roles from client to romantic partner to procurer or “pimp” (Kardikar and Prospero 2010; Stoebenau 2009).

While most literature on female sex work focuses exclusively on clients as sexual partners, this paper distinguishes between clients and romantic partners for a sample of FSWs and another consisting of women engaged in common economic activities in the same research site. We first examine the reported number of overall sexual partners per unit time with and without male condom use between the two samples, followed by a within-sample analysis exploring the effect of romantic partners upon overall sexual partner number and partners practicing unsafe sex for Kibera FSWs. We use the term “romantic partners” here rather than the more specific terms “intimate partner relationships”, now widely applied to describe HIV transmission to women from their long-term male partners who inject drugs, have sex with other men or are clients of sex workers (UNAIDS 2009), and “intimate partner violence”, frequently used to denote personal violence between FSWs and their romantic partners (World Health Organization 2002, 2004).

The Study Site

Study data were collected in 2009 from a survey of FSWs and women never engaged in commercial sex work, with both groups of women residing in the urban slum, or informal settlement known as Kibera in Nairobi, Kenya. Kibera is the largest informal settlement in East Africa, with an estimated population of 800,000 people (Odek et al. 2009) living within one square mile. Kibera epitomises the continuing enormous rural-urban migration in sub-Saharan Africa that has resulted in the majority of urban Africans now living in informal settlements. Today in sub-Saharan Africa over 70% of urban dwellers live in such settlements; in Kenya the absolute number is over 2 million (UN HABITAT 2003). Informal settlements are characterised by low household incomes, poor sanitation, lack of potable water, crowding, and weak health infrastructure. These conditions result in high levels of malnutrition and a heavy disease load (Bocquier et al. 2010; David et al. 2010; Kimani-Murage 2010).

Kibera lies in the South West of Nairobi City, just 7 km from the city centre. The area was uninhabited until the 1920s, when it was awarded to Sudanese Nubian soldiers who fought in the Great War (Bendiksen 2007). The name Kibera originally meant “swamp” in the Nubian language, referring to the wet marshlands in the locale. The British Colonial government did not give property titles to residents; consequently the area was omitted from post-Independence urban planning and received few public services. Today Kibera lacks roads, and most houses are made from mud and thatched with iron sheets. Clean water is scarce and expensive. Lacking any public sewage disposal, residents use communal pit latrines.

Nairobi health surveys group together HIV/AIDS and tuberculosis as the leading cause of mortality in informal settlements for those aged five years and above. Researchers suggest that Nairobi informal settlement residents have been more highly affected by HIV/AIDS than any other sub-Saharan African population (Kyobutungi et al. 2008). The HIV/AIDS prevalence rate in Kibera is estimated at 12%, more than twice the current national Kenya rate of 5.1% (Unge et al. 2009). As in all Nairobi slums, high levels of poverty, alcohol and substance use combine with early age at sexual initiation to exacerbate HIV transmission and pose serious challenges for HIV/AIDS treatment in Kibera (Zulu et al. 2002, 2004; Mugisha et al. 2003; Unge et al. 2010).

Methods and Materials

A Kenya Free of AIDS: Harnessing interdisciplinary science for HIV prevention (KEFA) is a United States' National Institutes of Health-funded Center Grant (R24) linking the University of Nairobi, Kenya, with the University of Washington, USA, and the University of Victoria, Canada. Along with infrastructure and training components KEFA features four field-based pilot projects. Our project, entitled, *Exploration of Kenyan Female Commercial Sex Workers and Their Male Partners- Life Course and Harm Reduction Approaches*, focuses on further understanding the social epidemiology of Kenyan FSWs. In 2009, this project employed respondent driven sampling techniques (RDS, Heckathorne 1997) to collect data on 320 Kibera women of reproductive age. Respondent driven sampling is a network-based sampling method developed for "hidden populations, i.e., those without a known sampling frame. Adapted from snowball sampling, RDS uses initial "seeds" who recruit a fixed number of respondents sharing specified characteristics, in this case whether a women ever engaged in sex work or not. RDS has been successfully used in recruiting female sex workers from urban centres in resource-constrained countries (Johnston et al. 2006; Yeka et al. 2006).

The research design followed that developed by two authors (Jansson et al. 2010; Benoit et al. 2011) for North American FSWs studies, in that it included a comparative group of women drawn from the same socio-economic environment who never engaged in sex work. Such comparison groups are often missing in ecological (Gysels et al. 2002; Voeten et al. 2007; Morris et al. 2009) and intervention (Yadav et al. 2005; Ngugi et al. 2007; Odek et al. 2009) studies of African FSWs. The comparative group consisted of Kibera women working in other occupations, including hairdressers, food sellers, hotel workers, tailors, etc., apart from sex work. To provide checks on involvement with sex work, the study questionnaire contained multiple questions concerning work history by year from first employment to present occupation, and asked for all past and present occupation titles and job descriptions. All FSWs in the sample worked out of Kibera bars, an environment linked to alcohol induced high-risk sexual behaviour (Chersich et al. 2007).

Seed selection was aided by one author's extensive research history with Kibera FSWs (Ngugi et al. 1988, 1999, 2007). All seeds were contacted through local health centres and various women's organizations, and asked to recruit comparable aged women from their own community. Specification of recruitment of comparable age women was to avoid potential confounding factors representing temporal change. Seeds were selected and in turn recruited from four age classes: 1) 18–24, 2) 25–34, 3) 35–44 and, 4) 45 and above. The rationale for the same community requirement is that Kibera is divided into ten villages: Lindi, Soweto (East and West), Makina, Kianda, Mashimoni, Gatuikira, Kisumu Ndogo, Laini Saba and Siranga. Each has its own ethnic identity; Kisumu Ndogo, for example, means "little Kisumu", reflecting its overwhelming Luo population, whose homelands are in Western Kenya and major city is Kisumu. Lacking sampling frames for Kibera, we attempted to make our sample as representative as possible by recruiting four FSWs and

four women from other economic occupations as seeds from each community. Each seed recruited three women from their own age class and economic occupation (sex work versus other occupation), living in their own community, yielding a sample of 160 FSWs and 160 women in other occupations ((4 seeds + 12 recruits) x 10 communities= 160). There was only one misclassification, represented by a women reporting past and current sex work, even though nominated by her peers as belonging to the group of women in other occupations.

Seeds and their recruits who met the above criteria were interviewed via a pretested questionnaire translated into Kiswahili, and approved by the ethics boards of the University of Nairobi, Kenya, the University of Washington, USA and the University of Victoria, Canada. The questionnaire contained both open-ended and closed sections dealing with: 1) childhood experiences and family history, 2) educational history, 3) current living conditions, 4) occupational history and current employment, 5) physical and mental health, 6) sexual health and, 7) history of legal and illegal substance use. Recruits were paid 500 Kenyan shillings to complete the survey questionnaire. Seeds were compensated an additional 200 Kenyan shillings for each recruit. All survey data were coded at the University of Nairobi and subsequently analysed by the Statistical Analysis System (SAS®) Version 9.2 at the University of Victoria.

Results

Descriptive Statistics: Demography and HIV Epidemiology

Descriptive statistics for the FSWs sex workers and Kibera women in other occupations are presented in Table 1, along with the corresponding questions that generated these data. Average age between samples was statistically non-significant ($t = 1.26, p=0.210$), successfully achieving our goal in specifying age-specific seeds and recruits. Compared to Kibera women in other occupations, FSWs averaged seven more years residence in Nairobi ($t=5.52, p<0.001$), but saw far fewer immediate family members in adolescence ($t=2.20, p=0.08$) and at present ($t=2.65, p=0.01$). The FSWs sample also achieved far lower educational levels ($X^2 = 19.1, p=0.0008$), and had significantly different marital status patterns ($X^2 = 107.6, p < 0.0001$), with only one FSW currently married. Less than one-half of FSWs had a romantic partner; for the other Kibera working women this figure is greater than 70% ($X^2 = 23.7, p<0.0001$). Overall, these comparisons indicate that FSWs in this sample, even though they have a longer residence in Nairobi, feature historic and currently weaker familial social support systems, lower educational levels, and were not as likely to be in a romantic relationship, relative to Kibera working women who never entered sex work. Taken together, these findings paint a picture of heightened social isolation and vulnerability for Kibera FSWs in this sample.

Table 2 presents descriptive sexual epidemiology statistics, again separated by sample. This shows that 89% of FSWs (143/161) and 87% (138/159) of Kibera women not working in the sex trade knew their HIV sero-status. While these rates were very similar, HIV prevalence rates were not. Discounting women with unknown HIV status for both groups, HIV prevalence for FSWs is 27.2% (39/143), while for the other working Kibera women it is less than half this figure, at 11.6% (16/138). Calculated in this manner the FSWs' rate is more than five times the current national Kenyan average of 5.1%, while the other working Kibera women sample's level closely agrees with the 12% estimate for Kibera. The reason for these differences is shown in the final rows of Table 2, which present the average numbers of sexual partners per week, the average number of partners who used condoms, and those who did not. These data show that FSWs averaged more than five partners per week, while Kibera women in other occupations averaged less than one partner.

The role of romantic partners: condom use and clients

Another difference between the two samples shown in Table 2 is that 67% for FSWs reported using condoms with their sexual partners, while for the other Kibera women this figure was only 19%. The rationale underlying these differences was reflected in respondents' answer to the survey instrument's open-ended question, "*Those times that you didn't use condoms please tell me why not?*" Kibera women working in other occupations emphasised that these times they were in intimate relationships with their romantic partners/husbands. In these relationships not using a condom was linked to notions of intimacy and trust, with frequent, typical responses to the above question including the following:

"I don't use a condom with my husband because we trust each other."

"One can never use a condom with her own husband."

"My husband refuses, saying if we use them then we don't trust each other."

In contrast, some FSWs indicated that not using condoms was a response to clients' declaration that they would pay more for unprotected sex, as reported in previous FSWs research (Ntumbanzondo et al. 2006). This was emphasised in the following responses:

"Clients refuse to use condoms, offer to pay more"

"Some clients don't want to use condoms, they want the real deal."

At the same time, FSWs also reported not using condoms when they were with their romantic partners, mirroring previous research on FSWs (Cusick 1998; Kerrigan 2003; Murray et al. 2007). Similar to the Kibera working women not involved in commercial sex work, their rationale for not using condoms in these relationships centred on feelings of intimacy and trust:

"This is my lover. I do not use condoms with him."

"This is my boyfriend and we trust each other".

Substitute the word husband for boyfriend or lover in the last two examples and the FSWs' statements are indistinguishable from those of Kibera women who never engaged in commercial sex work. What does distinguish FSWs from other Kibera working women is having both romantic partners and clients. To explore possible relationships between these different types of sexual partners we sub-divided the FSW sample into those currently in a romantic relationship from those not. FSWs currently with romantic partners (70/161=43%) reported significantly fewer overall sexual partners in the last week (Mean = 3.1, Standard Deviation = 5.6) than FSWs without such a relationship (Mean = 6.6, Standard Deviation = 9.20, $t = -2.86$, $p = 0.005$), and fewer sexual partners not using condoms (Mean = 0.9, Standard Deviation = 4.0) relative to those FSWs without a current romantic partner (Mean = 2.2, Standard Deviation = 7.4, $t = -1.38$, $p = 0.1690$).

To determine the effect of romantic partners relative to other possible determinants of sexual partner numbers, FSWs' partner distributions were analysed by negative binomial regression using the SAS® Version 9.2 programme GENMOD. Two models were constructed, the first with the count of total sexual partners and the second with the distribution of partners not using condoms as the dependent variable. Independent variables included the following:

Romantic Partner – dichotomised between women who currently have a romantic partner (1) versus those who do not (0)

Education - dichotomised to separate women with no formal education (0) from those who at least attended primary school (1)

HIV – a categorical variable distinguishing HIV- positive women (1) from those who last tested negative or do not know their status (0)

Family Now - a continuous variable denoting the number of family members, including uncles, aunts, nieces, nephews and sibs currently seen weekly

Beer - a categorical variable, designating those who drink beer at least once a day (1) versus those who drink less frequently (0)

These variables reflect predictions that low levels of educational attainment and frequent alcohol consumption are risk factors associated with a larger number of clients. In contrast, knowing one is HIV-positive, having a romantic partner, and currently being in contact with more family members are variables predicted to be associated with a smaller number of sexual partners. Negative binomial regression was used because FSWs' partner distributions featured larger variances than means (Hilbe 2007). The negative binomial regression took the form:

$$\log \lambda_i = \beta_0 + \beta_1 x_{i1} + \beta_2 x_{i2} + \dots + \beta_k x_{ik} + \sigma \quad (2)$$

In this form the dependent variable y_i features a Poisson distribution with expected value $\log \lambda$, conditional on the disturbance term, ϵ_i (Allison 1999:226).

Table 3 presents results for all sexual partners, while Table 4 shows results for partners not using condoms. Results are similar for both regressions with Romantic Partner the only significant variable. Since Romantic Partner is a categorical variable, its effect can be interpreted as e^β (Allison 1999:230). For the negatively signed Romantic Partner coefficient shown in Table 3 the expected average number of all sexual partners per week is $\exp(-0.8260)$, or only 43.8% of that that expected for women without a regular partner. Likewise, as shown in Table 4, women with a romantic partner could expect to have even fewer partners not using condoms - ($\exp(-1.2186)$) - or only 29.6% compared to the mean expected for women without a romantic partner.

Romantic partners and others as economic contributors

The previous analysis indicated a strong relationship between romantic partners and fewer FSWs' overall sexual partners and non-condom using partners, but did not explain why. Assuming these results reflect commercial sex work economics in which more money is generated by having more clients, and/or having clients pay more for unprotected sex, it was hypothesized that romantic partners may at least partially replace these economic gains by contributing to household expenses, as recently proposed by Robinson and Yeh (2011) for FSWs in Western Kenya. This hypothesis was tested by examining responses to three survey questions: 1) Does anyone in addition to you often contribute to your household needs per month? 2) If yes, how much do they contribute in an average month in shillings? and, 3) If yes, what is their relationship to you? Together, these questions allowed us to both quantify the amount of help FSWs receive, and to observe who contributed.

Table 5 presents the results of calculating contributions by specific relationship, with the FSWs sample again divided between women with and without romantic partners. For FSWs without romantic partners, the majority of women (59/91) did not have anyone contributing economically to their household. For FSWs with romantic partners over one-half of these partners (37/70) contributed to household expenses. For these women, romantic partners were numerically the largest donors, and their monthly contribution was substantial, averaging over 2,000 Kenyan shillings. For FSWs not in romantic relationships, the major contributors were friends, most likely roommates. While friends' average contribution was also in excess of 2,000 Kenyan shillings per month, less than one-fifth of the sample of

(18/91) received such contributions. Contributions from all sources were significantly higher for FSWs with romantic partners ($t= 3.44, p<0.001$). As a result total monthly income, calculated as the sum of FSWs' earnings and all contributions, are 800 Kenyan shillings higher for women currently in romantic relationships, but statistically non-significant ($t=1.16, p=0.25$).

Summary and Discussion

Analysis of sexual partner and condom use patterns for FSWs and a sample of same-aged working women recruited from the Nairobi informal settlement of Kibera revealed significant differences in partner distribution and condom use patterns between FSWs and women with no history of commercial sex work, and within the FSWs sample, for women who had a romantic partner. We recognise that this analysis has limitations. First, the study only evaluated the number of sex partners and overall condom use as outcome variables, not the frequency of sex, either overall and/or unprotected. This means we are unable to estimate the frequency of unprotected sex to understand infection risk; something we hope to address in the next stages of our research. Furthermore, while respondent driven sampling is superior to clinic-based sampling strategies, neither approach can produce a random sample of "hidden populations", including FSWs. Another problem is that we did not ask about casual or one-time clients versus regular clients with whom sex workers repeatedly have sex, who evolve into the role of procurer. These are important distinctions, as noted in the introduction, and with epidemiological and socio-economic ramifications (Ghani and Aral 2005; Robinson and Yeh 2011). Our sample is also restricted to FSWs who work in bars, while previous Kibera research revealed a spectrum of sex work, including women who worked from their homes, bars and nightclubs, with each group featuring different levels of condom use and partner change (Odek et al. 2009).

Despite these caveats, analysis generated findings potentially important to future sex worker health interventions. First and foremost, while the absolute numbers are small, the effect of having a romantic partner is large in this sample. Having a romantic partner reduced the average weekly number of sexual partners by over 50% in both univariate and multivariate analyses; more than the 44% reduction in weekly clients recorded for an intensive micro-finance programme recently reported for Kibera FSWs (Odek et al. 2009). Second, analysis supported the prediction that partner reductions are a function of romantic partners' monetary contributions replacing economic gains generated by more clients and/or clients paying more to have sex without condoms. In this sample having a romantic, regular relationship acts as a form of harm reduction, a perspective commonly applied to substance use studies (Sherman and Latka 2001; Latka et al. 2006; Gyarmathy and Neaigus 2009), but only rarely invoked in relationship to sex work (Rekart 2005). A notable exception is the Thuong et al. (2005) study of Vietnamese FSWs in which having a regular, non-paying partner was a protective factor against HIV/AIDS. However, in the sex work literature romantic partners are associated overwhelmingly with personal violence (WHO 2002, 2004). While not downplaying the role of romantic partner violence, the present study's findings warrant future research exploring the potential for including FSWs' romantic partners in harm reduction interventions. In particular, these findings indicate that romantic partners can be more than just a vector of sexually transmitted infections for Kibera FSWs but are also a source of reduced risk and economic and social support.

As an example specific to Kibera, these findings raise the prospect of FSWs and their romantic partners implementing family-based child care programmes. As recorded in Table 1, FSWs had almost identical number of children as their Kibera counterparts not employed in the sex trade. These data highlight the obvious but often overlooked fact that FSWs are mothers as well as sex partners. Recognizing this, a relevant research question is how do

FSWs as mothers who work outside the home organise childcare? A previous study of Kibera FSWs' child care (Chege et al. 2002) recorded three highly negative childcare practices: 1) mothers socialised girl children into the commercial sex trade, 2) mothers locked up their children at night when they went to look for clients and, 3) some mothers' alcoholism resulted in child neglect and loss of household income. These findings make it worthwhile to assess if romantic partners can help improve FSWs' childcare, either indirectly through economic contributions to pay for child care givers or directly through devoting their own time to providing child care. The need for such research is highlighted in a recent review of family-centred interventions for children of injection drug users and FSWs (Beard et al. 2007), which found multiple programmes designed for the former but only one devoted to the latter.

While the formation of such programmes can serve as the ultimate goal for incorporating FSWs' romantic partners into harm reduction programmes, much more research is needed to address such basic questions as: 1) do romantic relationships on average last long enough make such programmes feasible and, 2) would male partners provide economic and social support to FSWs' children whom they have not fathered? Finally, we wonder if similar results would be found for male sex workers, recognized as an increasingly important group for HIV/STI prevention in sub-Saharan Africa (Niang et al. 2003; Allman et al. 2007; Okal et al. 2009). The present paper can only raise, not address, such questions. However this analysis suggests the potential for doing so in the immediate future.

References

- Allison, P. Logistic regression using the SAS® System: Theory and application. Cary, NC: SAS Press; 1999.
- Allman D, Adebayo S, Myers T, Odomuye O, Ongunsola S. Challenges for the sexual health and social acceptance of men who have sex with men in Nigeria. *Culture Health and Sexuality*. 2007; 9(2):153–168.
- Beard J, Biemba G, Brooks M, Costello J, Ommerborn M, Bresnaran M, Flynn D, Simon J. Children of female sex workers and drug users: A review of vulnerability, resilience and family-centered models of care. *Journal of the International AIDS Society*. 2007; 13(Supp2)
- Bendikson, J. *The places we live*. New York: Aperture Foundation; 2007.
- Benoit, C.; Jansson, M.; Casey, L.; Phillips, R.; Burns, D. D. Developing KT with non-profit organizations serving vulnerable populations. In: Banister, E.; Leadbeater, B.; Marshall, A., editors. *Knowledge translation in community-based research and social policy contexts*. Toronto: University of Toronto Press; 2011. p. 15-31.
- Bocquier P, Beguy D, Zulu E, Muindi K, Kunseiga A, Ye Y. Do migrant children face greater health hazards in slum settlements? Evidence from Nairobi, Kenya. *Journal of Urban Health*. Nov 25.2010 2010 Published on-line.
- Chege M, Kabiru E, Mbithi E, Bwayo J. Child care practices of commercial sex workers. *East African Medical Journal*. 2002; 79(7):382–389. [PubMed: 12638835]
- Chersich M, Luchters S, Malonza I, Mwarogo P, King'ola N, Temmerman M. Heavy episodic drinking among Kenyan female sex workers is associated with unsafe sex, sexual violence and sexually transmitted infections. *International Journal of STD & AIDS*. 2007; 18:764–769. [PubMed: 18005511]
- Cusick L. Non-use of condoms by prostitute women. *AIDS Care*. 1998; 10(2):133–146. [PubMed: 9625898]
- D'Costa J, Plummer F, Bower I. Prostitutes are a major reservoir of sexually transmitted diseases in Nairobi, Kenya. *Sex Transmitted Diseases*. 1985; 12:1264–1267.
- David A, Mercado S, Becker S, Edmundo K, Mugisha F. The prevention and control of HIV/AIDS, TB and vector-borne diseases in informal settlements: Challenges, opportunities and insights. *Journal of Urban Health*. 2010; 84(1):165–174.

- Gallo M, Warner L, Bell A, Wiener L, Eschebach D, et al. Assessment of changes in condom use among female sex workers in a prospective cohort study introducing diaphragm use for disease prevention. *American Journal of Epidemiology*. 2010; 172:606–612. [PubMed: 20660519]
- Ghani A, Aral S. Patterns of sex worker-client contacts and their implications for the persistence of sexually transmitted infections. *Journal of Infectious Diseases*. 2005; 191:S34–S41. [PubMed: 15627229]
- Gyarmantny V, Neaigus A. The relationship of sexual dyad and personal network characteristics and individual attributes to unprotected sex among young injection drug users. *AIDS and behavior*. 2009; 13(2):196–206. [PubMed: 17690975]
- Gysels M, Pool R, Nnalusiba B. B. Women who sell sex in a Ugandan trading town: Life histories, survival strategies and risk. *Social Science and Medicine*. 2002; 54:179–192. [PubMed: 11824924]
- Heckathorn D. Respondent-driven sampling: A new approach to the study of hidden populations. *Social Problems*. 1997; 44:174–199.
- Hilde, J. *Negative binomial regression*. Cambridge: Cambridge University Press; 2007.
- Jansson M, Benoit C, Casey L, Phillips R, Burns D. In for the long haul: Knowledge translation between academic and non-profit organizations. *Qualitative Health Research*. 2010; 20:131–143. [PubMed: 19801416]
- Johnston L, Sabin K, Hien M, Huong P. Assessment of respondent driven sampling for recruiting female sex workers in two Vietnamese cities: Reaching the unseen sex worker. *Journal of Urban Health*. 2006; 83(Suppl1):16–26.
- Kardikar S, Próspero M. From client to pimp: Male violence against female sex workers. *Journal of Interpersonal Violence*. 2010; 25(2):257–273. [PubMed: 19553559]
- Kerrigan D, Ellen J, Moreno L, Rosario S, Katz J, Celentano D, Sweat M. Environmental-structural factors significantly associated with consistent condom use among female sex workers in the Dominican Republic. *AIDS*. 2003; 17:1–9. [PubMed: 12478064]
- Kimani-Murage E, Holding P, Fotso E, Madise N, Kahurani E, Zulu E. Food security and nutritional outcomes among urban poor orphans in Nairobi, Kenya. *Journal of Urban Health*. 2010 Published on line, October 10, 2010.
- Kyobutungi C, Kasiira Ziraba A, Ezeh A, Ye Y. The burden of disease profile of residents of Nairobi's slums: Results from a Demographic Surveillance System. *Population Health Metrics*. 2008; 6
- Latka M, Metsch L, Mizuno Y, Tobin K, MacKenzie S, Arnsten J, Gourevitch M. Unprotected sex among HIV-positive injection drug-using women and their sero-discordant male partners: Role of personal and partnership influences. *Journal of Acquired Immune Deficiency Syndromes*. 2006; 42:222–228. [PubMed: 16760799]
- Luke N. Exchange and condom use in informal sexual relationships in urban Kenya. *Economic Development and Cultural Exchange*. 2006; 54(2):319–348.
- Morris C, Sheldon A, Mossi R, Ferguson A. Sexual behavior of female sex workers and access to condoms in Kenya and Uganda on the trans-Africa Highway. *AIDS and behavior*. 2009; 13:860–865. [PubMed: 18665445]
- Mugisha F, Arinaitwe-Mugisha J, Hagember B. Alcohol, substance and drug use among urban slum adolescents in Nairobi, Kenya. *Cities*. 2003; 20(4):231–240.
- Murray L, Moreno L, Rosario S, Ellen J, Sweat M, Kerrigan D. The role of relationship intimacy among female sex workers and their regular paying partners in the Dominican Republic. *AIDS and behavior*. 2007; 11:463–470. [PubMed: 17096198]
- Niang CI, Tapsoba P, Weiss E, Diagne M, Niang Y, Moreau AM, Gomis D, Wade AS, Seck K, Castle C. 'It's raining stones': Stigma, violence and HIV vulnerability among men who have sex with men in Dakar, Senegal. *Culture Health and Sexuality*. 2003; 5(6):499–512.
- Simonsen, Ngugi EJ.; Bosire, M.; Ronald, AR.; Plummer, FA.; Cameron, DW.; Waiyaki, P.; Ndinya-Achola, JO. Prevention of transmission of human immunodeficiency virus in Africa: effectiveness of condom promotion and health education among prostitutes. *Lancet*. 1988:887–890. (iii). [PubMed: 2902326]
- Ngugi E, Wilson D, Sebstad J, Plummer F, Moses S. Focused peer-mediated educational programs among female sex workers to reduce sexually transmitted disease and human immunodeficiency

- virus transmission in Kenya and Zimbabwe. *Journal of Infectious Diseases*. 1996; 174(Supp 2):S240–S247. [PubMed: 8843254]
- Ngugi, E.; Branigan, E.; Jackson, D. Interventions for commercial sex workers and their clients. In: Gibney, L.; DiClemente, R.; Vermund, S., editors. *Preventing HIV in developing countries: Biomedical and behavioural approaches*. New York: Plenum Press; 1999. p. 205-230.
- Ngugi E, Chakkalackal M, Sharma A, Bukusi E, Njoroge B, Kimani J, MacDonald K, Bwayo J, Cohern C, Moses S, Kaul R. Kibera HIV Study Group. Sustained changes in sexual behavior by female sex workers after completion of a randomized HIV prevention trial. *Journal of Acquired Immune Deficiency Syndrome*. 2007; 45(5):588–594.
- Ntumbanzondo MR, Dubrow LM, Niccolai, Mwandagalirwa K, Merson M. Unprotected intercourse for extra money among commercial sex workers in Kinshasa, Democratic Republic of the Congo. *AIDS Care*. 2006; 18(7):777–785. [PubMed: 16971288]
- Odek W, Busza J, Morris C, Cleveland J, Ngugi E, Ferguson A. Effects of micro-enterprise services on HIV risk behaviour among female sex workers in Kenya's urban slums. *AIDS and Behavior*. 2009; 13(3):449–461. [PubMed: 18998204]
- Okal J, Luchtersa S, Geibelb S, Chersicha M, Langoa D, Temmermanc M. Social context, sexual risk perceptions and stigma: HIV vulnerability among male sex workers in Mombasa, Kenya. *Culture, Health and Sexuality*. 2009; 11(8):1–16.
- Rekart M. Sex-work harm reduction. *Lancet*. 2005; 366:2123–2134. [PubMed: 16360791]
- Robinson J, Yeh E. Transactional sex as a response to risk in Western Kenya. *American Economic Journal: Applied Econometrics*. 2011; 3(1):35–64.
- Sherman S, Latkin C. Intimate relationship characteristics associated with condom use among drug users and their sex partners: A multilevel analysis. *Drug and Alcohol Dependence*. 2001; 64:97–104. [PubMed: 11470345]
- Stoebenau K, Hinden M, Nathanson C, Rokatoarison P, Razafintsalama V. "... But then he became my Sipa": The implications of relationship fluidity for condom use among women sex workers in Antananarivo, Madagascar. *American Journal of Public Health*. 2009; 99(5):811–819. [PubMed: 19299685]
- Swidler A, Watkins S. Ties of dependence: AIDS and transactional sex in rural Malawi. *Studies in Family Planning*. 2007; 38(3):147–162. [PubMed: 17933289]
- Thuong N, Nhung V, Nghia K, Tram L, O'Farrell N. HIV in female sex workers in five border provinces of Vietnam. *Sexually Transmitted Infections*. 2005; 81:477–479. [PubMed: 16326850]
- Unge C, Sodergard B, Ekstron A, Carter J, Waweru M, Ilako F, Tagnarsson A, Thorson A. Challenges for scaling up ART in a resource-limited setting: A retrospective study in Kibera, Kenya. *Journal of Acquired Immune Deficiency Syndrome*. 2009; 50(4):397–402.
- Unge C, Sodergard B, Marrone G, Thorson A, Lukhwaro A, Carter J, Ilako F, Mia A, Ekstrom A. Long-term adherence to antiretroviral treatment and program drop-out in a high-risk urban setting in Sub-Saharan Africa: A prospective cohort study. *PLoS ONE*. 2010; 5(10):e13613. [PubMed: 21049045]
- UNAIDS. HIV transmission in intimate relationships in Asia. Geneva: United Nations Publication; 2009.
- United Nations HABITAT. The challenge of slums: Global report on human settlements. Geneva: United Nations; 2003.
- Voeten H, Egesah O, Varkevisser C, Habbema J. Female sex workers and unsafe sex in urban and rural Nyanza, Kenya: Regular partners may contribute more to HIV transmission than clients. *Tropical Medicine and International Health*. 2007; 12(2):1–9. [PubMed: 17207142]
- Wojcicki J. Commercial sex work or Ukuphanda? Sex-for- money exchange in Soweto and Hammanskraal Area, South Africa. *Culture, Medicine and Psychiatry*. 2002; 26:339–370.
- World Health Organization. World report on violence and health. Geneva, Switzerland: World Health Organization; 2002.
- Violence against women and HIV/AIDS: Critical intersections, intimate partner violence and HIV/AIDS. *Information Bulletin Series*. 2004 No. 1.
- Yadav G, Saskin R, Ngugi E, Kimani J, Keli F, Fonck K, Macdonald K, Bwayo J, Temmerman M, Moses S, Kaul R. Kibera HIV Study Group. Associations of sexual risk taking among Kenyan

female sex workers after enrollment in an HIV-1 prevention trial. *Journal of Acquired Immune Deficiency Syndrome*. 2005; 38(3):329–334.

Yeka P, Maibani–Michie G, Prybylski D, Colby D. Application of respondent driven sampling to collect baseline data on FSWs and MSM for HIV risk reduction interventions in two urban centres in Papua New Guinea. *Journal of Urban Health*. 2006; 83(Supp1):60–72.

Zulu E, Dodoo, Chika-Ezee A. Sexual risk-taking in the slums of Nairobi, Kenya, 1993-8. *Population Studies*. 2002; 56:311–323. [PubMed: 12553329]

Zulu, E.; Dodsoo, A.; Chika-Ezee, A. Urbanization, poverty and sex: Roots of sexual behaviour in slum settlements in Nairobi. In: Ezekiel, S.; Graddock, J.; Oponong, J.; Ghosh, J., editors. *HIV/AIDS in Africa: Beyond epidemiology*. London: Blackwell; 2004. p. 167-174.

Table 1

Descriptive statistics, Kibera female sex workers and women in other economic occupations (m = mean, s.d. = Standard Deviation).

Question	Female Sex Worker n.=161	Kibera Women in Other Occupation n.=159		
When were you born? (AGE)	m = 30.39 s.d. = 7.93	m = 29.32 s.d. = 7.20		
How many years have you lived in Nairobi?	m = 16.93 s.d = 9.30	m = 11.16 s.d. = 9.09		
How many family members, including aunts, uncles and siblings did you see on a weekly basis when you were 15 years of age?	m = 8.85 s.d. = 8.21	m = 10.15 s.d. = 6.14		
How many family members, including aunts, uncles and siblings, do you see on a weekly basis now?	m = 2.66 s.d. = 3.06	m = 3.86 s.d. = 4.77		
What was the highest education level that you attained?	None	100	None	48
	Primary	19	Primary	50
	Secondary	37	Secondary	55
	Post Secondary	3	Post Secondary	6
What is your current marital status?	Single/ Never Married	116	Single/Never Married	45
	Married	1	Married	78
	Divorced	38	Divorced	29
	Widowed	6	Widowed	7
Are you currently in an intimate relationship?	Yes	70	Yes	112
	No	91	No	47

Table 2

Sexual epidemiological variables by sample (m = mean, s.d. = Standard Deviation).

Question	Female Sex Worker n=161	Kibera Women in Other Occupations n=159
What was the result of your HIV/AIDS test?	HIV(+) 39 HIV (-) 104 Unknown 18	HIV(+) 16 HIV(-) 122 Unknown 21
How many different people have you had sex with in the past week?	m = 5.07 s.d. = 8.03	m = 0.47 s.d. = 0.51
How many of these different partners did you use condoms with in the past week?	m = 3.42 s.d. = 4.55	m = 0.10 s.d. = 0.31
How many of these different partners did you not use condoms with in the past week?	m = 1.65 s.d. = 6.19	m = 0.37 s.d. = 0.50

Table 3

Results of negative binomial analysis performed for total partners of the FSWs sample

Parameter	df	Coefficient	Standard Error	Wald Chi-Square	Probability
Intercept	1	1.9021	0.1981	92.17	<0.001
HIV Status <i>Positive vs. Negative and Unknown</i>	1	-0.1901	0.2049	0.86	0.3535
Romantic Partner <i>Present vs. Absent</i>	1	-0.8260	0.1814	20.74	<0.0001
Education <i>No Education vs. Some Education</i>	1	0.0712	0.1085	0.43	0.5119
Beer <i>Drink Beer Daily vs. Drink Less Frequently</i>	1	-0.2809	0.1796	2.45	0.1178
Family Now <i>Continuous Variable</i>	1	0.0126	0.0247	0.26	0.6102

Table 4

Results of negative binomial analysis performed for romantic partners not using condoms, FSW's sample.

Parameter	df	Coefficient	Standard Error	Wald Chi-Square	Probability
Intercept	1	0.8216	0.5418	2.30	0.1294
HIV STATUS <i>Positive vs. Negative and Unknown</i>	1	0.2999	0.5316	0.32	0.5726
Romantic Partner <i>Present vs. Absent</i>	1	-1.2186	0.5021	5.89	0.0152
Education <i>No education vs. Some Education</i>	1	0.2873	0.2939	0.96	0.3283
Beer <i>Drink Beer Daily vs. Drink Less Frequently</i>	1	-0.5935	0.4784	1.54	0.2147
Family Now <i>Continuous Variable</i>	1	-0.0901	0.0765	1.39	0.2385

Table 5

Monthly earnings and contributions expressed as Kenyan shillings, FSWs sample (m = mean, s.d. = Standard Deviation).

Variable	Female Sex Workers With Romantic Partners n.=70	Female Sex Workers Without Romantic Partners n.=91
Monthly Earnings (Kenyan Shillings)	m = 2,933 s.d. = 3372 n. = 70	m = 3,061 s.d. = 3,789 n. = 91
Monthly Contribution Intimate Partner (Kenyan Shillings)	m = 2,073 s.d. = 1,432 n. = 37	
Monthly Contribution Parents (Kenyan Shillings)	m = 2,977 s.d. = 2,681 n. = 9	m = 1,739 s.d. = 2,083 n. = 14
Monthly Contribution Friends (Kenyan Shillings)	m = 1,400 s.d. = 1,083 n. = 4	m = 2,103 s.d. = 2,275 n. = 18
Total Monthly Contributions (Kenyan Shillings)	m = 1,601 s.d. = 1,798 n. = 70	m = 684 s.d. = 1,577 n. = 91
Totals Monthly Earnings+ Contributions (Kenyan Shillings)	m = 4,534 s.d. = 4,336 n. = 70	m = 3,745 s.d. = 4,222 n. = 91