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While Kenya has had a long-standing national HIV-prevention programme, evidence on the level of exposure to its interventions and related effects on behavioural changes among female sex workers (FSWs) is limited. Using cross-sectional behavioural data collected in 2013 from 1 357 FSWs aged 18 years and above in Nairobi, Kenya, this study explores the relationship between FSW programme exposure levels and behavioural outcomes including condom use, sexually transmitted infection (STI)-treatment, and empowerment measures like disclosure of self-identity and violence reporting. We categorised programme exposure levels as none, moderate and intensive. Multivariate logistic regression was used for analysis. Overall, 35% of the FSWs were not exposed to any HIV prevention programme, whereas about 24% had moderate and 41% had intensive exposure. FSWs having intensive programme exposure had a higher likelihood of using condoms consistently with occasional clients (AOR: 1.57; 95% CI: 1.08–2.31) and seeking treatment for STIs (AOR: 3.37; 95% CI: 1.63–7.02) compared to FSWs with no or moderate exposure. Intensive programme exposure was also associated with higher self-disclosure of sex-work identity (AOR: 1.63; 95% CI: 1.19–2.24), reporting of violence to police (AOR: 2.45; 95% CI: 1.03–5.84), and negotiation of condom use at last sex when the client was under the influence of alcohol (AOR: 1.63; 95% CI: 0.94–2.82). Although HIV prevention programmes in Kenya have been underway for over a decade, programme efforts were largely focused on saturating the coverage (intervention breadth). Strategies should now focus on ensuring improved quality of contacts through intensified programme exposure (intervention depth) to enhance gains in behavioural change among FSWs and preventing the burden of HIV infection among them.

Keywords: behaviour change, condom use, empowerment, programme exposure, violence

Background

Kenya has the fourth largest HIV epidemic in the world and the highest national HIV prevalence of any country outside of Southern Africa (Avert, 2017). It has a mixed and geographically heterogeneous HIV epidemic, with an estimated adult HIV prevalence of 6% in 2013 (NACC, 2015). The two Kenya AIDS indicators surveys (KAIS) conducted in 2007 and 2012 suggest that there has been a decline in HIV prevalence among the general population (William et al., 2014), but the disproportionate burden of HIV among women in Kenya has remained almost the same (Kerrigan, Telles, Torres, Overs, & Castle, 2013).

Female sex workers (FSWs) experience a greater burden of HIV infection (Baral et al., 2012; UNAIDS, 2014), and face systematic barriers to accessing appropriate HIV prevention and care services globally, including Kenya (Beattie et al., 2012; Decker et al., 2015; Scorgie et al., 2013). According to the 2009 Kenya Modes of Transmission study, an estimated 14.1% of national HIV infections can be attributed to the burden among FSWs and their clients, and 33% of all new HIV infections are among key populations, including FSWs (Gelmon, Kenya, Oguya, Cheluget, & Haile, 2009). Further, recent analyses suggest that traditional methods of assessing the proportion of overall HIV burden that is attributed to the prevalence among key populations may provide significant underestimations (Mishra et al., 2014; Mishra et al., 2012). The Modes of Transmission study found that up to 6% of adult women reported selling sex in Kenya (Kerrigan et al., 2013). Additionally, a national mapping and estimation exercise of key populations conducted by the National AIDS and STI Control Programme (NASCOP) (Odek et al., 2014) indicated that there are upwards of 133 000 FSWs in urban areas of the country. Criminalisation of sex work also increases sex workers’ vulnerability to violence. A study conducted during 2013–2014 among
key populations in Kenya found that about 45% of FSWs reported experiencing violence in the 6 months preceding the survey (Bhattacharjee et al., 2015). Due to the high number of sex workers and prevailing high level of HIV infection and violence against sex workers in Kenya, sex work has been identified as having a central role in HIV transmission dynamics; sex workers are therefore one of the key populations prioritised for focused preventive programming in the Kenya AIDS Strategic Framework 2014/15-18/19 (NACC, 2014).

The mapping and size estimation exercise among FSWs in Kenya indicated a large concentration of FSWs in just a few urban cities and towns (Odek et al., 2014). Nairobi had the highest concentration of FSWs followed by Mombasa (NACC & NASCOP, 2012). NASCOP estimated (Odek et al., 2014) that Nairobi city has over 27 000 FSWs operating in over 2 500 spots; a large proportion of them work out of fixed venues. This accounts for about 20% of the estimated number of sex workers in Kenya (Odek et al., 2014) with an estimated HIV prevalence of 29.3% (Musyoki et al., 2015; NASCOP, 2014a). Evidence to date indicates that HIV transmission in sex work can be interrupted in many ways (Steen, Wheeler, Gorgens, Mziray, & Dallabetta, 2015). When interventions among FSWs are implemented at sufficient scale, HIV epidemics have been halted and reversed (Chersich et al., 2013; Laga et al., 1994; Pickles et al., 2013; Steen et al., 2013; Wi et al., 2006). Such evidence serves to underscore the importance of scaling up HIV prevention and care programmes among FSWs, especially in Nairobi and in other large cities.

Currently, the HIV prevention programmes among FSWs in Kenya are implemented in 32 out of 47 counties, with funding support from the US President’s Emergency Plan for AIDS Relief (PEPFAR) and the Global Fund, to reach more than 140 000 FSWs (NASCOP, 2016). These programmes are being implemented by three implementing partners, including community-based organisations and non-governmental organisations (NGOs), who deliver the intervention package prescribed by the national programme. These programmes largely follow the peer-led approach where FSWs, identified as peer educators, meet other FSWs and provide them education, distribute condoms and lubricant, provide support at times of violence and refer them to the nine NGO-run and other government clinics currently offering prevention and care services in Nairobi. The revised national guidelines for key populations (NASCOP, 2014b) mandate programmes to adopt a “combination prevention” approach, including behavioural, biomedical and structural interventions. The feasibility and effectiveness of combination prevention services such as peer education and outreach, condom promotion, clinical services for sexually transmitted infections (STIs), antiretroviral therapy (ART) and pre-exposure prophylaxis (PrEP), as well as community mobilisation for individual and collective empowerment and anti-violence support, have been documented based on a range of research from Asia and Africa (Beattie et al., 2015; Blanchard et al., 2013; Chersich et al., 2013; Luchters et al., 2008; Ramesh et al., 2010; Reza-Paul et al., 2012; Shahmanesh, Patel, Mabey, & Cowan, 2008). A systematic review of sex work interventions specifically in Africa showed that interventions with sex workers, implemented at sufficient scale and intensity, could effectively contribute to reducing HIV prevalence, risk and vulnerability, in part by serving as valuable platforms for community mobilisation and empowerment (Chersich et al., 2013). However, the efficacy of individual interventions, especially PrEP, would largely depend on higher adherence, the integration of services, and synergies with existing prevention programmes (Mugo, Ngure, Kiragu, Irungu, & Kilonzo, 2016; Syvertsen et al., 2014).

Although scale up of interventions has received more attention in recent years in Africa and other parts of the globe, the intensity and level of exposure to these interventions and related effects on HIV prevention have not been well-studied. One study has identified targeted geographic coverage, with adequate intensity and sustainability of cost-effective services, as critical factors shaping the course of epidemics (Steen et al., 2015), and maintaining higher adherence to the programme (Syvertsen et al., 2014). In this context, our paper examines the association between intensity of exposure to key components of a combination HIV prevention programme and selected HIV-related behavioural outcomes, including condom use, health-seeking behaviour and empowerment measures, that the programme aims to improve.

Methods
Study design
For this study, we used a cross-sectional behavioural survey conducted in Nairobi, Kenya, in 2013 among 1 357 FSWs aged 18 years and above. The survey aimed to understand the operational characteristics and typologies of FSWs and their unmet need for HIV prevention services. A multi-stage stratified random sampling method was adopted for data collection. In the first stage, all sex work spots were stratified by typology. These are defined in the Kenya National Guidelines for HIV/STI Programmes for Sex Workers, namely street-based, home-based, venue-based (bar with or without lodge; night club/casino; strip club; lodge/guest house/hotels), road (truck stop)-based, sex den-based, massage parlour-based and escort services-based sex work were examined in the study (Odek et al., 2014). At the second stage, stratification was done by geographic region. Within each stratum, spots were selected using a population proportional to size (PPS) approach, with the estimated number of FSWs in the spot as the population size. Thus the total number of interviews to be done in each spot was fixed in advance.

The participants were recruited randomly from each of the selected spots. The study team visited the spots during peak times so that all or most of the FSWs practising sex work in the spot could be included. At each spot, selection of participants was made from the sex workers available at that spot during the time when the study team visited that particular spot. If the total number of sex workers available in a spot were equivalent to the number of participants to be selected from those spots, all the sex workers were invited to participate in the study. Interviewers contacted the FSWs with the support of community workers who were responsible for delivering the programme services to sex workers, as part of the ongoing HIV prevention programme for key populations in Nairobi implemented by the Sex Worker’s Outreach Project (SWOP). The community workers helped
build rapport with the gatekeepers of the venues/spots, and in identifying eligible respondents for the study. The eligibility criteria included being at least 18 years of age and reporting to have exchanged sex for gifts, or materials or cash.

The interaction with the respondents was done through a face-to-face interview using an anonymous pen and paper questionnaire without recording names or personal identifiers. Each interview took 35–40 minutes, on average. A detailed and standardised consent process was administered. Informed verbal consent was obtained from each respondent at the time of recruitment in the presence of a witness, independent of the study, who could confirm the respondent’s verbal consent. NASCOP, Ministry of Health, Kenya, approved the study, and the Centre for Global Public Health (CGPH) at the University of Manitoba provided technical support. Ethical approval was obtained from the Ethics and Research Committee of Kenyatta National Hospital and the University of Nairobi (KNH/UoN-ERC).

**Variables**

**Outcome variables**

There were three sets of behavioural outcomes that encompassed safe sex practices, health-seeking behaviour and empowerment among FSWs. Safe sex practices were defined in terms of condom use at last sex (yes/no) and consistent condom use (“every time” condom use/no use) with different types of male sexual partners: (i) “occasional/casual clients”, defined as clients who visited the FSW only once or on a few occasions, and were not well known to her; (ii) “regular clients”, defined as those who were known to the FSW and visited her regularly/repeatedly; and (iii) “regular non-paying partners”, such as husbands, boyfriends and live-in partners.

Health-seeking behaviours were measured using two binary variables: (i) self-reported symptoms of STIs in the 6 months preceding the survey (yes/no); and (ii) treatment seeking for the last STI symptom (yes/no). Three variables that reflected empowerment were included: (i) self-disclosure of sex work identity to someone (yes/no); (ii) reporting an act of violence to a law enforcement agency such as the police (yes/no); and (iii) negotiation of condom use at last sex when the client was under the influence of alcohol (yes/no). The variables on self-disclosure of sex worker’s identity and the reporting of violence to police were treated as indicators of higher self-confidence (akin to “power within”) and collective power (“power with others”) have been found to encapsulate similar empowerment processes elsewhere and in broader theoretical frameworks (Blanchard et al., 2013; Cornwall, 2016; Kabeer, 1999).

**Exposure variable**

Level of programme exposure was defined using FSW answers to three questions with a binary response (yes/no). The level of programme exposure was defined as intensive if the sex workers responded “yes” to all the following three questions: contact with peer educators; received condoms through the programme; and visits to clinics exclusively meant for sex workers; FSWs who reported “yes” to one or two of the three questions were categorised as having moderate programme exposure, and those reporting “no” to all three questions were grouped into a no exposure category. Other socio-demographic, economic or sexual behaviour characteristics that could potentially influence associations between exposures and outcomes were also included in the analysis.

**Analysis**

Bivariate and multivariate methods in the form of cross-tabulations, and unadjusted and adjusted odds ratios (ORs), were used to measure the associations between outcomes and the exposure, that is, the level of exposure to HIV prevention programmes. The Wald test was performed to identify the importance of the exposure variable relative to other covariates in the multivariate model.

To measure the association between predictors (socio-demographic and sex work characteristics), exposure and the outcomes, the analysis was conducted in two stages. First, univariate unadjusted models explored the associations between the exposure and the outcomes. Next, adjusted multivariate models were built by keeping all those socio-demographic and sex work characteristics into the model that were associated with the outcomes in univariate analysis to a significance level of p < 0.20 (results not shown). Only age, marital status, literacy, place of solicitation, and level of programme exposure were considered as important for adjustment a priori in all the multivariable models based on contextual importance. Separate logistic regression models were created for each of the outcome measures. All statistical analyses were performed in STATA (version 14.0; StataCorp, College Station, TX).

**Results**

**Characteristics of the study population**

Table 1 summarises the socio-economic, demographic and sex work characteristics of the study participants. A total of 1 357 FSWs participated in the survey, of whom about one-fifth were aged below 25 years, with a mean age of about 30 years. Almost all participants were literate (96%), 60% were ever-married, 65% were local to the area, 90% had at least 1 child, and 4% had a source of income other than sex work at the time of the survey. FSWs were predominantly Christian, with 48% Protestant and 40% Catholic.

More than half of the sampled FSWs (57%) operated from fixed venues such as hotels/lodges, bars/restaurants, homes, and “sex dens” (an establishment with several rooms that clients and sex workers can use for sexual activities — similar to a brothel but not being regularised by a brothel madam). The remaining 43% used street-based spots as a mode of solicitation. The mean age at sexual debut was about 17 years, and nearly one-fifth reported first sex at the age of 15 years. About 18% of FSWs reported that their first sexual experience was coerced or forced. Over half of the study participants practised sex work typically for five or more days per week, with an average weekly volume of seven clients. Condom use at last sex with a paying client was at 96%, and 70% with a non-paying partner. Overall, 17% of respondents reported condom breakage during the past 7 days of work. Just over half of the FSWs who participated in the survey had ever been contacted by a peer educator (55%), received a condom from them (51%), or ever visited a sex work-friendly clinic for a health check-up or other STI-related services (54%).
Table 1: Socio-economic, demographic and sex work characteristics, and programme exposure parameters of FSWs (N = 1 357)

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Percentage and mean</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. Socio-economic and demographic characteristics</strong></td>
<td></td>
</tr>
<tr>
<td>Current age: &lt;25 years (%)**</td>
<td>21.6</td>
</tr>
<tr>
<td>Mean age (SD)**</td>
<td>29.7 (6.8)</td>
</tr>
<tr>
<td>Literate (%)</td>
<td>95.7</td>
</tr>
<tr>
<td>Ever married (%)</td>
<td>59.3</td>
</tr>
<tr>
<td>Local resident (%)</td>
<td>65.0</td>
</tr>
<tr>
<td>Currently have children (%)**</td>
<td>90.2</td>
</tr>
<tr>
<td>Any source of income than sex work (%)**</td>
<td>3.6</td>
</tr>
<tr>
<td>Religion</td>
<td></td>
</tr>
<tr>
<td>Non-Christian</td>
<td>12.1</td>
</tr>
<tr>
<td>Christian-Catholic</td>
<td>40.2</td>
</tr>
<tr>
<td>Christian-Protestant</td>
<td>47.7</td>
</tr>
<tr>
<td><strong>B. Sex work characteristics</strong></td>
<td></td>
</tr>
<tr>
<td>Sex work typology; venue based (%)</td>
<td>46.3</td>
</tr>
<tr>
<td>Age at first sex: &lt;15 years (%)</td>
<td>19.3</td>
</tr>
<tr>
<td>First sex was coerced (%)</td>
<td>18.2</td>
</tr>
<tr>
<td>Mean years of duration in sex work (SD)**</td>
<td>5.6 (2.6)</td>
</tr>
<tr>
<td>Weekly client volume (%)**</td>
<td></td>
</tr>
<tr>
<td>Below 5</td>
<td>34.2</td>
</tr>
<tr>
<td>5–9</td>
<td>35.1</td>
</tr>
<tr>
<td>10 or more</td>
<td>30.7</td>
</tr>
<tr>
<td>Mean number of clients per week (SD)</td>
<td>7.4 (6.82)</td>
</tr>
<tr>
<td>Condom use at last sex with regular clients</td>
<td>82.0</td>
</tr>
<tr>
<td>Condom use at last sex with non-paying partners</td>
<td>70.3</td>
</tr>
<tr>
<td>Experienced condom breakage at last sex</td>
<td>17.0</td>
</tr>
<tr>
<td><strong>C. Programme exposure</strong></td>
<td></td>
</tr>
<tr>
<td>Ever contacted by a peer educator</td>
<td>55.4</td>
</tr>
<tr>
<td>Received condom by a peer educator</td>
<td>50.6</td>
</tr>
<tr>
<td>Ever visited a sex-worker friendly clinic</td>
<td>53.5</td>
</tr>
</tbody>
</table>

SD = standard deviation; ¹Among those who reported sex with occasional/regular paying clients; ²Among those who reported sex with a non-paying partner in last three months; **Socio-demographic and sex work variables differ significantly (p < 0.05) by exposure group

Intensity of exposure to HIV intervention components

Table 2 shows the distribution of FSWs by the extent of uptake of different programme services. Although more than half of the FSWs were exposed to each of the HIV prevention programme elements examined, 41% reported receiving all 3 services (intensive exposure to the programme). Another 35% had no programme exposure, and 24% had moderate exposure. Of those who had moderate exposure, 10% reported visiting the clinic, but had no peer contact (including not having received condoms from a peer educator), and 9% reported being contacted by peers and receiving condoms from them, but never visited a programme clinic.

Association between programme exposure, condom use and STIs

The associations between programme exposure levels, and condom use and STI-related outcomes are presented in Table 3. Overall, 96% of FSWs reported using a condom at last sex with occasional clients, 75% with regular clients and 70% with regular non-paying partners. Consistent condom use with these partners was 85%, 66% and 46% respectively. Although there was a weak association between the level of programme exposure and condom use at last sex with any client/partner, a significant association was found between levels of programme exposure and consistent condom use with occasional clients. FSWs reporting intensive programme exposure were more likely to consistently use condoms with their occasional clients compared to those with no programme exposure (88% vs 80%, AOR = 1.57, 95% CI: 1.08–2.31). A higher proportion of those FSWs reporting moderate programme exposure also consistently used condoms with their occasional clients versus those with no programme exposure (86% vs 80%), but this difference was not statistically significant after adjustment.

FSWs with intensive programme exposure were more likely to report STI symptoms in the 6 months preceding the survey compared to those with no programme exposure (19% vs 15%), but this difference was not statistically significant in the multivariate model. However, FSWs with intensive programme exposure were significantly more likely to seek treatment for the last STI symptom compared to those with no programme exposure (91% vs 78%, AOR = 3.37, 95% CI: 1.63–7.02).

Association between programme exposure and empowerment

We found a strong association between level of programme exposure and outcomes related to FSWs’ empowerment (Table 4). FSWs with intensive programme exposure were more likely to self-disclose their sex work identity (78% vs 65%, AOR = 1.63, 95% CI: 1.19–2.24), to report instances of violence to police (19% vs 8%, AOR = 2.45, 95% CI: 1.03–5.84), and to negotiate condom use at last sex when a client was under the influence of alcohol (94% vs 90%, AOR = 1.63, 95% CI: 0.94–2.82) compared to those with no programme exposure. Associations between having moderate exposure compared to no exposure to the programme and indicators for empowerment were not statistically significant in multivariate analyses.

Discussion

This study aimed to understand the ability of in-depth exposure to a combination of interventions to achieve key behavioural and biomedical outcomes among FSWs as a key population of Kenya’s HIV prevention strategy. We found that about one-third of the surveyed FSWs had never been exposed to any programme providing FSW-friendly HIV prevention and care services. Another one-quarter accessed the services moderately (24%), while the remaining 41% reported intensive exposure to programme services. After adjusting for the effects of socio-demographic and sexual behaviour characteristics, significant associations were found between FSWs having
intensive programme exposure compared to those with no programme exposure, with respect to consistent condom use at last sex with occasional/casual clients and STI treatment-seeking behaviour. Similarly, significant associations were observed between FSWs having intensive programme exposure and no exposure with respect to two of the three outcomes representing empowerment of sex workers, that is, self-disclosure of sex worker identity and reporting violence to law enforcement agencies such as police. There was also a positive trend for being better able to negotiate condom use at last sex when a client was under the influence of alcohol.

Our findings are consistent with those from previous observational studies conducted in Asia and Africa (Bhattacharjee et al., 2015; Deering et al., 2011; Laga et al., 1994; Luke, 2006; Ramesh et al., 2010) and those which evaluated the role of peer-mediated interventions on increasing protected sex (Luchters et al., 2008) and reducing the STI and HIV incidence among sex workers in Kenya (Ngugi, Wilson, Sebstad, Plummer, & Moses, 1996). The link between intensive programme exposure and consistent condom use with occasional/casual clients can be explained by evidence showing that regular contact between sex workers and peer educators (who provide information on safe...
Sexual practices, distribute condoms, and demonstrate correct condom use), can increase knowledge and risk perception, and better access to and skills in using condoms (Chersich et al., 2013; Deering et al., 2011; Odek et al., 2014).

Similar to the findings from a previous study (Bradley et al., 2010), the association between programme exposure and condom use with occasional clients can also be attributed to better availability of condoms. Since FSWs with intensive exposure were more likely to have received condoms through the programme, there was a higher likelihood of condoms being more readily available to them at all times. Evidence also suggests that distribution of condoms through programmes can not only facilitate increased condom access, but also the social acceptance of condoms by normalising their use in everyday life (Deering et al., 2011). Programmes that include condom distribution have similarly shown higher consistent condom use among FSWs with their clients (Cohen, 2004; Kerrigan et al., 2008).

Although we found a strong relationship between intervention exposure and consistent condom use with occasional clients, such a relationship was not observed with other sexual partners of FSWs, such as regular clients or regular non-paying partners, including cohabiting partners or lovers. We do not yet have quantitative information on reasons for inconsistent condom use with different partners, but studies have shown that condom use with FSWs' regular partners is more challenging than with clients in many contexts, relating to issues of intimacy and trust in their relationships (Beattie et al., 2014; Bhattacharjee et al., 2015; Luke, 2005, 2006; Wang, Li, Song, Ding, & Cathy, 2007; Wojcicki & Malala, 2001). Power disparities that favour male partners and greater financial reliance on regular partners, have been identified as other barriers to low condom use in an intimate partner relationship (Luke, 2005; Wang et al., 2007; Wojcicki & Malala, 2001). Studies have also found that lower condom use in non-paying relationships is more likely in longer-term relationships, as the longer duration generates a sense of trust with the partners (Isac et al., 2015; Varga, 1997).

We also found that health-seeking behavioural outcomes were significantly associated with the intensity of programme exposure. FSWs with intensive programme exposure were more likely to seek STI treatment. As our exposure variable included clinic visits as one of the components, it seems more likely that FSWs who were regular visitors to the sex worker-friendly clinics would have been correctly diagnosed with STI symptoms and to have received appropriate treatment. Other studies have also documented a strong association between programme exposure and improved STI treatment seeking behaviour (Chersich et al., 2013; Laga, Galavotti, Sundaraman, & Moodie, 2010; Ramakrishnan et al., 2010; Rou et al., 2007; van Griensven, Limanonda, Ngaokeow, Ayuthaya, & Poshyachinda, 1998; Walden, Mwanguulu, & Makhumula-Nkhoma, 1999; Wu, Rou, Jia, Duan, & Sullivan, 2007). An evaluation of a large-scale HIV prevention programme in India found that sex workers exposed to programmes were more likely to have sought treatment for STIs from trained medical practitioners, received peer education, and showed significantly improved health-seeking behaviour (Ramakrishnan et al., 2010). Moreover, improved health-seeking behaviour was found to be effective in reducing STI rates among FSWs (Shahmanesh et al., 2008; Steen & Dallabetta, 2003; Steen et al., 2006).

Another important finding from our study was the strong association between intensive programme exposure and outcomes related to empowerment, such as FSWs' ability to self-disclose their sex work identity to someone, report instances of violence to police, and to negotiate condom use with clients under the influence of alcohol. These associations were significant independent of socio-demographic characteristics. Although the exposure variable used in this study could not directly capture the influence of community mobilisation or empowerment strategies, our results are supported by other evidence suggesting that repeated peer contacts can build solidarity and create a sense of agency among sex workers (Deering et al., 2011; Halli, Ramesh, O'Neil, Moses, & Blanchard, 2006; Sarkar, 2010). FSWs' participation in peer groups has also been found to be an effective strategy in creating an enabling environment within which sex workers are able to take greater control over their lives, which has been found to lead to lower experience of violence, fewer exploitative practices (such as police bribery) and better access to social entitlement schemes (Bhattacharjee et al., 2013). Additionally, research has shown that community mobilisation and empowerment activities have been effective in promoting consistent condom use with clients and regular partners, especially in India (Beattie et al., 2014; Biradavolu, Burris, George, Jena, & Blankenship, 2009; Blanchard et al., 2013; Blankenship, Burroway, & Reed, 2010; Campbell & Cornish, 2010; Reed, Gupta, Biradavolu, Devireddy, & Blankenship, 2010; Saggurti et al., 2013) and some parts of Brazil (Lippman et al., 2012; Walden et al., 1999). Further evaluative research would help to build a greater understanding of these processes in different African contexts.

This study has a few limitations. First, both exposure and outcome indicators were based on self-reported responses which could have been affected by recall and social desirability biases. Second, in the absence of a control group, the outcomes are compared between the population subgroups having different levels of programme exposure, but they actually come from the same population. FSWs reported no programme exposure could have also been exposed to some programme components directly or indirectly, as the HIV prevention programme was implemented in all parts of Nairobi city. Thus, the group of FSWs having no programme exposure does not represent a true control group. Third, we could not assess the quality of the services provided to FSWs. Fourth, findings from this study may not be generalisable to all of Kenya, particularly rural areas, as the data were collected from Nairobi county which is largely urban. This study used reporting violence to police as one of the indicators of FSW empowerment. This may create challenges for interpretation, as reporting violence to police can be influenced by women's level of empowerment and by receptivity of police, and criminalisation of the population. It would have been ideal to compare the disclosure of violence to a NGO or other organisation instead of police, however, data on this were not available. Finally, our data are cross-sectional and hence have limitations with respect to ascertaining the direction of the established...
associations (Zaba, Slaymaker, Urassa, & Boerma, 2005). Nevertheless, the aim of these combined interventions was to create a context in which there was enough depth or intensity of exposure that outcomes like condom use, HIV testing or reporting of violence become the overwhelming norms amongst FSW communities, in other words, to some degree the outcome also becomes the cause.

Conclusions

Findings from this study contribute to the literature by providing new insights into the importance of the intensity of exposure to HIV prevention programmes for facilitating behavioural change and empowerment to reduce HIV risk and vulnerability among FSWs in urban Nairobi, Kenya. Few such studies have been conducted in Africa (Kaul et al., 2004; Thomsen et al., 2006; Wi et al., 2006). The Kenya national strategy involves a wide array of interventions including behavioural, biomedical and structural interventions. Our study focussed on measuring exposure to key components of those interventions using the most available information. Other biomedical and structural elements like ART, PrEP, violence, and alcohol reduction are also important and have significant impacts on reducing the disease burden. Future in-depth research is needed to ascertain the benefits each can have for improving these outcomes and how they complement or augment the effects of the others. This study provides strong evidence that not only scaling up of a combination of HIV prevention programmes among FSWs is important, but aiming for high intensity of programme exposure among those who have been reached through the programme is crucial for achieving substantial HIV-related behavioural change among FSWs in a high prevalence setting. The study’s findings that first, about 60% of the study participants had either no or moderate exposure to HIV prevention programmes, and second, that those who intensively accessed services had reportedly better outcomes related to condom use, treatment seeking and empowerment, supports a strong call for urgent attention by the Kenya national programme to intensively implement a combination of prevention interventions that are locally-relevant and accessible to those they serve to effectively reduce the HIV burden across the population.

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