

HIV prevention and care seeking behaviour among female sex workers in four cities in India, Kenya, Mozambique and South Africa

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Short title: HIV care seeking behaviour among FSWs

Abstract

Introduction

In the context of an implementation research project aiming to improve use of sexual and reproductive health services for female sex workers (FSWs) in four cities, a baseline cross-sectional survey was conducted in each city to identify gaps in the use of HIV prevention and care services and commodities.

Methods

Using respondent-driven sampling, 1566 FSWs were recruited in Durban (n=400), Tete (n=308), Mombasa (n=400) and Mysore (n=458) and interviewed face-to-face. RDS-adjusted proportions were estimated by non-parametric bootstrapping, and compared across cities using post-hoc pairwise comparison.

Results

Condom use with last client ranged from 88.3% to 96.8%, ever female condom use from 1.6% to 37.9%, HIV testing within the past 6 months from 40.5% to 70.9%, receiving HIV treatment and care from 35.5% to 92.7%, care seeking for last STI from 74.4% to 87.6%, and having had at least 10 contacts with a peer educator in the past year from 5.7% to 98.1%. Many of the differences between cities remained statistically significant ($p < 0.05$) after adjusting for differences in FSWs' sociodemographic characteristics.

Conclusion

The use of HIV prevention and care by FSWs is often too low and differed greatly between the four cities. Differences could not be explained by variations in sociodemographic sex worker characteristics. Models to improve use of condoms and HIV prevention and care services should

be tailored to the specific context of each site. Programs at each site must focus on improving availability and utilisation of those services that are currently least used.

Keywords: female sex workers; HIV prevention and care; care seeking behaviour; condom use; peer education; Sub-Saharan Africa; India

Introduction

Female sex workers (FSWs) have, by the nature of their work, a multitude of sex partners and sexual contacts and are therefore more exposed to HIV and other sexually transmitted infections (STI) [1, 2]. Sex work settings in low-resource countries are characterised most commonly by poverty, endemic violence, criminalisation and repeated human rights violations [3]. Risky occupational contexts and low community cohesion underlie risky behaviours such as low condom use, anal sex and heavy episodic drinking [4]. Limited efforts have been made to mobilise FSWs and to involve them in service delivery, meaning that levels of empowerment and solidarity among these communities is likely low [5]. Access to condoms and HIV prevention and care services, such as STI care, HIV testing services (HTS), and HIV treatment and care, is further hampered by factors such as stigmatisation and discrimination at the general health services, high mobility and unfamiliarity with the locally available services and unsuitable opening hours. Parallel services specifically targeting FSWs have been established in various places but overall attain limited coverage [6]. As a result, the use of HIV prevention and care services is often low [7-9]. Considerably progress has been made in certain settings, such as in India, towards empowering FSWs and addressing the structural factors that shape FSW's risk for ill health and inadequate service seeking behaviour [10] but these experiences have not yet been translated to other settings.

While the low use of HIV prevention and care services by FSWs has been repeatedly documented [7, 11, 12], these studies typically only addressed one particular service or prevention method in one specific setting, and applied different measurement tools. A more comprehensive assessment of the use of multiple services, and a standardised comparison between several different settings has not been conducted previously. We addressed this gap by comparing the use of all HIV

prevention and care services in four different low-resource settings, as measured in a baseline assessment in the context of an implementation research project. The objectives were to quantify the use of services in four different settings, assess to what extent the use differs across settings, and what this implies for the development of interventions aiming at improving service use.

Methods

Contextual background

The DIFFER project (Diagonal Interventions to Fast-Forward Enhanced Reproductive health) aims to raise access to sexual and reproductive health (SRH) services for FSWs by improving linkages between interventions targeted at FSWs and general health services. It is an implementation research project designed as a set of case studies, with the ‘case’ being an urban geographical area where sex work is common. These are Durban, South Africa; the Tete-Moatize area in Mozambique; Mombasa, Kenya; and Mysore, India. In Durban, FSW-targeted services are provided through outreach by non-governmental organisations. In the Tete-Moatize area, SRH services for FSWs are available at a small non-governmental clinic at the outskirts of Moatize [13] and in Mombasa, SRH services are offered by a non-governmental organisation at 3 drop-in clinics in different divisions [14]. In Mysore, SRH services are provided by a clinic operated by the FSW association Ashodaya Samithi [15].

The DIFFER project applies a methodological framework for health systems research, starting with a detailed situation analysis identifying site-specific gaps and informing the development of context-specific packages of interventions to strengthen SRH service delivery in each city. These packages are implemented over a period of at least 12 months, after which the feasibility, acceptability, effectiveness, cost-effectiveness and sustainability of the intervention package will be assessed. The baseline analysis used a mixed methods design combining quantitative surveys

among FSWs and SRH service clients, with qualitative focus group discussions, key informant interviews, document reviews and health facility assessments [16]. A baseline cross-sectional survey among FSWs was conducted in each of the four cities to measure quantifiable indicators that will be re-assessed at the end of the project. This paper reports on the comparison of the extent of the use of HIV prevention and care services and commodities, and peer education exposure by FSWs, as measured by the cross-sectional surveys.

Cross-sectional surveys

FSWs (defined as women having received money or gifts for sex at least three times in the last six months) were recruited using Respondent-Driven-Sampling (RDS) during 2012-2013. RDS is similar to snowballing, but corrects for the bias towards FSWs with large social networks through statistical adjustments [17]. RDS begins with the selection of “seeds” who are known members of the FSW population. The seeds are instructed to enrol a limited number of other FSWs from their social circle for the survey, who in turn enrol other FSWs, and so on. In Durban, 11 seeds were recruited, in Tete 13, in Mombasa 16, and in Mysore 8.

In settings with different FSW sub-populations, it is important to categorize seeds according to these sub-populations, to ensure branching into all FSW networks and that the sample is representative of all the different types of sex workers in that area [18]. The selection of sub-populations thus vary by site, and were selected based on data from previous research in the area, or local knowledge among the study team. In Durban, seeds were categorized according to age, indoor/outdoor FSW and migration status, in Tete according to nationality (Mozambican/Zimbabwean), place of residence (Tete city/ Moatize city) and type of FSW (full-time/occasional), and in Mombasa according to location of soliciting sex (bar/club based, street/truck based, brothel/home based, and beach based).

Each participant recruited up to 3 (Durban, Tete, Mombasa) or 5 (Mysore) new participants using coupons. Issuance and receipt of coupons was monitored in Durban, Tete and Mombasa using Electronic RDS Coupon Manager Version 3.0 and in Mysore manually through a coupon log notebook. A minimum sample size of 400 FSWs in each city was estimated to allow the detection of substantial changes in key project indicators between the initial baseline survey and the end-of-project survey with a significance level of 0.05 and a power of 0.80. In Tete, recruitment was stopped after 6 months at 308 FSWs because of time constraints. Refusal rate was high at this site, in particular among FSWs of Mozambican nationality. In Mysore recruitment was continued beyond the minimum sample size and 458 FSWs were enrolled.

FSWs were screened for eligibility, informed about the survey and asked for their consent to participate at a private and secure place. Only FSWs 18 years and older were enrolled.

Consenting FSWs were interviewed face-to-face by a trained interviewer using either a paper-based questionnaire (in Durban, Mombasa and Mysore) or Computer-Assisted Personal Interview (QDS™) software (in Tete). The questionnaire collected information on socio-demographic and sex work characteristics, condom use at last sex and frequency of condom use with different type of partners in the past 3 months, ever having had condom breakage, ever having used a female condom, knowledge of partners' HIV status, care sought for last abnormal vaginal discharge or genital ulcer in the past 12 months, when last tested for HIV, HIV status and current use of HIV care services, and exposure to peer education in the past 12 months.

After the interview, all participants were invited to provide a venous blood specimen for rapid HIV testing. In Tete and Mombasa, consenting FSWs were counselled and tested on-site, while in Durban and Mysore, they were referred to a collaborating government-accredited HTS centre.

Rapid testing was conducted using a serial testing scheme based on the national algorithm of each country. The study protocols were approved by the responsible ethical boards in each country

(the University of Witwatersrand's Human Research Ethics Committee in South Africa, the National Committee of Bioethics for Health in Mozambique, the KNH/UoN Ethics and Research Committee in Kenya, and the Asha Kirana Institutional Ethics Committee in India), and by the ethical board of the coordinating agency in Belgium (Commission for Medical Ethics of the University Hospital Ghent).

In Durban, Mombasa and Mysore, the questionnaires were entered in an MS-Access database and in Tete uploaded in a QDS data warehouse. The survey data were merged with the HIV test result and coupon data, and imported into STATA (Version 12, College Station, TX). The analysis focused on the comparison of the extent of use of condoms and HIV prevention and care services, exposure to peer outreach, and socio-demographic and sex work characteristics across the four cities. To assess overall use of HIV prevention and care commodities and services we established a composite index, with the number of services a FSW is in need of in the denominator and the number of services used in the numerator. We included in the index consistent use of condoms with all partners, care sought for the last STI episode, HIV testing within the last 6 months and use of HIV treatment and care services.

The STATA RDS analysis package was used to calculate population point estimates adjusted for social network size and homophily within networks and 95% confidence intervals (CI) [19]. We used the Volz-Heckathorn estimator (RDS II estimator) for the adjustment and bootstrapping for calculating the CI. For the comparison among cities, we performed post-hoc pairwise comparison tests after fitting a logistic regression model with RDS-adjusted weights, using jack-knife resampling and Dunn-Šidák correction for multiple comparisons [20]. Sociodemographic characteristics that were associated with both the outcome and the city were stepwise introduced in the regression model and retained if they changed the odds ratio with at least 10%.

Results

Socio-demographic and sex work characteristics (Table 1)

FSWs were on average older in Mysore than in the 3 African cities. In Durban, Mombasa and Mysore, FSWs were almost all nationals of the respective countries, while in Tete 68% were of foreign origin. Educational level of FSWs was higher at the African cities than in India. In Mysore, FSWs had resided substantially longer at their current residence and in particular in Tete and Mombasa a large proportion had lived for less than 3 years at their current residence.

Mobility was higher in the African cities compared to Mysore, with much larger proportions reporting being away from their residence in the past 12 months. More than half of FSWs in Durban and Mombasa reported never having been married or cohabiting with a partner, while in Mysore this proportion was very small (3.5%). The proportion currently living with a partner, married or unmarried, was particularly small in Mombasa (1.2%). In Tete most FSWs had previously been in a steady relationship, but were currently single (61%).

The median number of commercial sex acts reported in the past month ranged from 20 to 30, and the proportion reporting more than 25 acts was substantially lower in Mysore than in the African cities. The proportion of FSWs that reported a regular non-commercial partner was much higher in Mysore (97%) and substantially more FSWs reported other non-commercial partners in Mysore and Tete (60% and 49%, respectively) than in Durban and Mombasa (20% and 24%, respectively). Fewer FSWs had another source of income in Durban (11%) than in the other cities.

Use of condoms and HIV prevention and care services (Table 2 and 3)

Self-reported condom use with clients was lower in Durban and Mombasa (both 88% with last client) than in Tete (97%) and Mysore (96%) ($p < 0.05$). Condom use with first-time clients was

generally higher than with regular clients, and it was lower with non-paying partners, in particular with the regular partners. Most FSWs did not know the HIV status of their non-paying partners, particularly in Durban and Tete. Excluding FSWs with a pregnancy wish, the proportion of sex workers that consistently used condoms with all partners was similar across cities (ranging from 48% in Mombasa to 54% in Mysore), although that after adjusting for sociodemographic sex worker characteristics it was significantly higher in Mysore. More than half of FSWs in the African cities reported ever experiencing a male condom breakage, while in Mysore this was only 6.6%. Female condom use was highest in Tete (38% ever used it) and lowest in Mysore (1.6%). Genital symptoms were more often reported in Durban (69% reporting either an abnormal vaginal discharge or a genital ulcer in the past 12 months) and Tete (50%) compared to Mombasa (30%) and Mysore (35%). However, care seeking for these symptoms did not significantly differ among the four cities.

The proportion of FSWs who ever had tested for HIV was high in Mombasa, Mysore (both 95%) and Tete (93%), but lower in Durban (74%). When asked when they were last tested, the proportion that reported to have been tested within the past 6 months, excluding those who had tested HIV positive before that period, was substantially higher in Mombasa (71%) than in the 3 other cities (ranging from 41% to 58%).

Forty-seven percent of ever tested FSWs in Tete, 43% in Durban, 18% in Mombasa and 8% in Mysore reported to be HIV positive. The results of the rapid HIV tests indicated a higher HIV prevalence in all cities, of 71% in Durban, 62% in Tete, 22% in Mombasa and 15% in Mysore. FSWs who self-reported to be HIV positive were asked if they were in HIV treatment and care (pre-ART or ART) and the proportion was substantially lower in Durban (36%) than in the other cities (84% to 93%). Adding FSWs who had tested positive with the rapid test but reported to be negative to the denominator, the proportion of HIV positive FSWs receiving HIV treatment and

care reduces to only 17% in Durban, 54% in Tete, 44% in Mombasa and 43% in Mysore. In Mysore, almost all FSWs in HIV care were on ART, while in Durban less than half were.

The proportion of FSWs accessing all the services they needed - included in the index - was low in all cities and significantly lower in Durban (13% in Durban, 30% in Tete, 33% in Mombasa and 22% in Mysore, respectively).

Exposure to peer education (Table 4 and 5)

In Mysore, almost all FSWs reported to have had a contact with a peer educator in the last 12 months and the large majority had 10 contacts or more. In Durban and Tete, about half of FSWs had a contact in the past 12 months and in Mombasa about a third. Only a minority had 10 or more contacts, in particular in Tete (0.8%) and Mombasa (5.7%). All educators were reported to have been fellow FSWs in Mysore, but only 53% in Tete, 50% in Durban and 39% in Mombasa. The services provided by the educators in the African cities are mostly condom distribution and general information on HIV/STI. Referral for STI treatment and HTS is commonly done by educators in Mysore, but not in the African cities.

Discussion

Our analysis indicates that, prior to the implementation of FSW-targeted interventions within the DIFFER project, in all four cities there were HIV prevention and care commodities or services that were insufficiently used by FSWs. We also observed that HIV prevention and care utilisation differed greatly between cities. The study revealed important differences in FSW characteristics across cities, in particular when comparing FSWs in Mysore with those in the African cities. Some of these socio-demographic characteristics were associated with care seeking, and we therefore adjusted for their potential confounding effect in our analysis. The differences persisted after adjustment and we therefore conclude that they are not likely to be due to differences in

measured socio-demographic characteristics. We did not measure other individual characteristics, such as attitudes, self-efficacy, skills and knowledge, and thus it is possible that these factors account for the differences detected. However, from the other components of the situational analysis, namely the focus group discussions, the key informant interviews and the health facility assessments [21], we learned that the offer, availability and accessibility of HIV prevention and care services differed substantially between cities and therefore believe that these structural and contextual factors play an important role.

To effectively prevent HIV infection, FSWs should use a condom at every sex occasion with all clients [22-24]. However, according to self-reports, in none of the cities all FSWs do this, and in particular in Durban and Mombasa a substantial proportion reported no condom use with their last client. Condom use with regular partners was substantially lower, as has repeatedly been shown elsewhere [25, 26], despite the fact that most FSWs did not know the HIV status of their regular partners. As well as promoting increased condom use with clients, emphasis should be placed on involving FSWs' regular partners in sexual health education in all cities, for example through couple counselling. Experience of condom breakage varied across the cities, but was much lower in Mysore than in the African cities. The reason for this difference needs to be explored, in particular the role of dry sex and the non-use of lubricants, both of which have been associated with condom breakage in some studies [27-31] and are common in Southern and East Africa [32, 33]. Female condoms are not distributed in Mysore because their acceptance by FSWs was found to be low in community meetings. In the African cities, female condoms are distributed for free but their use by FSWs is nevertheless low. Although female condoms have been shown to be well accepted by women in Africa, their use often remains low and the reasons for this need further exploration [34-36].

Another cornerstone of HIV prevention among FSWs is prompt and effective treatment of genital symptoms, such as abnormal vaginal discharge or genital ulcers [37]. These symptoms were much more commonly reported in Durban and Tete, probably because of the overall higher incidence of sexually transmitted and reproductive tract infections in Southern Africa [38]. A substantial proportion of FSWs did not seek care for genital complaints, indicating a need for stronger sensitisation of FSWs about the importance of immediately seeking care.

Regular testing and counselling is an integral component of an HIV prevention and care strategy. Knowing their HIV status may motivate FSWs to adopt or to maintain safer sex behaviours, and enable those living with HIV to access care and support services [22]. Less than half of the HIV-negative FSWs in all cities reported testing for HIV in the past 3 months and a substantial proportion had not been tested for over a year. The situation was relatively better in Mombasa, but in all cities FSWs need to be further encouraged to regularly get an HIV test.

HIV prevalence differs substantially by site and is by far the highest in Durban and Tete, cities located in Southern Africa, the region worst affected by the HIV epidemic [39]. A large proportion of the FSWs who tested positive with the rapid HIV test reported that their last test had been negative. In Durban, most of the discordant respondents (35 out of 49) had their last HIV test over one year ago and therefore may have seroconverted since then. However, in Tete, Mombasa and Mysore, many of the discordant respondents (14 out of 39, 17 out of 26, and 15 out of 24, respectively) reported being tested less than 6 months ago and it is unlikely that all of these seroconverted in this short time period. The most probable explanation is that these FSWs did not want to report their positive HIV status during the interview.

In addition to the benefit to HIV-positive FSWs, providing ART to sex workers has the potential for making a substantive impact on the AIDS epidemic, by reducing their HIV viral load and therefore minimizing the risk of sexual transmission to others [22, 23]. This indicates the

importance of early initiation of HIV care and treatment in this population. The discrepancy found between self-reported and confirmed HIV infection complicated the assessment of HIV care seeking behaviour. In Mysore, most of the FSWs who reported to be HIV-positive reported to be in HIV care and on antiretroviral therapy (ART). In Tete and Mombasa a substantial proportion reported not to be in care, and in Durban only about a third was in care and only 13% on ART. If the FSWs who reported to be HIV-negative but tested positive with the rapid tests are also included, the proportion of HIV-positive FSWs in care drops drastically, particularly in Durban where it falls below 20%. Access to and use of HIV care needs to be promoted in all cities, especially Durban.

To obtain an overall measure of use of HIV prevention and care services, we calculated a composite index. This index shows that uptake of commodities and services is generally poor in all cities, and particularly in Durban due to low use of HIV care services there.

Peer education is yet another crucial component of a FSW HIV prevention and care programme [22, 24]. In all cities, there were peer education activities in place but their coverage and scope varied greatly. In Mysore, coverage was almost complete with very few FSWs reporting not to have had contact with a peer educator in the last 12 months; while most others had multiple contacts (half of the FSWs reported over 200 contacts in the last 12 months). The scope of services offered by these peer educators was broad, including the provision of HIV/STI information, condom distribution, and referral for STI care and HTS. Coverage was much lower in the African cities, with less than half of the FSWs reporting to have had a contact in the past 12 months with an educator, who was not always a fellow FSW, and those who had a contact mostly reporting a low number of contacts. The services offered in the African cities primarily focused on general STI/HIV information and condom distribution, while referral for STI care and HTS was much less common. Community outreach and empowerment has been at the core of the

Ashodaya program in Mysore since 2004, as it has been in other parts of India [10], and the African cities can clearly learn from these more advanced programs.

Our study has limitations inherent in its design and these have to be taken into account in the interpretation of the results. An RDS approach facilitates reaching less visible FSWs, but it assumes successful recruitment of participants by their peers. In Tete, this was not always the case. The refusal rate among Mozambican FSWs was high and we therefore believe that FSWs of Zimbabwean origin are over-represented. All data, except HIV prevalence, were collected through a face-to-face interview and therefore subject to bias inherent to this method. Responses could be influenced by recollection bias, poor understanding of the question, social desirability bias, or reluctance to divulge sensitive personal information [40]. To minimize differential bias across the cities, the questions were phrased in the same way and the same response options were used. Nevertheless, reporting bias could differ across the cities because of the different socio-cultural context.

Conclusion

Despite the limitations of the study design, the findings revealed that the current use of HIV prevention and care services by FSWs differs greatly between cities and that these differences are not due to variations in sociodemographic characteristics of sex workers. Models to improve the use of condoms and HIV prevention, treatment and care services need to be tailored to the specific context of each site. As a next step, each site will develop an appropriate intervention combining the findings of the cross-sectional survey with the findings of the other situational analysis components.

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References

1. Baral S, Beyrer C, Muessig K, Poteat T, Wirtz AL, Decker MR, et al. Burden of HIV among female sex workers in low-income and middle-income countries: a systematic review and meta-analysis. *Lancet Infectious Diseases*. 2012;12(7):538-49.
2. Pruss-Ustun A, Wolf J, Driscoll T, Degenhardt L, Neira M, Calleja JMG. HIV Due to Female Sex Work: Regional and Global Estimates. *Plos One*. 2013;8(5).
3. Scorgie F, Vasey K, Harper E, Richter M, Nare P, Maseko S, et al. Human rights abuses and collective resilience among sex workers in four African countries: a qualitative study. *Globalization and Health*. 2013;9.
4. Scorgie F, Chersich MF, Ntaganira I, Gerbase A, Lule F, Lo YR. Socio-Demographic Characteristics and Behavioral Risk Factors of Female Sex Workers in Sub-Saharan Africa: A Systematic Review. *Aids and Behavior*. 2012;16(4):920-33.
5. Moore L, Chersich MF, Steen R, Reza-Paul S, Dhana A, Vuylsteke B, et al. Community empowerment and involvement of female sex workers in targeted sexual and reproductive health interventions in Africa: a systematic review. *Globalization and Health*. 2014;10.
6. Dhana A, Luchters S, Moore L, Lafort Y, Roy A, Scorgie F, et al. Systematic review of facility-based sexual and reproductive health services for female sex workers in Africa. *Globalization and Health*. 2014;10.

7. Mountain E, Mishra S, Vickerman P, Pickles M, Gilks C, Boily MC. Antiretroviral Therapy Uptake, Attrition, Adherence and Outcomes among HIV-Infected Female Sex Workers: A Systematic Review and Meta-Analysis. *Plos One*. 2014;9(9).
8. Scorgie F, Nakato D, Harper E, Richter M, Maseko S, Nare P, et al. 'We are despised in the hospitals': sex workers' experiences of accessing health care in four African countries. *Culture Health & Sexuality*. 2013;15(4):450-65.
9. Vuylsteke B, Ghys PD, Mah-bi G, Konan Y, Traore M, Wiktor SZ, et al. Where do sex workers go for health care? A community based study in Abidjan, Cote d'Ivoire. *Sexually Transmitted Infections*. 2001;77(5):351-2.
10. Laga M, Galavotti C, Sundararaman S. The importance of sex-worker interventions: the case of Avahan in India (vol 86, pg i6, 2010). *Sexually Transmitted Infections*. 2010;86(3):250-.
11. Ghimire L, Smith WCS, van Teijlingen ER. Utilisation of sexual health services by female sex workers in Nepal. *Bmc Health Services Research*. 2011;11:8.
12. UNAIDS. The Gap Report 2014.
13. Lafort Y, Geelhoed D, Cumba L, Lazaro CDM, Delva W, Luchters S, et al. Reproductive health services for populations at high risk of HIV: Performance of a night clinic in Tete province, Mozambique. *Bmc Health Services Research*. 2010;10.
14. Luchters S, Chersich MF, Rinyiru A, Barasa MS, King'ola N, Mandaliya K, et al. Impact of five years of peer-mediated interventions on sexual behavior and sexually transmitted infections among female sex workers in Mombasa, Kenya. *Bmc Public Health*. 2008;8.
15. O'Brien N, Reza-Paul S, Akram P, Jai S, Venukumar CT, Venugopal MS, et al. Community-led structural intervention's promise for HIV prevention: A case study from the Ashodaya Samithi sex worker collective of Mysore, India. *Sexually Transmitted Infections*. 2011;87:A234-A.
16. ICRH. The DIFFER Project [Available from: <http://differproject.eu/>].

17. Gile KJ, Handcock MS. Respondent-driven sampling: An assessment of current methodology. In: Liao TF, editor. *Sociological Methodology*, Vol 40. *Sociological Methodology*. 402010. p. 285-327.
18. Johnston L, Sabin K. Sampling hard-to-reach populations with respondent driven sampling. *Methodological Innovations Online*. 2010;5(2):38-48.
19. Salganik MJ, Heckathorn DD. Sampling and estimation in hidden populations using respondent-driven sampling. *Sociological Methodology*, 2004, Vol 34. 2004;34:193-239.
20. Dinno A. Nonparametric pairwise multiple comparisons in independent groups using Dunn's test. *Stata Journal*. 2015;15(1):292-300.
21. The DIFFER Consortium. Report of situational analysis of reproductive health services for general population women and female sex workers in India, Kenya, Mozambique and South Africa. 2013. [Available from: http://differproject.eu/Project_Documents.]
22. WHO. Prevention and treatment of HIV and other sexually transmitted infections for sex workers in low- and middle-income countries: recommendations for a public health approach. World Health Organization; 2012.
23. WHO. Consolidated guidelines on HIV prevention, diagnosis, treatment and care for key populations: World Health Organization; 2014
24. Chersich MF, Luchters S, Ntaganira I, Gerbase A, Lo YR, Scorgie F, et al. Priority interventions to reduce HIV transmission in sex work settings in sub-Saharan Africa and delivery of these services. *Journal of the International Aids Society*. 2013;16.
25. Luchters S, Richter ML, Bosire W, Nelson G, Kingola N, Zhang XD, et al. The Contribution of Emotional Partners to Sexual Risk Taking and Violence among Female Sex Workers in Mombasa, Kenya: A Cohort Study. *Plos One*. 2013;8(8).

26. Voeten H, Egesah OB, Varkevisser CM, Habbema JDF. Female sex workers and unsafe sex in urban and rural Nyanza, Kenya: regular partners may contribute more to HIV transmission than clients. *Tropical Medicine & International Health*. 2007;12(2):174-82.
27. Civic D, Wilson D. Dry sex in Zimbabwe and implications for condom use. *Social Science & Medicine*. 1996;42(1):91-8.
28. Gabbay M, Gibbs A. Does additional lubrication reduce condom failure? *Contraception*. 1996;53(3):155-8.
29. Rojanapithayakorn W, Goedken J. Lubrication use in condom promotion among commercial sex workers and their clients in Ratchaburi, Thailand. *J Med Assoc Thai*. 1995;78(7):350-4.
30. Schwandt M, Morris C, Ferguson A, Ngugi E, Moses S. Anal and dry sex in commercial sex work, and relation to risk for sexually transmitted infections and HIV in Meru, Kenya. *Sexually Transmitted Infections*. 2006;82(5):392-6.
31. Use and procurement of additional lubricants with male and female condoms – advisory note. WHO, UNFPA, FHI360, 2012.
32. Francois I, Bagnol B, Chersich M, Mbofana F, Mariano E, Nzwalo H, et al. Prevalence and motivations of vaginal practices in Tete province, Mozambique. *International Journal of Sexual Health*. 2012;24(3):205-17.
33. Hilber AM, Hull TH, Preston-Whyte E, Bagnol B, Smit J, Wacharasin C, et al. A cross cultural study of vaginal practices and sexuality: Implications for sexual health. *Social Science & Medicine*. 2010;70(3):392-400.
34. Beksinska ME, Smit JA, Mantell JE. Progress and challenges to male and female condom use in South Africa. *Sexual Health*. 2012;9(1):51-8.
35. Peters A, van Driel F, Jansen W. Acceptability of the Female Condom by Sub-Saharan African Women: A Literature Review. *African Journal of Reproductive Health*. 2014;18(4):34-44.

36. Guerra FM, Simbayi LC. Prevalence of Knowledge and Use of the Female Condom in South Africa. *Aids and Behavior*. 2014;18(1):146-58.
37. Steen R, Dallabetta G. Sexually transmitted infection control with sex workers: Regular screening and presumptive treatment augment efforts to reduce risk and vulnerability. *Reproductive Health Matters*. 2003;11(22):74-90.
38. WHO. Global incidence and prevalence of selected curable sexually transmitted infections - 2008. 2012 Contract No.: 978 92 4 150383 9.
39. Williams BG, Gouws E, Somse P, Mmelesi M, Lwamba C, Chikoko T, et al. Epidemiological Trends for HIV in Southern Africa: Implications for Reaching the Elimination Targets. *Current Hiv/Aids Reports*. 2015;12(2):196-206.
40. Langhaug LF, Sherr L, Cowan FM. How to improve the validity of sexual behaviour reporting: systematic review of questionnaire delivery modes in developing countries. *Tropical Medicine & International Health*. 2010;15(3):362-81.

Table 1: Socio-demographic and sex work characteristics in the 4 cities

Characteristic	Durban (N=400)		Tete (N=308)		Mombasa (N=400)		Mysore (N=458)	
	RDS-Adjusted %	95% CI	RDS-Adjusted %	95% CI	RDS-Adjusted %	95% CI	RDS-Adjusted %	95% CI
Age (years)								
Median		27		29		26		34
<=20	6.4	3.6 – 9.7	15.6	9.0 – 23.8	11.6	7.5 – 16.3	0.3	0.2 – 0.8
21-25	37.3	30.1 – 44.4	20.6	15.3 – 26.6	30.6	24.6 – 37.5	16.6	11.2 – 23.4
26-30	31.3	24.9 – 38.1	27.1	20.3 – 34.5	29.0	23.5 – 34.7	33.0	20.8 – 42.1
31-35	12.8	8.7 – 17.3	19.8	14.6 – 25.6	15.7	11.0 – 21.1	19.5	13.7 – 25.2
>=36	12.2	6.7 – 18.4	16.9	11.2 – 22.2	13.0	9.3 – 17.2	30.7	23.2 – 39.2
Nationality								
Foreign	1.0	0.1 – 2.1	67.5	59.9 – 76.1	2.7	1.1 – 4.4	0.0	-
Education								
Less than primary	10.5	6.3 – 15.0	10.2	5.7 – 15.2	47.6	40.8 – 54.2	79.0	67.4 – 87.7
Primary completed	68.7	61.4 – 75.7	69.3	62.3 – 76.0	41.1	34.8 – 47.3	16.7	8.1 – 27.8
Secondary completed	20.8	14.9 – 26.8	20.4	15.3 – 25.8	11.3	7.2 – 16.5	4.3	2.3 – 7.0
Years living in current residence								
<3	39.8	32.4 – 47.4	55.0	47.4 – 62.0	56.6	49.9 – 63.2	11.6	7.0 – 17.5
>=3	60.2	52.6 – 67.6	45.0	38.0 – 52.6	43.4	36.8 – 50.1	88.4	82.5 – 93.0
Was away from residence in past 12 months	56.5	48.8 – 63.3	27.4	21.6 – 33.8	48.2	41.5 – 55.1	8.5	5.1 – 13.2
Present relationship								
Married/cohabiting	28.7	22.2 – 35.4	8.2	2.9 – 15.1	1.2	0.3 – 2.3	54.1	44.0 – 6.3
Single, never married or cohabited	70.5	63.6 – 77.1	31.0	24.1 – 37.5	61.8	55.1 – 67.7	3.5	1.2 – 6.8
Single, previously married or cohabited	0.8	0.2 – 1.6	60.8	52.9 – 68.8	37.1	31.1 – 43.7	42.4	33.4 – 52.6
No of commercial sex acts in past month								
Median		29		30		20		20
<=15	30.6	23.3 – 37.9	15.0	10.6 – 20.2	8.8	5.7 – 12.2	41.9	31.8 – 51.7
16-25	25.0	18.8 – 31.4	26.0	18.3 – 33.0	73.3	67.6 – 78.4	55.6	45.8 – 65.5
26-40	20.9	15.2 – 27.1	32.2	24.5 – 40.6	17.6	13.1 – 22.4	2.5	0.8 – 4.6
>40	23.5	18.0 – 29.2	26.7	20.2 – 33.2	0.3	0.2 – 0.8		
Non-commercial sex partners in the past month								
Regular partner*	46.8	39.6 – 54.2	33.8	26.0 – 41.0	51.7	44.9-58.3	96.8	94.2 – 98.8
Occasional partner*	20.2	14.7 – 25.9	48.7	40.9 – 56.5	24.0	17.7 – 30.7	59.6	50.0 – 69.4
Has other source of income								
Yes	10.5	6.5 – 15.0	19.2	13.9 – 25.1	42.6	36.3 – 49.0	27.8	21.2 – 35.1

*‘Regular’ partner defined as ‘a long-standing non-commercial partner who did not give you money or gifts in return for sex and towards whom you feel an emotional attachment’ and an occasional partner as ‘those partners other than your regular partner(s) who did not give you money or gifts in return for sex’.

Table 2: Use of condoms, and HIV prevention and care services in the 4 cities

	RDS-Adjusted %							
	Durban		Tete		Mombasa		Mysore	
	N	%	N	%	N	%	N	%
Condom use at last sex with:								
Any type of client	374	88.3	300	96.8	384	87.7	458	96.2
New client	127	94.8	300	97.3	371	87.6	458	97.4
Regular client	357	86.6	279	98.4	-	-	374	93.3
Occasional partner	112	82.6	84	(97.6)*	77	72.9	144	94.2
Regular partner	200	61.5	138	43.4	189	61.7	404	63.0
Always uses condoms with all partners ¹								
Yes	390	51.9	284	52.1	396	48.1	441	53.9
Ever had a male condom break								
Yes	399	71.1	301	67.7	397	55.9	458	6.6
Ever used female condom								
Yes	400	15.4	301	37.8	399	16.6	457	1.6
Abnormal discharge or genital ulcer in past 12 months								
Yes	400	68.8	298	49.5	392	29.6	458	34.8
Care sought for last STI/RTI syndrome ²								
Yes	206	84.7	165	79.9	75	87.6	143	74.4
Knows HIV status of : ³								
Last non-paying partner	296	10.8	185	23.6	246	38.3	408	54.4
Last regular partner	214	16.3	143	28.9	197	41.8	397	57.3
Ever tested for HIV								
Yes	398	73.8	301	92.7	400	94.8	458	95.2
When last tested for HIV ⁴								
Less than 3 months	325	30.0	-	-	373	44.5	428	26.3
Less than 6 months	340	40.9	206	57.7	379	70.9	431	40.5
Less than 12 months	362	47.0	256	84.9	382	82.7	432	76.8
Result of last test ⁵								
Positive	266	42.6	274	46.8	363	17.6	437	8.0
HIV rapid test result								
Positive	349	70.7	207	61.8	388	21.8	455	15.0
Currently using HIV care services ⁶								
Yes	117	35.5	126	84.0	41	88.8	33	(92.7)*
On ART	117	12.9	126	69.0	41	76.9	33	(92.8)*
Currently using HIV care services ⁷								
Yes	253	17.4	136	53.8	73	43.8	56	42.7
On ART	253	6.3	136	46.0	73	39.3	56	42.6
Used all services she needed (composite index)								
Yes	400	13.3	301	30.3	400	32.6	458	21.6

* Bootstrap analysis was not possible because of too few observations in some categories. A weighed proportion was calculated instead.

¹ N: Excludes women who desire pregnancy

² N: Had abnormal discharge or genital ulcer in past 12 months

³ N: Had this type of partner in the past 3 months

⁴ N: FSWs who tested positive for HIV before the period are excluded

⁵ N: Ever tested for HIV=Yes

⁶ N: Reported to be HIV positive

⁷ N: Result of rapid HIV test was positive

Table 3: Pairwise comparison of use of condoms and HIV prevention and care services across the 4 cities*

	Tete vs Durban		Mombasa vs Durban		Mysore vs Durban		Mombasa vs Tete		Mysore vs Tete		Mysore vs Mombasa	
	OR**	p-value	OR	p-value	OR	p-value	OR	p-value	OR	p-value	OR	p-value
Condom use at last sex with:												
Any client	3.54	0.048	0.98	1.000	3.49	0.007	0.28	0.037	0.99	1.000	3.58	0.004
New client	1.27	1.000	0.38	0.986	2.12	0.997	0.30	0.087	1.67	0.922	5.56	<0.001
Regular client	5.36	0.001	-	-	2.17	0.096	-	-	0.40	0.183	-	-
Occasional partner	6.40	0.406	0.65	0.962	3.01	0.224	0.10	0.169	0.47	0.979	4.65	0.017
Regular partner	0.41	0.040	0.80	0.984	0.74	0.972	1.96	0.230	1.81	0.616	0.92	1.000
Always uses condoms with all partners ¹												
Yes	0.88	0.987	0.95	1.000	2.07	0.046	1.10	0.998	2.42	0.014	2.19	0.015
Ever had a male condom break												
Yes	0.79	0.932	0.57	0.093	0.03	0.000	0.73	0.724	0.04	<0.001	0.06	<0.001
Ever used female condom												
Yes	3.64	<0.001	1.10	0.999	0.10	0.001	0.30	<0.001	0.03	<0.001	0.09	<0.001
Abnormal discharge or genital ulcer in past 12 months												
Yes	0.40	0.001	0.19	<0.001	0.17	<0.01	0.48	0.008	0.42	0.009	0.87	0.997
Care sought for last STI/RTI syndrome ²												
Yes	0.52	0.489	1.46	0.980	0.37	0.456	2.79	0.334	0.71	0.990	0.25	0.292
Knows HIV status of : ³												
Last non-paying partner	2.87	0.015	5.07	<0.001	8.52	<0.001	1.77	0.316	2.97	0.028	1.68	0.439
Last regular partner	2.34	0.118	3.63	0.001	5.35	<0.001	1.55	0.673	2.29	0.097	1.47	0.713
Ever tested for HIV												
Yes	3.86	<0.001	6.05	<0.001	4.89	0.434	1.57	0.858	1.27	1.000	0.81	1.000
When last tested for HIV ⁴												
Less than 3 months	-	-	2.08	0.019	0.92	0.981	-	-	-	-	0.44	0.007
Less than 6 months	1.87	0.089	3.49	<0.001	1.04	1.000	1.87	0.064	0.56	0.190	0.30	<0.001
Less than 12 months	6.03	<0.001	4.88	<0.001	3.23	0.002	0.81	0.976	0.54	0.399	0.66	0.664
Result of last test ⁵												
Positive	1.17	0.991	0.20	<0.001	0.06	<0.001	0.17	<0.001	0.05	<0.001	0.31	0.019
HIV rapid test result												
Positive	0.68	0.672	0.09	<0.001	0.04	<0.001	0.13	<0.001	0.06	<0.001	0.46	0.071
Currently using HIV care services ⁶												
Yes	8.62	0.001	15.05	<0.001	23.2	0.030	1.75	0.936	2.70	0.916	1.54	0.999
On ART	17.16	<0.001	44.17	<0.001	195.04	<0.001	2.57	0.512	11.37	0.153	4.42	0.622
Currently using HIV care services ⁷												
Yes	4.53	<0.001	3.50	0.026	3.64	0.173	0.77	0.992	0.80	0.999	1.04	1.000
On ART	11.51	<0.001	10.39	<0.001	12.92	0.002	0.90	1.000	1.12	1.000	1.24	0.999

	Tete vs Durban		Mombasa vs Durban		Mysore vs Durban		Mombasa vs Tete		Mysore vs Tete		Mysore vs Mombasa	
	OR**	p-value	OR	p-value	OR	p-value	OR	p-value	OR	p-value	OR	p-value
Used all services she needed												
Yes	2.91	0.002	4.54	<0.001	4.20	<0.001	1.56	0.248	1.44	0.766	0.93	1.000

* Post-hoc pairwise comparison tests after fitting a logistic regression model with RDS-adjusted weights and adjusting for the confounding effect of sex worker sociodemographic characteristics

** Odds Ratio

¹ N: Excludes women who desire pregnancy

² N: Had abnormal discharge or genital ulcer in past 12 months

³ N: Had this type of partner in the past 3 months

⁴ N: FSWs who tested positive for HIV before the period are excluded

⁵ N: Ever tested for HIV=Yes

⁶ N: Reported to be HIV positive

⁷ N: Result of rapid HIV test was positive

Table 4: Exposure to peer outreach

	Durban		RDS-Adjusted %				Mysore	
	N	%	Tete N	%	Mombasa N	%	N	%
Had contact with a peer educator in last 12 months								
Yes	400	46.2	258	49.3	389	32.6	458	99.6
Had at least 10 contacts with a peer educator in last 12 months								
Yes	325	14.4	258	0.8	390	5.7	456	98.1
Peer educator was a FSW ¹								
Yes	189	49.5	130	52.8	172	38.8	455	100.0
Services or information received from the peer educators								
General HIV/STI prevention	393	39.0	258	43.1	393	22.7	458	93.7
Condoms	393	41.8	258	27.7	393	18.4	458	99.6
Referral for STI treatment	393	14.4	258	11.3	393	2.0	458	90.2
Referral for HTC	393	8.1	258	13.5	393	7.1	458	92.1

¹ N: Had contact with a peer educator in last 12 months=Yes

1 **Table 5: Pairwise comparison of exposure to peer outreach across the 4 cities***

	Tete vs Durban		Mombasa vs Durban		Mysore vs Durban		Mombasa vs Tete		Mysore vs Tete	
	OR ¹	p-value	OR	p-value	OR	p-value	OR	p-value	OR	p-value
Had contact with a peer educator in last 12 months										
Yes	0.92	1.000	0.76	0.757	449.08	<0.001	0.82	0.952	486.85	<0.001
Had at least 10 contacts with a peer educator in last 12 months										
Yes	0.05	0.001	0.42	0.098	157.91	<0.001	8.37	0.034	3098.60	<0.001
The peer educator was a FSW ²										
Yes	1.13	1.000	0.58	0.544	-	-	0.51	0.342	-	-
Services or information received from the peer educators										
General HIV/STI prevention	1.44	0.577	0.80	0.934	33.74	<0.001	0.56	0.058	23.36	<0.001
Condoms	0.51	0.020	0.43	0.001	531.48	<0.001	0.85	0.983	1050.76	<0.001
Referral for STI treatment	0.74	0.931	0.20	0.001	112.56	<0.001	0.28	0.021	152.60	<0.001
Referral for HTC	1.25	0.980	1.35	0.918	212.15	<0.001	1.08	1.000	169.21	<0.001

2 * Post-hoc pairwise comparison tests after fitting a logistic regression model with RDS-adjusted weights and adjusting for the
3 confounding effect of sex worker characteristics

4 ¹ Odds Ratio

5 ² N: Had contact with a peer educator in last 12 months=Yes

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