Background

Female sex workers face many barriers to accessing sexual and reproductive health (SRH) care because of stigma and discrimination [1, 2], which increase their vulnerability and impede their right to access health services [3, 4]. Other factors contributing to poor SRH outcomes include high sexually transmitted infections (STI) prevalence [1], HPV infection and thus risk for cervical cancer [5], unintended pregnancies [6, 7], repeated physical and emotional abuse [8], high mobility and frequently an illegal immigrant status [2, 9]. In most countries the prevalence of HIV is 10 to 20 times higher among female sex workers than it is among women in the general population [10–12]. In South Africa, at least one-third of sex workers are HIV positive by the age of 24 and levels of infection reach 80% among older age women [1]. Further, HIV transmission between female sex workers and their clients accounts for an estimated 6–20% of all heterosexual transmission in South Africa. Overcoming these barriers through improved service delivery to link sex workers to early antiretroviral treatment is essential if the ambitious global goal of ending the HIV epidemic by 2030 is to be reached [13].

Most sex work programmes in Africa are not linked with broader HIV care and treatment networks [2]. The South African government recently adopted a comprehensive national HIV plan for sex workers [14]. This plan combines the rollout of pre-exposure prophylaxis (PrEP) for those that are HIV negative, and immediate antiretroviral treatment for HIV-positive sex workers, in addition to six integrated support packages of care encompassing the multifaceted lives of sex workers. The plan targets SRH and HIV, and includes a minimum package of health services, peer-led service delivery, psychosocial and human rights support, building sex worker organisations, and promoting career paths and economic opportunities. SRH services included in the plan are periodic presumptive treatment for STIs, contraception (including dual protection and emergency contraception), referral for termination of pregnancy, and annual PAP smears for screening for cervical

their main partners and clients, alcohol and marijuana use, number of times the woman moved house in the last 12 months, and the site of service delivery. 'Site of delivery' indicates where the sex worker accessed healthcare for the first time, which could be a clinic, mobile van, or from a hotel or brothel (the latter two grouped together).

Analysis

Data were extracted from participant files into a Microsoft Access database and exported to STATA 13.1 for analysis. Chi-square tests were used to test relationships between categorical variables and Student t-tests were performed on continuous variables. We used multivariate logistic regression to assess associations between the independent and outcome variables. Results are consistently reported for Johannesburg first and then Pretoria.

Results

The Johannesburg database recorded 1422 first visits and the Pretoria site 408 (Table 1).

Socio-demographics and sexual behaviours

Compared with sex workers in Pretoria, those in Johannesburg were almost 5 years younger (Johannesburg mean = 28.6 sd = 5.35, Pretoria mean = 33.2 sd = 9.9, $P < 0.001$). A third (34.9%) of the sex workers in Pretoria were above 35 years of age compared to only 13.8% in Johannesburg ($P < 0.001$) (Table 1). Women in Johannesburg were more likely than those in Pretoria to have finished secondary education (57.1% vs. 36.0%, OR = 2.4 $P = 0.021$) and were half as likely to have more than one child living with them (13.2% vs. 24.8%, OR = 0.5; $P < 0.001$). In both sites, around half of the women had a main partner (48.7% vs. 54.4%, $P = 0.043$) and a third (32.6% vs. 38.3%, $P = 0.036$) had more than 3 adult dependents. Almost half of the sex workers in Johannesburg were from Zimbabwe (43.7%) and 13.4% from countries other than South Africa and Zimbabwe, while only 39.7% were from Zimbabwe in Pretoria ($P = 0.005$) and 2.9% from other countries.

Alcohol use was twice as high among women in Johannesburg as in Pretoria (74.4% vs. 56.7%, OR = 2.2; $P < 0.001$), but in both sites around 8% of women reported marijuana use. Johannesburg women moved house markedly more often in the past year (mean 3.7 vs 1.3; $P < 0.001$), with women in Johannesburg 24 times more likely than those in Pretoria to have moved house more than twice in the last yearn   ia (

Table 1

of their visit, almost 40% did not plan to continue with the pregnancy (not shown).

Sex workers in Johannesburg were more likely to have no child dependents than Pretoria women (20.1% vs. 15.3%, OR = 1.4; CI = 1.0–1.9) (Table 1). Predictably, younger age (Johannesburg AOR = 0.5, CI = 0.3–0.9, Pretoria AOR = 0.9, CI = 0.5–1.6) showed positive relationships with not having child dependents in both sites (Table 3). There was no association between contraceptive use and number of child dependents.

Women from Zimbabwe (Johannesburg AOR = 0.7, CI = 0.5–1.0; Pretoria AOR = 0.5, CI = 0.3–0.9) were less likely to have no child dependents than South African women. Women with no child dependents were more likely to smoke marijuana (Johannesburg AOR = 1.6, CI = 0.9–2.6, Pretoria AOR = 2.8, 1.1–6.6). In Johannesburg, compared to women attending the clinic, those with no child dependents were twice as -1.

Table 2

	(%)	(5%)	(%)	(5%)	(%)	(5%)	(%)	(5%)
N 1422 / N 408								
25	77 (23.8)***	1.0	(22.0)***	1.0	167 (4 .1)		5 (11.6)	1.0
25–2	206 (41.6)	1.0 (0.8–1.2)	36 (40.5)	0.5 (0.3–0.)	228 (44.1)		4 (4.4)	0.30 (0.1–1.3)
30–34	182 (51.1)	1.6 (1.3–2.1)	73 (57.)	1.4 (0. –2.1)	15 (43.1)		14 (10.)	0.58 (0.2–1.)
35	110 (58.2)	2.1 (1.5–2.)	0 (64.8)	2.1 (1.4–3.4)	76 (38.8)		8 (5.7)	0.32 (0.1–1.1)
	27 (61.4)**	1.0	37 (62.7)*	1.0	16 (34.8)**	1.0	4 (6.7)**	1.0
8–10	214 (45.6)	1.3 (1.0–1.6)	8 (56.0)	1.3 (0.8–1.)	1 8 (40.4)	0.8 (0.6–1.0)	24 (13.3)	1.3 (0.4–5.3)
11–12	308 (3 .6)	0.8 (0.6–1.0)	68 (46.)	0.7 (0.5–1.1)	384 (47.5)	1.4 (1.1–1.7)	5 (3.4)	0.4 (0.1–1.6)
	21 (31.8)	0.6 (0.5–1.1)	7 (36.8)	0.5 (0.2–1.4)	27 (38.6)	0.8 (0.5–1.3)	1 (5.3)	0.2 (0.0–3.2)
	2 8 (42.)		103 (57.22)		340 (46.6)*	1.0	12 (6.5)	
	277 (41.5)		107 (4 .3)		2 0 (41.)	0.8 (0.7–1.0)	22 (10.0)	
0	160 (53.2)		160 (53.2)				27 (8.8)	
1	51 (52.0)		51 (52.0)				6 (5.)	
0	71 (42.3)		18 (46.2)		1 (50.8)*	1.0	5 (12.8)	
1–2	321 (43.6)		112 (55.5)		31 (41.8)	0.8 (0.6–1.0)	14 (6.7)	
3	173 (3 .7)		77 (51.0)		211 (46.3)	1.1 (0. –1.4)	15 (.8)	
	286 (48.6) ***	1.0	123 (53.7)		252 (41.3)		12 (5.1)***	1.0
	210 (35.4)	0.6 (0.5–0.8)	80 (50.6)		288 (46.4)		18 (11.1)	1.4 (0.53–3.)
	7 (43.7)	1.1 (0.8–1.5)	8 (66.7)		0 (47.1)		4 (33.3)	7.8 (1.6–37.1)
	125 (38.)		84 (50.6)		157 (46.6)		14 (8.3)	
	406 (43.1)		117 (53.7)		428 (43.8)		18 (8.1)	
	4 8 (42.4)		181 (51.1)		542 (44.4)		27 (7.5)	
	33 (37.1)		20 (66.7)		43 (46.7)		5 (15.6)	
2	180 (38.0)***	1.0	158 (53.)		243 (4 .0)		20 (6.7)**	1.0
2–5	125 (41.8)	1.0 (0.7–1.3)	33 (48.5)		134 (43.1)		11 (15.5)	2.0 (0.7–5.4)
5	76 (60.8)	2.4 (1.6–3.6)	20 (52.6)		56 (42.4)		2 (5.3)	0.7 (0.1–3.7)
0–10	220 (45.1)**	1.0	21 (53.)		223 (43.3)*	1.0	2 (4.)	
11–20	188 (42.)	1.1 (0.8–1.3)	38 (53.3)		220 (48.7)	1.1 (0. –1.4)	6 (8.3)	
20	122 (36.3)	0.7 (0.6–0.)	57 (54.8)		140 (40.7)	0.8 (0.6–1.0)	12 (11.4)	
	1 (47.6)**	1.0	37 (66.1)**	1.0	2 (45.8)		14 (.3)	
	122 (35.7)	1.3 (1.0–1.8)	65 (43.3)	0.5 (0.25–1.02)	152 (43.3)		5 (8.6)	
	362 (43.6)	0.7 (0.6–1.0)	10 (56.5)	0.8 (0.43–1.66)	386 (44.4)		15 (7.5)	

work early as they lack official documentation and experience xenophobic-related stigma that diminishes their employment opportunities in other sectors [16, 25].

Migrancy and mobility are an inherent part of sex work in most settings [8, 16, 26], which limits their contact with

Table 3

for child support grants to assist sex workers that are mothers [29].

South Africa's national network of dedicated sex worker services has already been shown to be acceptable to women [30]. Trained staff who are sensitised to the medical, emotional and legal needs of sex workers have been able to create user-friendly environments that facilitate women's use of services. This could extend to the provision of cross-border services which promote retention in HIV treatment programmes [17].

Limitations of the study include the reliance on self-report, the cross-sectional nature of the study and the smaller sample size in Pretoria. The smaller sample in Pretoria has a two-fold explanation: firstly the programme only started in 2014 and it may take time for sex workers to become aware of the programme and enter its services. Also, the estimated sex worker population in Pretoria (13,218) is smaller than that in Johannesburg (21,540) [31]. Only sex workers that had been reached with services were included; those not accessing services are likely to differ from the study population in important ways. Missing these women and sub-populations of sex workers such as those who are internet-based likely diminishes the generalizability of the results. Also, other contributors to poor sexual health outcomes were not assessed, such as mental health status and experience of violence. Further, data were missing for some variables; likely as data were collected primarily for patient care and not for research purposes. However, the central role played in the programme by experienced peer educators and the use of sensitized clinical staff, may have strengthened the validity of the data.

Future research should explore individual risk profiling based on the typology of sex workers, and the specific vulnerabilities of sub-groups. As street-based sex workers are the most vulnerable sub-group, we propose research on harm reduction strategies to protect them from police arrest, public harassment and abuse [17]. Research on risk mitigation strategies used by sex workers could add new interventions to current programmes. Further, a better understanding of treatment cascades for sex workers and ways to reduce fall-off in the continuum of care [32] will support South Africa to achieve its ambitious HIV prevention targets [33].

Conclusions

This study clearly shows the diversity of sex workers and their varying needs in the workplace and at home. Early engagement and consultation with sex workers in local sites is required to account for heterogeneity. The use of standardised treatment guidelines and a non-differentiated approach to care could seriously curta-1.m(33)11(-)]TJ0uldch

Authors' contributions

Competing interests

Consent for publication

Ethics approval and consent to participate

(141032   160135).

Publisher's note

About this supplement

17
3, 2017

-17-   -3.

Author details

_4, 2017

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