

# Engagement in HIV Care Among Young Female Sex Workers in Zimbabwe

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**Introduction:** Young female sex workers (FSWs) are at greater HIV risk than their older counterparts. Yet, the extent of their engagement with HIV services is largely unknown. We compared engagement among FSWs aged 18–24 years with those 25 years and older.

**Methods:** We used respondent-driven sampling to recruit FSWs from 14 communities in Zimbabwe from November to December 2013. We collected data on demographics, behavior, service uptake, and HIV and viral load testing. Data were pooled and weighted using respondent-driven sampling-2 estimation. We analyzed HIV care cascade variables by age group. To identify potential drivers of younger FSW service use, we explored factors associated with knowing one's HIV status.

**Results:** Among 2617 participants, mean age was 31 years and 26% were 18–24 years. Over half of FSWs initiated sex work before the age of 25 years. Overall HIV prevalence was 59% but was lower among younger FSWs (35% vs 67%,  $P < 0.01$ ). Younger HIV-infected FSWs were significantly less engaged at each step of the care cascade. Among younger FSWs reporting

antiretroviral therapy use, 62% had an undetectable viral load compared with 79% in older FSWs. In multivariable regression, young FSWs encouraged to have an HIV test by another FSW (adjusted odds ratio = 2.54; 95% confidence interval: 1.44 to 4.50), and those with no recent clients (adjusted odds ratio = 4.31; 95% confidence interval: 1.30 to 14.33) were more likely to report knowing their status.

**Conclusions:** The high proportion of FSWs initiating sex work before the age of 25 years and their lower engagement in HIV services highlights the importance of considering this vulnerable population in HIV programming. Implementing targeted services tailored to the unique needs of young FSWs is a public health imperative.

**Key Words:** sex workers, young people, HIV care continuum, Zimbabwe, key and vulnerable populations

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## INTRODUCTION

Young women who sell sex are highly vulnerable and at considerably greater risk for HIV acquisition than their older counterparts.<sup>1</sup> A substantial proportion of female sex workers (FSWs) begin selling sex as young women, with data indicating 20%–40% of FSWs globally initiated sex work as adolescents younger than 20 years.<sup>2</sup> Young FSWs experience both vulnerabilities of youth, including lack of knowledge, poorly developed life skills, lack of financial autonomy, and limited access to health facilities,<sup>3</sup> as well as those associated with being FSWs, such as stigma, discrimination, criminalization, and violence.<sup>4–6</sup> Compared with older FSWs, studies have shown that younger FSWs have increased numbers of partners, less power to negotiate condom use, increased susceptibility to violence, and increased biological susceptibility to HIV acquisition.<sup>7–9</sup> There has been one study using programmatic data from Zimbabwe's National Sex Worker Programme reporting that annual HIV incidence may be as high as 10% among FSWs 25 years and younger, as compared to 6% in those 36 years and older.<sup>10</sup>

A 2014 UNAIDS technical brief provides examples of successful programs, highlighting considerations for targeting services to young FSWs.<sup>1</sup> However, few programs currently address the unique needs of young FSWs, and empirical data on how best to deliver these evidence-based interventions in

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a way that is acceptable and accessible to this population remain sparse.<sup>11,12</sup> Furthermore, particularly for young women, sex work is often a fluid concept, with women having different interpretations of, and identification with, sex work.<sup>13,14</sup> During the period of sex work initiation, young women may be at especially high risk of new infection and least likely to access both general and FSW-targeted services.<sup>11,12</sup> The extent to which young FSWs are engaged with HIV services is unknown.

In Zimbabwe sex work is illegal; however, FSWs have been identified as a key population and included in Zimbabwe's National HIV and AIDS Strategic Plan since 2006.<sup>15–17</sup> In 2009, following a national FSW situational analysis in Zimbabwe,<sup>18</sup> the National Sex Worker Programme, Sisters with a Voice, was established in 5 sites. By 2013, the Sisters program had expanded to 36 sites, covering all provinces of Zimbabwe. Services are based on guidance from the World Health Organization (WHO)<sup>19</sup> and include dedicated FSW clinics offering HIV testing and counseling, reproductive health services, condom provision, and health education supported by trained peer educators, and a program of participatory activities to build community empowerment. As of December 2017, the Sisters program had seen approximately 65,000 women at around 155,000 visits. In 2013, we conducted surveys of FSWs in 14 sites around Zimbabwe as part of the Sisters Antiretroviral therapy Programme for Prevention of HIV—an Integrated Response (SAPPH-IRe) trial [Pan African Trials Registry (PACTR201312000722390)], a cluster randomized trial to determine the effectiveness of an enhanced community-based intervention to increase uptake, retention in care, and adherence to antiretroviral-based prevention and treatment among FSWs. In this analysis, we compared engagement in services and the HIV care cascade among FSWs aged 18–24 years compared with those aged 25 years and older. We also explored factors associated with young FSWs' engagement in HIV services. We focused specifically on knowledge of HIV status, as this represents the biggest drop off in the cascade, particularly among younger women.

## METHODS

Between November and December 2013, 2722 FSWs were recruited using respondent-driven sampling (RDS) from 14 Sisters sites in Zimbabwe. RDS was used as it was not feasible to assemble a sampling frame of the intended target population. RDS is a recommended sampling strategy for hard-to-reach populations.<sup>20</sup> The results are reported using the STROBE-RDS reporting guidelines.<sup>21</sup> Detailed methods are described elsewhere,<sup>22</sup> but in brief: eligible participants were 18 years and older and currently working as an FSW, defined as having exchanged sex for money, goods, or services in the past 30 days, and had lived at the site for at least the previous 6 months. At each site, we conducted geographic and social mapping to identify 6–8 “seed” participants. Seeds were purposefully selected to represent all subpopulations within the sex worker communities at each site. Seeds were interviewed and given 2 recruitment coupons to pass on to other sex workers in their social network. When women

receiving a coupon attended for the interview, they were then given 2 coupons to pass on to other FSWs they knew who worked in that location and had not previously been recruited to the survey. Participants were given \$5 to compensate for loss of earnings during the interview and \$2 for each peer recruited. In all 14 sites, a maximum of 6 iterations, or “waves”, of this process were performed, including initial seeds. Approximately 200 FSWs were recruited into the study per site. All participants completed an interviewer-administered questionnaire to collect data on demographics, sexual behavior, sex work, HIV testing history and serostatus, uptake of HIV services, and antiretroviral therapy (ART) use. All women provided a finger-prick dried blood spot (DBS) sample for HIV testing. If this test was positive, viral load (VL) was measured using the same sample.

## Measures

Younger FSWs were defined as 18–24 years (WHO upper age range for defining youth and young people), and older FSWs were defined as 25 years and older. Finger-prick blood samples were collected as DBS and used for HIV antibody testing (AniLabsystems EIA kit; AniLabsystems Ltd, Oy, Vantaa, Finland). If HIV antibodies were detected, then the sample was tested for HIV VL using NucliSENS EasyQ HIV-1 v2.0, to quantify the VL. An undetectable VL, that is, viral suppression, was defined as a VL of <1000 copies per milliliter. Knowing one's HIV status was defined as reporting having previously received an HIV-positive test result or having received an HIV-negative test result in the past 6 months before the survey. Mental health was assessed using the validated Patient Health Questionnaire (PHQ-9), a set of 9 questions about mental state in the previous 2 weeks.<sup>23</sup> A score of 9 or more of the 20-item assessment indicated depressive disorder.

## Statistical Analyses

Performance of the RDS surveys and RDS analytic methods has been reported elsewhere. We pooled data from across the 14 survey sites. We applied the svy command in Stata to replicate what the RDS-2 analysis package performs, probability weighting participants by the inverse of their network size, that is, the number of women that each individual could have recruited, but adapted it for use with data pooled across sites. We normalized inverse degree weights by dividing them by the sum of inverse degrees at each site because the degree distribution differed across sites, and we did not wish to weight women up or down on the basis of where they were from. As recommended, seeds were dropped in conducting the RDS estimation and regression analyses.<sup>24</sup> A fixed-effect term for study site was included in regression analyses. All analyses were conducted using Stata 14.

Characteristics of participants, and variables of importance along the HIV care cascade, were analyzed descriptively and stratified by younger vs older age. Differences in distribution of categorical variables by age group were tested using  $\chi^2$  tests. To further understand potential drivers of

**TABLE 1.** Baseline Characteristics of Study Participants, Weighted (N = 2617)

Characteristic	Age at Survey			Comparison P
	18–24 years (N = 641) n (%)	≥25 years (N = 1976) n (%)	Total n (%)	
Age at start of sex work				<0.001
<18 yrs	159 (24.4)	139 (6.3)	298 (11.1)	
18–24 yrs	482 (75.6)	670 (30.1)	1152 (42.1)	
25–29 yrs	n/a	614 (34.9)	614 (25.7)	
30–39 yrs	n/a	479 (25.2)	479 (18.6)	
≥40 yrs	n/a	74 (3.5)	74 (2.6)	
No. of years in sex work				<0.001
0–1 yrs	189 (36.3)	151 (9.8)	340 (16.8)	
2–4 yrs	368 (52.1)	587 (31.1)	955 (36.6)	
5–8 yrs	77 (10.5)	538 (25.2)	615 (21.3)	
≥9 yrs	7 (1.1)	700 (34.0)	707 (25.3)	
Marital status				<0.001
Divorced/separated	378 (59.9)	1259 (62.5)	1637 (61.9)	
Widowed	19 (2.4)	461 (25.6)	480 (19.5)	
Never been married	241 (37.3)	238 (10.8)	479 (17.8)	
Married/living together as if married	3 (0.4)	18 (1.0)	21 (0.9)	
No. of children				<0.001
0	191 (32.8)	294 (17.1)	485 (21.2)	
1	374 (57.6)	1043 (51.6)	1417 (53.2)	
≥2	76 (9.6)	639 (31.4)	715 (25.6)	
Highest level of education				<0.001
No formal schooling	9 (1.8)	87 (5.1)	96 (4.3)	
Some primary school	140 (23.5)	596 (35.5)	736 (32.3)	
Some secondary school	275 (45.4)	653 (31.5)	928 (35.2)	
Completed secondary or more	215 (29.3)	625 (27.9)	840 (28.3)	
Religion				0.002
Christian	318 (50.8)	1161 (58.7)	1479 (56.6)	
Other	47 (8.3)	223 (11.6)	270 (10.7)	
No religion	275 (40.9)	590 (29.7)	865 (32.7)	
Proportion of income generated through sex work				0.01
<25%	35 (6.1)	177 (9.5)	212 (8.6)	
25%–50%	56 (10.2)	243 (14.0)	299 (13.0)	
>50%–99%	157 (25.6)	516 (25.3)	673 (25.4)	
100%	393 (58.1)	1040 (51.2)	1433 (53.0)	
Venue for client recruitment				0.32
Bars/nightclubs/entertainment venue	471 (71.3)	1366 (68.6)	1837 (69.3)	

**TABLE 1.** (Continued) Baseline Characteristics of Study Participants, Weighted (N = 2617)

Characteristic	Age at Survey			Comparison P
	18–24 years (N = 641) n (%)	≥25 years (N = 1976) n (%)	Total n (%)	
By telephone	35 (7.3)	121 (6.3)	156 (6.6)	
In the market place/street	98 (16.2)	347 (19.5)	445 (18.6)	
Other	26 (5.3)	96 (5.6)	122 (5.5)	
No. of clients in the last week				0.02
0	36 (6.1)	160 (9.6)	196 (8.7)	
1–4	228 (41.6)	798 (43.8)	1026 (43.3)	
5–9	161 (25.2)	481 (24.2)	642 (24.4)	
≥10	216 (27.1)	537 (22.4)	753 (23.7)	
Amount charged per client				0.04
≤\$2	5 (1.4)	16 (1.1)	21 (1.2)	
\$2–5	380 (56.4)	1141 (61.4)	1521 (60.1)	
>\$5–10	207 (34.2)	693 (33.6)	900 (33.7)	
>\$10	38 (8.1)	78 (3.9)	116 (5.0)	
Alcohol consumption in the past 12 mo				0.02
Never	222 (38.2)	780 (43.7)	1002 (42.3)	
Once a month or less	63 (10.5)	200 (11.1)	263 (10.9)	
2–4 times per month	88 (13.0)	304 (15.2)	392 (14.6)	
2–3 times per week	100 (14.7)	238 (10.7)	338 (11.7)	
4 or more times per week	168 (23.6)	451 (19.4)	619 (20.5)	
Symptoms of depressive disorder*				0.17
Yes	253 (41.2)	878 (45.8)	1131 (44.6)	
No	387 (58.8)	1084 (54.2)	1471 (55.4)	
Personal health rating				<0.001
Very good	115 (20.3)	188 (10.3)	303 (12.9)	
Good	300 (50.5)	778 (40.0)	1078 (42.8)	
Fair	182 (22.9)	725 (35.2)	907 (31.9)	
Poor	41 (6.3)	272 (14.6)	313 (12.4)	

\*As per the Patient Health Questionnaire (PHQ-9).

engagement in HIV services among younger FSWs, we explored factors associated with knowing one’s HIV status, as defined above. We included in our model demographic, behavioral, and health factors that could conceivably influence engagement in services. We estimated the odds ratio (OR) and 95% confidence interval (CI) of factors associated with knowing one’s status using logistic regression models. Adjusted Wald tests were used to calculate P values. Factors associated with the outcome at P ≤ 0.20 on a Wald test in univariable regression were entered into a multivariable regression model. A hierarchical model was used, first fitted

**TABLE 2.** Variables of Importance Along the HIV Prevention and Care Cascades, by Age Group

Characteristic	Age at Survey			Comparison <i>P</i>
	18–24 yrs n (%)	≥25 yrs n (%)	Total n (%)	
Testing and testing history				
Knows where to get an HIV test				0.23
Yes	634 (99.0)	1970 (99.5)	2604 (99.4)	
No	6 (1.0)	6 (0.5)	12 (0.6)	
Months since last HIV test				<0.001
< 6 mo	459 (72.7)	1009 (51.5)	1468 (57.2)	
6–12 mo	50 (7.2)	210 (11.6)	260 (10.4)	
>12 mo	63 (10.2)	576 (28.3)	639 (23.5)	
Never tested	58 (9.9)	147 (8.6)	205 (9.0)	
Result of most recent HIV test, among those who have tested				<0.001
Positive	106 (16.0)	960 (52.0)	1066 (42.5)	
Negative	475 (84.0)	855 (48.0)	1330 (57.5)	
Ever told anyone the results of HIV test(s), among those who have tested				0.49
Yes	458 (81.7)	1487 (79.9)	1945 (80.4)	
No	124 (18.3)	341 (20.1)	465 (19.6)	
HIV status				
HIV status on day of survey				<0.001
Positive	229 (34.7)	1311 (67.4)	1540 (58.7)	
Negative	411 (65.3)	648 (32.6)	1059 (41.3)	
Among those HIV-positive, knows HIV status*				<0.001
Yes	97 (37.9)	913 (68.5)	1010 (63.6)	
No	132 (62.1)	398 (31.6)	530 (36.4)	
Care-seeking behavior among those who know they are HIV-positive				
Currently on ART				0.06
Yes	49 (55.4)	625 (68.9)	674 (67.7)	
No	47 (44.6)	288 (31.1)	335 (32.3)	
If not on ART, why not				0.47
Not eligible for ART/advised to wait	38 (74.8)	244 (83.3)	282 (82.2)	
Eligible but cannot access ART	0 (0.0)	5 (2.1)	5 (1.8)	
Does not want to take ART	4 (16.7)	11 (3.8)	15 (5.4)	
Eligibility for ART has not been evaluated	2 (8.5)	22 (10.8)	24 (10.6)	

**TABLE 2.** (Continued) Variables of Importance Along the HIV Prevention and Care Cascades, by Age Group

Characteristic	Age at Survey			Comparison <i>P</i>
	18–24 yrs n (%)	≥25 yrs n (%)	Total n (%)	
Among those on ART, where is ART being accessed				0.27
Hospital	30 (63.4)	308 (51.3)	358 (52.2)	
Dedicated sex worker (Sisters) clinic	0 (0.0)	5 (1.1)	8 (1.0)	
Government clinic	18 (35.9)	289 (45.7)	307 (45.0)	
Antenatal clinic	1 (0.7)	19 (1.9)	20 (1.8)	
Private doctor	0 (0.0)	2 (0.0)	2 (0.0)	
Viral suppression among those who know they are HIV-positive				
Among those reporting being on ART, ART is taken at the exact time prescribed				0.84
Less than half of the time	1 (0.1)	10 (0.9)	11 (0.9)	
Half of the time or more, but not most of the time	1 (0.4)	13 (1.7)	14 (1.6)	
Most of the time	5 (16.3)	60 (9.2)	65 (9.7)	
All of the time	42 (83.2)	539 (88.1)	581 (87.8)	
Among those reporting being on ART, viral load is undetectable (<1000 copies/mL)				0.06
Yes	23 (62.1)	463 (78.7)	486 (77.5)	
No	25 (37.9)	150 (21.3)	175 (22.6)	
Among those reporting not being on ART, viral load is undetectable (<1000 copies/mL)				0.09
Yes	9 (8.7)	66 (19.7)	75 (18.3)	
No	38 (91.3)	219 (80.3)	257 (81.7)	

\*Defined as having reported receiving a previous HIV+ result.

on sociodemographic and then behavioral and health variables, which could be on the causal pathway between socio-demographic factors and the outcome.<sup>25</sup> Variables were retained in the final model if independently associated with the outcome at the  $P \leq 0.10$  level, or if their inclusion altered the effect estimate of any variables in the model by  $\geq 10\%$  (ie, were possible confounders).

**Ethics**

This research was reviewed and approved by the Medical Research Council Zimbabwe, Research Council of Zimbabwe, University College London, the London School of Hygiene and Tropical Medicine, and RTI International before initiating research activities. All participants provided written informed consent for study participation.

**RESULTS**

A total of 2722 participants were recruited over 6 waves from the 14 sites. The 90 seeds were dropped from the analysis. An additional 15 participants were missing recruiter information and were therefore treated as seeds and dropped from the analysis, leaving a total of 2617 participants.

Mean age of participants was 31 years (range 18–65), and 24% were younger than 25 years. Table 1 shows RDS-weighted baseline characteristics overall and stratified by younger vs older age. Overall 1450 (42%) women reported initiating sex work before the age of 25 years, with 11% starting before 18. Younger FSWs had a mean duration of sex work of 2.6 years, vs 8.0 years for older FSWs (data not shown). Younger FSWs were more likely to have never been married ( $P < 0.01$ ) and less likely to have had children ( $P < 0.01$ ). They were more educated ( $P < 0.01$ ), more likely to report no religion ( $P < 0.01$ ), and to rate their overall health as good or very good ( $P < 0.01$ ).

HIV prevalence among the whole population was 59% and was lower among younger FSWs (35% vs 67%,  $P < 0.01$ ; Table 2). Virtually, everyone (99%) reported knowing where to get an HIV test. However, younger FSWs were more likely to report having had an HIV test in the past 6 months (73% vs 52%,  $P < 0.01$ ), and this remained true when restricting to HIV-negative participants (77% vs 68%,  $P = 0.01$ ; data not shown). However, among FSWs living with HIV, younger FSWs were less likely to report knowing their HIV status (38% vs 69%,  $P < 0.01$ ). Among those who reported knowing their HIV-positive status, younger FSWs were moderately less likely to report ART use (55% vs 69%,  $P = 0.06$ ). A high proportion of women on ART in both age groups reported 100% ART adherence (83% vs 88%).

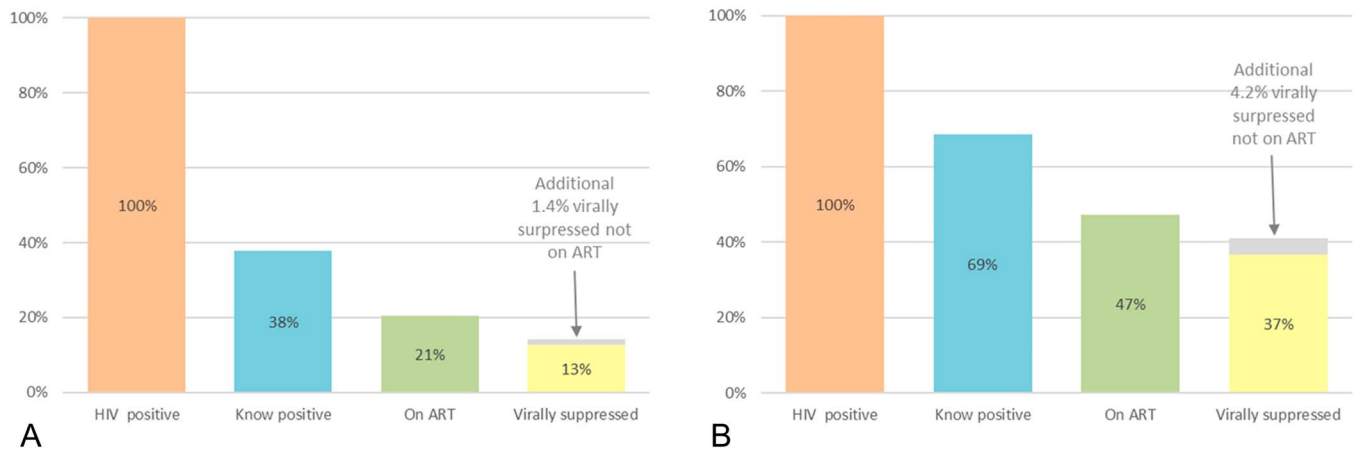
However, only 62% of younger FSWs reporting ART use had a VL <1000 copies per milliliter, compared with 79% in older FSWs ( $P = 0.06$ ). In both groups, a proportion of those who knew their HIV-positive status and reported no ART use had a VL <1000 copies per milliliter, including 9% among younger FSWs and 20% in older FSWs ( $P = 0.09$ ).

Figure 1 shows the HIV care cascades among younger and older FSWs, respectively. Each step on the cascade was statistically significantly different between the 2 age groups. Comparing the younger vs older age groups at each stop of the cascade, 38% vs 69% knew their positive status. Among these, 55% vs 68% were on ART, and of those, 62% vs 79% were virally suppressed, respectively. Among all HIV-infected younger FSWs, just 13% knew their status, were on ART, and had an undetectable VL, compared with 37% of older FSWs. Among all HIV-infected FSWs, 1% of younger FSWs and 4% of older FSWs reported not being on ART but were virally suppressed.

Among young FSWs, in univariable logistic regression analysis of factors associated with knowing their HIV status (Table 3), women reporting no clients in the previous week (OR = 3.87; 95% CI: 1.17 to 12.85), as compared to 1–4 clients, were more likely to know their status. Young FSWs who reported being encouraged to have an HIV test by another FSW in the past month were more likely to know their status (OR = 2.41; 95% CI: 1.37 to 4.23). In multivariable analysis, these variables remained significantly associated with young FSWs knowing their HIV status: having no clients in the last week (adjusted OR = 4.31; 95% CI: 1.30 to 14.33) and those encouraged to have an HIV test by another FSW in the past month (adjusted OR = 2.54; 95% CI: 1.44 to 4.50).

**DISCUSSION**

This study compares engagement with HIV services and progression along the care cascade between FSWs 18–24 years and FSWs 25 years and older. Few comparative data exist, which estimate younger FSW engagement along the cascade. In our work, roughly a quarter of all FSWs sampled were aged 18–24 years, and over half of all FSWs reported



**FIGURE 1.** A and B, Cascade of care for HIV-positive female sex workers (SWs) (A) <25 years and (B) ≥25 years in Zimbabwe.

**TABLE 3.** Factors Associated With Knowing HIV Status—Defined as Having Received a Positive Result or Having had a Negative HIV Test Within the Last 6 Months Before the Survey—Among Young FSWs (N = 641)

Characteristic	No. of Women Knowing Status (n = 492) n (%)	Crude OR (95% CI)	P	Adjusted OR (95% CI)	P
Age			0.46		
18–19 yrs	78 (17.5)	Ref			
20–24 yrs	414 (82.5)	1.27 (0.68 to 2.37)			
No. of years in sex work			0.30		
0–1 yrs	144 (38.1)	Ref			
2–4 yrs	281 (49.8)	0.64 (0.36 to 1.12)			
5–8 yrs	60 (10.6)	0.79 (0.35 to 1.82)			
≥9 yrs	7 (1.5)	—			
Marital status			1.00		
Divorced/separated	293 (59.8)	Ref			
Widowed	16 (2.3)	1.00 (0.21 to 4.89)			
Never been married	181 (37.4)	1.04 (0.59 to 1.83)			
Married/living together as if married	2 (0.4)	1.37 (0.07 to 27.31)			
Highest level of education			0.64		
No formal schooling	7 (1.8)	Ref			
Some primary school	99 (21.8)	1.02 (0.19 to 5.34)			
Some secondary school	216 (45.8)	1.46 (0.29 to 7.43)			
Completed secondary or more	168 (30.7)	1.56 (0.29 to 8.26)			
Religion			0.64		
Christian	240 (49.8)	Ref			
Other	31 (8.0)	0.81 (0.34 to 1.91)			
No religion	220 (42.2)	1.21 (0.67 to 2.19)			
Proportion of income generated through sex work			0.36		
<25%	25 (5.3)	Ref			
25%–50%	41 (9.8)	1.52 (0.39 to 5.89)			
>50%–99%	128 (28.2)	2.79 (0.70 to 11.11)			
100%	298 (56.7)	1.46 (0.46 to 4.71)			
Venue for client recruitment			0.59		
Bars/nightclubs/entertainment venue	359 (70.2)	Ref			
By telephone	27 (7.6)	1.35 (0.47 to 3.89)			
In the market place/street	76 (16.2)	1.22 (0.54 to 2.73)			
Other	20 (6.0)	2.22 (0.67 to 7.37)			
No. of clients in the last week			0.07		0.04
1–4	167 (41.7)	Ref		Ref	
5–9	127 (23.3)	0.70 (0.35 to 1.39)		0.64 (0.31 to 1.32)	
≥10	167 (27.5)	1.11 (0.58 to 2.12)		1.07 (0.56 to 2.02)	
0	31 (7.5)	3.87 (1.17 to 12.85)		4.31 (1.30 to 14.33)	
Condom use with clients in the past month			0.36		
Never	66 (10.0)	Ref			
Rarely—about 25% of the time	12 (1.7)	2.41 (0.43 to 13.64)			
Some of the time—about 50% of the time	34 (7.6)	2.75 (0.75 to 10.04)			
Most of the time—about 75% of the time	56 (14.3)	1.30 (0.49 to 3.49)			
Always—100% of the time	278 (60.8)	1.94 (0.785 to 4.47)			
Don't wish to answer	46 (5.7)	0.95 (0.29 to 3.15)			
Was encouraged to have an HIV test by another FSW in the past month			0.002		0.001
No	125 (25.7)	Ref		Ref	
Yes	365 (74.3)	2.41 (1.37 to 4.23)		2.54 (1.44 to 4.50)	
Alcohol consumption in the past 12 mo			0.54		
Never	176 (38.8)	Ref			
Once a month or less	48 (10.1)	0.75 (0.28 to 1.98)			
2–4 times per month	75 (14.6)	1.51 (0.60 to 3.78)			

(continued on next page)

**TABLE 3.** (Continued) Factors Associated With Knowing HIV Status—Defined as Having Received a Positive Result or Having had a Negative HIV Test Within the Last 6 Months Before the Survey—Among Young FSWs (N = 641)

Characteristic	No. of Women Knowing Status (n = 492) n (%)	Crude OR (95% CI)	P	Adjusted OR (95% CI)	P
2–3 times per week	71 (13.5)	0.64 (0.27 to 1.49)			
4 or more times per week	122 (23.1)	0.94 (0.48 to 1.84)			
Symptoms of depressive disorder*			0.87		
No	290 (58.8)	Ref			
Yes	201 (41.2)	0.95 (0.54 to 1.68)			
Personal health rating			0.29		
Very good	91 (20.4)	Ref			
Good	245 (51.8)	1.18 (0.53 to 2.66)			
Fair	121 (20.6)	0.74 (0.32 to 1.71)			
Poor	35 (7.2)	2.05 (0.56 to 7.52)			

\*As per the Patient Health Questionnaire (PHQ-9).

initiating sex work before the age of 25 years. Accurate global estimates of the number of young people engaged in sex work are lacking<sup>1</sup>; however, our findings support estimates that 20%–40% of FSWs globally initiated sex work as adolescents.<sup>2</sup> HIV prevalence was high (59%) overall but as expected was lower among younger FSWs, who are likely to have initiated sex work more recently. Although recent testing was more common among younger FSWs, HIV-positive young FSWs were less likely to report knowing their HIV status. This may reflect high HIV incidence and more recent HIV infection, which has been documented in other research among FSWs in Zimbabwe.<sup>10</sup> Fewer younger FSWs reported taking ART, even among those who knew their status. This could again reflect more recent infection and/or slower HIV progression, or it could indicate lower engagement in HIV care more generally. Differential social desirability bias, whereby younger women may be less comfortable disclosing their positive HIV status or initiation onto ART, may also contribute to these findings. Challenges in uptake of and adherence to HIV services for FSWs have been well-documented.<sup>26,27</sup> There are additional challenges facing younger women, including lack of knowledge, limited social/economic empowerment, and autonomy.<sup>28–30</sup> In addition, there may be competition and mistrust between older and younger FSWs, which may result in younger women failing to access services designed for adults.<sup>12,31</sup> These additional barriers may need to be specifically addressed to achieve more equitable engagement of young FSWs in HIV services.

We conducted a regression analysis of factors associated with reporting knowing one's HIV status, to identify potential areas for intervention. The strongest predictor of young FSWs knowing their HIV status was being encouraged to have an HIV test by another FSWs. This finding lends support to the growing body of research on the positive impact of social support and community empowerment among FSWs in HIV prevention and care.<sup>4,32</sup> This is an important consideration for future HIV programming for this population and may be particularly relevant for younger

FSWs who are the most difficult to access within the population of FSW as a whole.

Among young FSWs who reported that they were HIV positive, 74% were on ART and 62% of those on ART had a VL <1000 copies per milliliter. At the time of this survey, “test and treat” had not been introduced as national policy (although was the policy for women self-identifying as sex workers), therefore many newly HIV-infected young FSWs may not have been identified as eligible for treatment. With introduction of universal “test and treat” in Zimbabwe, we would expect the proportion on ART to increase, and this should be evaluated in future research. However, the low rate of viral suppression among those on ART has implications for resistance and resistance transmission and is a priority to address among these young women.

This research represents a robust analysis among a large number of FSWs from 14 diverse sites across Zimbabwe. We used RDS, a technique designed for sampling hard-to-reach populations. With that in mind, this research has limitations. We applied a lower age limit of 18 years. It is likely that those younger than 18 years are the most vulnerable and least engaged in HIV services among FSWs, and they were not represented in this research. We used RDS because it was not possible to assemble a sampling frame of the target population. RDS uses a model of sampling probability to weight observations to approximate a random sample. This model makes a number of assumptions that might not have been met, some of which cannot be investigated.<sup>33</sup> However, we have investigated potential RDS biases relating to estimation of HIV care cascade indicators in this study previously and judged that the process had worked well.<sup>22</sup> Because participants recruit each other, it is difficult to document refusal rates, which may bias the sample. Knowledge of HIV status and ART use were self-reported, and thus subject to reporting bias, and this bias may also be differential by age. However, HIV status and VL at the time of the survey were biologically measured. The use of DBS samples may have decreased sensitivity as compared to plasma, but our previously published validation study demonstrated good agreement.<sup>34</sup>

There is little research on young FSWs and their engagement in HIV services, and there are currently few interventions targeting their specific needs and even fewer that have been taken to scale.<sup>1</sup> The transition into sex work is likely an especially important time for young women, when self-identification as a FSW is low, risk is very high, negotiation skills are generally lower, and capacity to access targeted services is weak. The fact that over half of women in our study reported initiating sex work before 25 years of age highlights the importance of considering the needs of this vulnerable population in HIV programming. Despite the availability of a national network of dedicated FSW clinics in Zimbabwe, similar reported attendance at the clinics and similar sociodemographic characteristics between younger and older FSWs, our research demonstrated that engagement at each step along the HIV care cascade was significantly lower among younger FSWs as compared to their older counterparts. A number of challenges have been identified in supporting HIV prevention and care for younger FSWs, particularly so for those younger than 18 years who are not represented in this study.<sup>35</sup> These include difficulty in identifying young women who sell sex, particularly as initiation into sex work may be gradual and they may not self-identify as FSWs. For those younger than 18 years, there may be a tension between harm reduction and child protection approaches, whereby young women may not want to present for services for fear of laws around the criminalization of sex work or child trafficking. Stigma around sex work and HIV remain significant barriers to engagement in services.<sup>36</sup> Young FSWs are often highly mobile, making service provision challenging.<sup>28</sup> These represent just some of the challenges of delivering HIV programs for young FSWs.

## CONCLUSIONS

We have a growing body of research demonstrating possible strategies to increase engagement of young FSWs in HIV services. An appropriate package of services will likely include combination strategies including biological and structural interventions that are tailored to the priorities and needs of adolescent girls and young women. A critical component of these programmes is social cohesion, bringing girls together as a community, and empowering them. This needs to support other activities. Harm reduction and condom access are vital. Formative research in Zimbabwe suggests that education, training, and skills-building opportunities are necessary, both to support less risky behavior and increased economic empowerment, and/or to provide alternatives to sex work for those who desire them. Young FSWs may operate in different situations compared with older FSWs and therefore need to be supported on a case-by-case basis according to their individual needs.

Within the Sisters With a Voice program in Zimbabwe, we have already begun implementing additional services targeting younger FSWs, and young peer educators have been recruited at all sites. In 2016, the Determined, Resilient, Empowered, AIDS-free, Mentored, Safe (DREAMS) intervention was also launched in Zimbabwe and includes working with adolescent girls and young women who sell

sex in 6 of 63 districts. DREAMS is a multicomponent intervention using structural, behavioral, and biomedical approaches to reduce HIV among the highest risk adolescent girls and young women. These services have since been expanded with funding from Global Fund for AIDS TB and Malaria. Despite the myriad challenges, implementing targeted services, tailored to address the unique and varying needs of young women who sell sex is a public health imperative.

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