

# Differences in Access to HIV Services and Risky Sexual Behaviors Among Malawian Women at Social Venues Who Do and Do Not Engage in Sex Work

Nicole Y. Frascino<sup>1</sup>  · Jessie K. Edwards<sup>1</sup> · Michael E. Herce<sup>2,3</sup> · Joanna Maselko<sup>1,4</sup> · Audrey E. Pettifor<sup>1</sup> · Nyanyiwe Mbeye<sup>5</sup> · Sharon S. Weir<sup>1,4</sup> · Brian W. Pence<sup>1</sup>

Accepted: 23 April 2021 / Published online: 13 May 2021

## Abstract

In the high HIV-burden country of Malawi, female sex workers (FSW) are one of the populations most profoundly affected by HIV. The Malawi Priorities for Local AIDS Control Efforts (PLACE) surveyed 1,004 self-identified FSW, 213 other FSW (OFSW), and 130 other high risk women (OHRW) at social venues. Analyses compared the three groups using survey-weighted log binomial regression models. Each group had a distinct pattern of usage and access to services: OFSW and FSW had greater access to condoms, while using a condom ever was greatest among FSW. Nearly all women knew where to get tested for HIV but very few used FSW drop-in centers. HIV prevalence was high in all three groups (35% FSW, 20% OFSW, 20% OHRW). Given these results, HIV services should be targeted to all women at social venues in Malawi, regardless of sex worker status to improve health outcomes and limit onward transmission of HIV.

**Keywords** Africa-Region · Key and vulnerable populations · Sex workers · Violence · Women

## Introduction

Women in Malawi face a disproportionate HIV burden with 1.5 times the HIV prevalence of adult men at 11.1%. The Malawi HIV prevention strategy identifies female sex workers (FSW) as one of the key populations (KP) most likely to be affected by and transmit HIV nationally [1]. Previous studies of the estimated 36,700 Malawian FSW have found

an HIV prevalence of 55–63%, one of the highest in the world [2–5].

At social venues in Malawi, we often find three distinct populations of women: self-identified FSW, other female sex workers (OFSW) who do not identify as sex workers but have recently exchanged sex for cash, and other high risk women (OHRW) who do not engage in sex work but are looking for sexual partners at the venue. Each of these groups faces distinct barriers to HIV prevention, care, and treatment and reduction in risky sexual behaviors. In the only study of the HIV treatment cascade among FSW in Malawi, 69% of FSW living with HIV in Lilongwe had any history of HIV care, with 52% currently receiving ART and only 45% virally suppressed (4). Studies of condom and lubricant usage among FSW found 93% used a condom the last time they had sex with a client, however, only 60% reported consistent condom usage over the previous year and 23% reported lubricant use ever [2, 5, 6]. FSW also reported being able to receive more money from clients for condomless sex [2]. Identifying barriers to accessing HIV care and prevention services is paramount to reducing the HIV burden among FSW in Malawi.

Several studies have shown that women who work in bars or other alcohol-serving establishments have similar rates of

✉ Nicole Y. Frascino  
Nicole.Frascino@Duke.edu

<sup>1</sup> Department of Epidemiology, Gillings School of Global Public Health, University of North Carolina at Chapel Hill, 135 Dauer Drive, Chapel Hill, NC 27599-7435, USA

<sup>2</sup> School of Medicine, Institute for Global Health and Infectious Diseases, University of North Carolina at Chapel Hill, Chapel Hill, NC, USA

<sup>3</sup> UNC Project-Malawi, Tidziwe Centre, Lilongwe, Malawi

<sup>4</sup> Carolina Population Center, University of North Carolina at Chapel Hill, Chapel Hill, NC, USA

<sup>5</sup> School of Public Health and Family Medicine, College of Medicine, University of Malawi, Blantyre, Malawi

poverty, sexual violence, depression, and HIV prevalence as FSW, however, they often have fewer sexual partners, primarily meet partners in alcohol-serving venues and sometimes exchange sex for goods and services rather than money [7–9]. These OFSW and OHRW are especially challenging to access as they may not utilize HIV services targeted at FSW. To date, there have been no studies to estimate the prevention practices and use of HIV treatment among OFSW or OHRW in Malawi.

This study compares access to HIV prevention and care services and risky sexual behaviors between FSW, OFSW, and OHRW in Malawi.

## Methods

This study utilized data from the Malawi Priorities for Local AIDS Control Efforts (PLACE) study. For detailed information about the PLACE methodology, see (Appendix S1). In short, the Malawi PLACE study used multi-stage sampling of districts, community informant identified venues, and individuals at the venues. Eligible women were then surveyed about sexual health and behavior, access to services, and social vulnerabilities. Data were collected between July and December 2017.

## Key Variables

Participant demographics measured in the survey included age, education, how frequently the participant attends the venue, where the participant slept last night, and if the participant worked at the venue. Age was self-reported by participants in years. Education was coded as a binary variable of secondary school completion since nearly all participants had at least started secondary school. Participants were asked if they worked at the venue, lived at the venue, and slept at the venue last night with a possible yes/no answer.

The outcomes of interest were related to accessing HIV prevention, sexual behaviors, HIV/STI testing and use and adherence to ART. The majority of the variables were coded as “yes/no” including ease of obtaining a condom or personal lubricant quickly at the venue; receiving information from an outreach worker at this venue in the past 12 months; accessing free condoms in the past 6 months; being given a condom by an outreach worker in the past 6 months; buying condoms in the past 6 months; accessing free lubricant in the past 6 months; visiting a drop-in center created for FSW; having ever used a male condom; using a condom last time had sex; having a condom on them during the survey; having had anal sex without a condom in the past 3 months; having had penile-vaginal sex without a condom in the past 3 months; having ever been tested for HIV and received test results; having been tested for HIV in the last six months

and received test results; having been tested or examined for an STI other than HIV in the past 12 months; and knowing where to get tested for HIV in the district. Number of male sexual partners in the last 4 weeks and 12 months and number of new male sexual partners in the last 4 weeks were categorized into  $\leq 1$ , 2–5, 6–20, and  $> 20$  partners. HIV positive participants were asked if they were currently taking antiretroviral medications (ART) and, of those on ART, if they had taken their ART at least four of the past seven days.

For these analyses, women were classified as a self-identified female sex worker (FSW) based on a positive response to “Some people get paid money for sex and see themselves as sex workers. Do you get paid money for sex and do you see yourself as a sex worker”? Women were classified as OFSW if they negatively answered the above question and positively answered the question, “In the past 3 months, has someone paid you money for having sex”? Women who answered both questions negatively, but met the eligibility criteria (Appendix 1) were considered other high-risk women (OHRW).

HIV status in this analysis was based on self-report from the questionnaire for all participants. For these analyses, an individual was considered HIV-positive if they positively answered either or both of the following questions, “Some people were infected with HIV over a year ago. Did you have an HIV test over a year ago indicating that you were infected with HIV?” and “In the past year, have you had a positive HIV test indicating an HIV infection (not including today)”?

## Statistical Analyses

In this study, we estimated the proportion of women who reported accessing HIV prevention services, risky sexual behaviors, HIV/STI testing, and use of and adherence to ART among women who participated in the Malawi PLACE study. We fit a log binomial regression model for the proportion with each outcome conditional on category. Using these models, we estimated prevalence ratios comparing the proportion reporting each outcome between FSW, OFSW, and OHRW, where OHRW were the reference group. Prevalence estimates were compared using the following criteria: if the 95% CIs of two estimates did not overlap they were considered different (and described in the results as “higher,” “lower,” “better,” etc.), however, if the 95% CIs of the two estimates overlapped they were considered to be comparable. Comparisons of dichotomous demographic variables were also made using the prevalence ratio estimates from log binomial regression models where a P-value  $< 0.05$  signified the two groups were significantly different. Comparisons of continuous demographic variables were made using a T-test of the mean differences with a P-value threshold of  $< 0.05$ .

For all estimates, we applied survey sampling weights in Stata (Version 16.0, StataCorp, College Station, TX, USA),

which were based on the inverse of the probability that the venue was selected for the master list times the probability the venue was selected for surveys from the master list times the probability the individual was sampled from the venue in phase IV. Standard errors were corrected for the stratified sampling and clustering of venues within districts. Figures were produced in SAS version 9.4 (Cary, NC) and GraphPad version 8.4.1 (San Diego, CA).

## Results

A total of 1,347 female study participants were surveyed from 15 districts: 1004 self-identified as sex workers (FSW), 213 did not identify as sex workers, but had sold sex for money in the previous 3 months (OFSW), and 130 did not engage in sex work (OHRW). Compared to OHRW, FSW were significantly younger ( $P=0.030$ ), less likely to have completed secondary school ( $P=0.051$ ) and more likely to live, work and sleep at the venue (all  $P<0.001$ ) (Table 1).

The OFSW were demographically different from both the OHRW and FSW populations. Compared to FSW, OFSW tended to be older ( $P=0.001$ ), more likely to have completed secondary school ( $P=0.001$ ), and less likely to live ( $P=0.006$ ) and work at the venue ( $P<0.001$ ) (Table 1). OFSW were more likely to live ( $P=0.024$ ) and sleep ( $P=0.012$ ) at the venue than OHRW. Interestingly, few participants across all three groups reported current employment, despite many self-reporting current sex work, indicating some women do not view sex work as a type of employment (Table 1).

These three groups of women had different patterns of access to HIV prevention, risky sexual behaviors, HIV/STI testing and, among those who were HIV-positive, use of and

adherence to ART. In general, FSW and OFSW reported better access to and receipt of condoms and lubricant in the past 6 months compared to OHRW (Table S2, Fig. 1). Receipt of information from an outreach worker at that venue in the last 12 months suggested a similar pattern, although the CIs for the OHRW (35%; 95% CI: 26–45%) and OFSW (61%; 95% CI: 44–77%) groups are overlapping. Ease of accessing condoms and lubricants quickly at the venue was also more frequently reported by FSW and OFSW compared to OHRW, however, the difference between groups was not as stark as access in the past 6 months (Table S2). Use of drop-in centers for FSW was fairly low across all groups with FSW and OHRW equally reporting 30% usage compared to 15% of OFSW (Table S2).

For most sexual behaviors, the three groups had very different prevalence estimates with clear differences between the FSW and OHRW; on these measures the OFSW generally fell between the other two groups, sometimes with and sometimes without confidence interval overlap. Nearly all FSW reported ever having used a male condom (99%; 95% CI: 97–100%) compared with 87% (95% CI: 67–95%) of OFSW and 58% (95% CI: 41–74%) of OHRW (Fig. 2, Table S3). Condom use at last sex was also highest among FSW (87%; 95% CI: 83–90%), followed by OFSW (66%; 95% CI: 45–82%) and OHRW (38%; 95% CI: 29–48%) (Fig. 2, Table S3). Prevalence of individuals having a condom on them during the survey was lower overall but still greatest among FSW (65%; 95% CI: 57–71%) followed by OFSW (35%; 95% CI: 21–53%) and OHRW (7%; 95% CI: 3–18%) (Fig. 2, Table S3). Penile-vaginal or anal sex without a condom differed from other sexual behaviors. Penile-vaginal sex without a condom in the last 3 months was common and fairly similar across all three groups with 60–70% reporting it (Table S3). Anal sex without a condom

**Table 1** Demographic characteristics of female participants by sex worker status, Malawi PLACE 2018

|                                | FSW<br>N=1004 | Test Statistic* | P-value | OFSW<br>N=213 | Test Statistic* | P-value | OHRW<br>N=130 |
|--------------------------------|---------------|-----------------|---------|---------------|-----------------|---------|---------------|
|                                | Mean          |                 |         | Mean          |                 |         | Mean          |
| Age                            | 26            | -2.17           | 0.030   | 27            | -0.95           | 0.341   | 28            |
|                                | Percentage    | PR**            | P-value | Percentage    | PR**            | P-value | Percentage    |
| Completed secondary school     | 6%            | 0.390           | 0.051   | 28%           | 1.700           | 0.361   | 16%           |
| Employed                       | 13%           | 0.930           | 0.797   | 9%            | 0.620           | 0.259   | 14%           |
| Lives at this venue            | 78%           | 3.577           | <0.001  | 44%           | 2.010           | 0.024   | 22%           |
| Slept at this venue last night | 76%           | 6.156           | <0.001  | 45%           | 3.681           | <0.001  | 12%           |
| Work at this venue             | 79%           | 2.359           | <0.001  | 36%           | 1.061           | 0.837   | 34%           |

FSW self-identifies as a female sex worker, OFSW other female sex workers (engages in sex work, but does not self-identify as a sex worker), OHRW other high risk women, PLACE priorities for local AIDS control efforts, SW sex work

\*Test statistic is the t-statistic for continuous variables

\*\*Reference group is OHRW

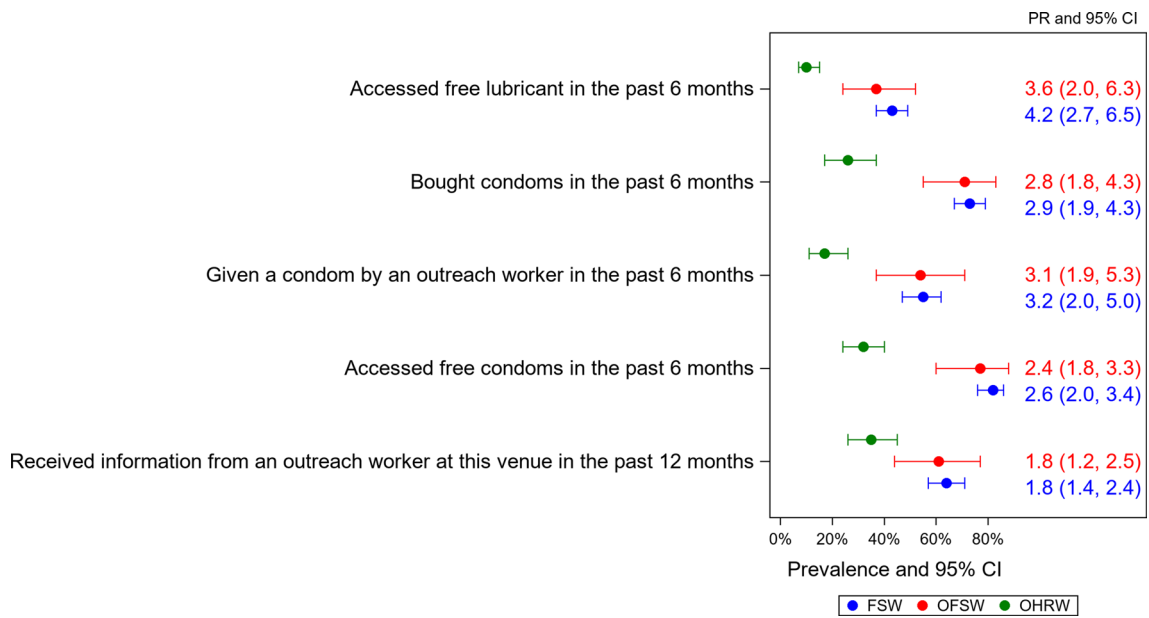


Fig. 1 Prevalence estimates of access to HIV prevention by FSW, OFSW, and OHRW

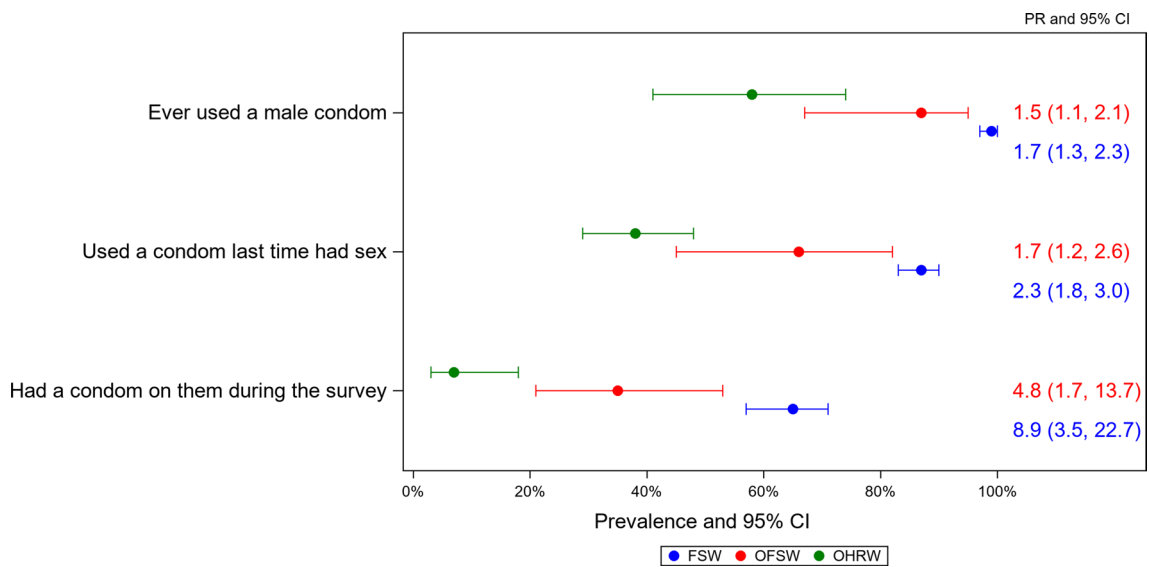


Fig. 2 Prevalence estimates of sexual behaviors by FSW, OFSW, and OHRW

was uncommon in all three groups, but greatest among FSW (9%) compared to OFSW (2%) and OHRW (4%) (Table S3).

HIV/STI testing prevalence was similar among the three groups and generally quite high. Roughly 90% of each group knew where to get tested for HIV in the district where they were interviewed (Fig. 3, Table S4). Likewise, ever having been tested for HIV was very high with over 80% of each group ever testing and receiving HIV test results (Fig. 3, Table S4). Testing for HIV in the last 6 months was a bit lower, but prevalence still ranged from 60 to 80% (Fig. 3,

Table S4). Testing for other STIs was much less frequent than HIV testing across all three groups with prevalence estimates less than 50% (Fig. 3, Table S4).

The number of male sexual partners over the last four weeks and 12 months and new male sexual partners over the last four weeks differed greatly between groups. Among FSW, 52% reported > 20 male partners in the last four weeks compared with 25% among OFSW and 5% among OHRW (Fig. 4a). Conversely, OHRW had the greatest percentage (86%) of women reporting ≤ 1 partner in the last 4 weeks

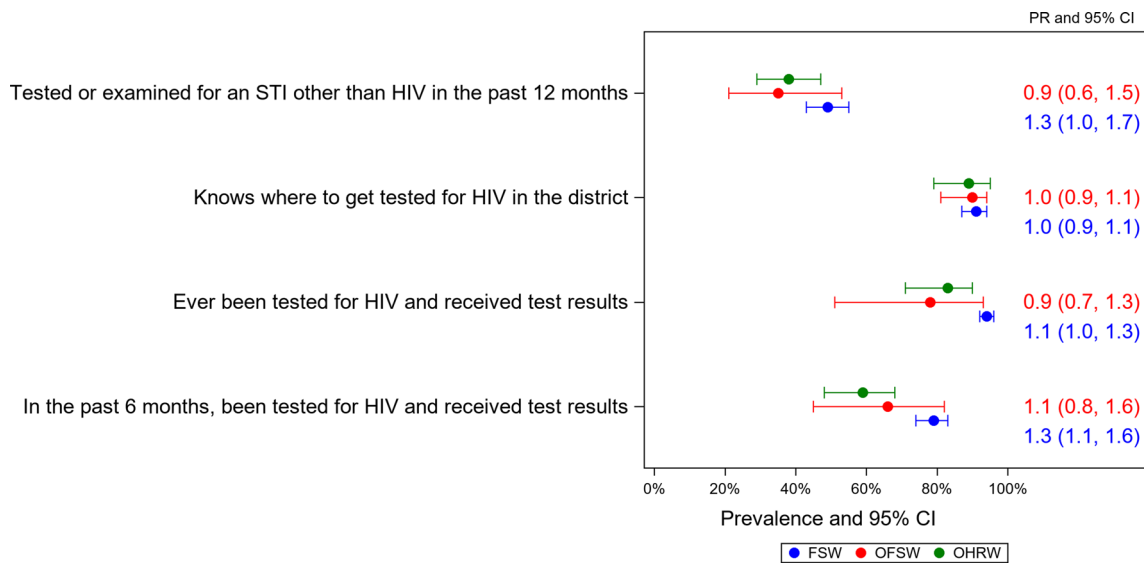


Fig. 3 Prevalence estimates of HIV/STI testing by FSW, OFSW, and OHRW

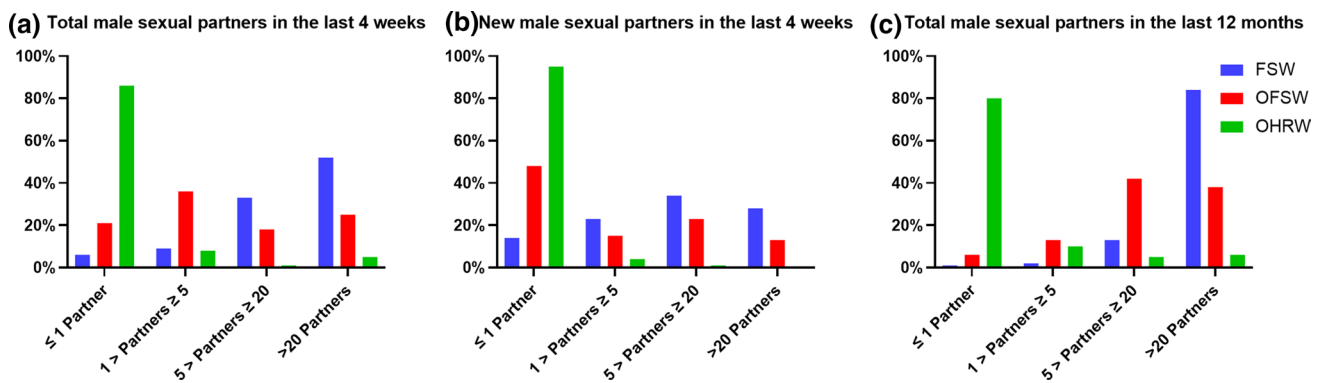


Fig. 4 Number of male sexual partners at 4 weeks and 12 months by FSW, OFSW, and OHRW

compared to OFSW (21%) and FSW (6%) (Fig. 4a). This pattern continued when looking at the number of new male sexual partners over the last four weeks and number of male sexual partners in the last 12 months, with more FSW reporting > 20 new partners than the other two groups and more OHRW reporting ≤ 1 partners than the other two groups (Figs. 4b and c).

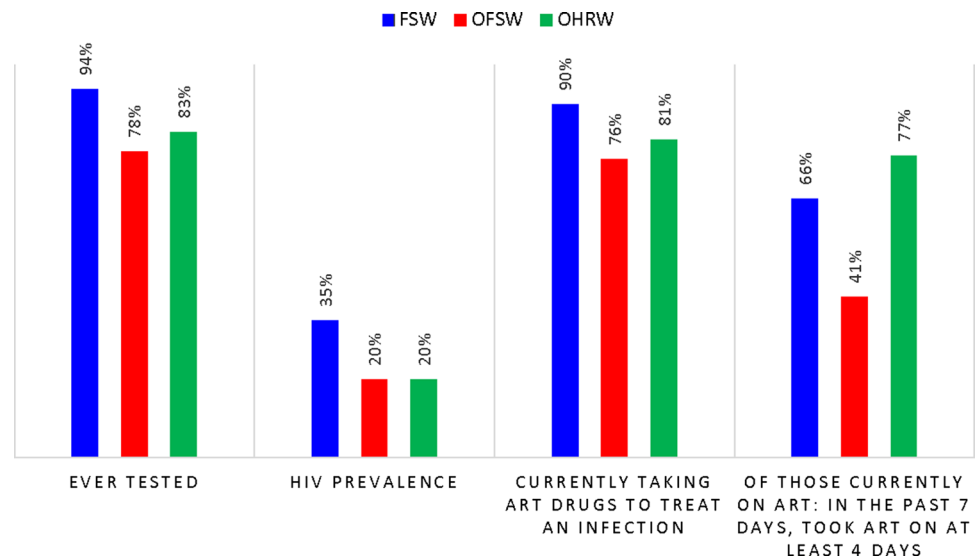
Examination of indicators of access to and utilization of HIV care services was limited to HIV-positive individuals. Self-reported HIV prevalence was 35% among FSW, 20% among OFSW, and 20% among OHRW, which are all notably higher than the adult female HIV prevalence in Malawi (11.1%) [10]. Prevalence of ART use was similar across all three groups; 90% of FSW, 76% of OFSW, and 81% of OHRW reported current use of ART (Table S5, Fig. 5). Having missed ART on at least 3 of the last 7 days was considered non-adherent to their ART regimen. FSW (66%) and

OHRW (77%) were more likely to be adherent to their ART regimen compared to OFSW (41%) (Table S5, Fig. 5).

## Discussion

This study is one of the first to describe the differences among women in rural Malawi who either self-identify as a female sex worker (FSW), engage in sex work but do not self-identify as a sex worker (OFSW), or do not engage in sex work but frequent social venues (OHRW). We provide one of the first estimates of self-reported HIV prevalence among these three groups in Malawi, specifically in rural settings. Self-reported HIV prevalence was greatest among FSW (35%), but the prevalence among OFSW (20%) and OHRW (20%) were still double that of the general female population of Malawi (11.1%) [10].

**Fig. 5** Treatment cascade among high risk women in the Malawi PLACE study



FSW generally reported inconsistent condom usage and the greatest number of sexual partners. OFSW also generally reported inconsistent condom usage and low ART adherence among HIV-positive women. OHRW had the lowest reported access to and usage of condoms and lubricants. To address the HIV programming gaps of each group, organizations should focus on: among FSW, increasing consistent condom use during sex, providing access to pre-exposure prophylaxis (PrEP), protection from partner abuse, and supporting ART adherence among those who are HIV positive; among OFSW, increasing access to and consistent use of condoms, increasing regular testing for HIV and other STIs, and supporting ART adherence among those who are HIV positive; and among OHRW, improving outreach from HIV and women’s health focused organizations, increasing condom use and awareness, and increasing regular testing for HIV and other STIs. Tailoring HIV prevention, treatment, and care programming to better address the differential service needs in these populations can help reduce HIV transmission and improve sexual health.

Each group exhibited prevention behaviors to varying degrees and, therefore, increasing these behaviors across groups will require a more individualized and collaborative approach [11, 12]. HIV testing is fairly common among FSW but women in the OHRW group may not need to be tested as often if they don’t have multiple sexual partners. Fortunately, 90% of women in all three groups knew where to get tested for HIV in their district. Similarly, condom use is lowest among OHRW, however, they are most likely to have a single sexual partner, reducing their risk of HIV acquisition. Questions on condom use focused on ever using a male condom, rather than participants’ regular condom use, which is more indicative of transmission potential [13]. FSW were the most likely to live and work at the venue,

indicating that outreach programs at these venues may be most likely to reach this group of women.

Previous research from Malawi and the region point to several potential reasons why these gaps between the three groups exist and where interventions may be targeted to achieve greater impact. Numerous studies have shown that women who frequent alcohol serving venues, like OFSW and OHRW, have an increased prevalence of psychosocial factors that can exacerbate HIV infection risk [14–21]. One study in South Africa found women who attended alcohol-serving venues daily had more partners and more unprotected sex than those who didn’t [22]. A study in Zimbabwe found that women at venues offering alcohol described more risky behaviors than those without alcohol [23]. Several studies have shown that condoms are not available in many of the locations where people meet potential sexual partners, putting all patrons at higher risk for STIs. In a study of beer halls in Zimbabwe, only 2.2% of men and 1.4% of women reported obtaining condoms from a bar, beer hall, or hotel [24]. In a study of places where people meet new sexual partners in Zambia, nearly all of the venues were bars, restaurants, and hotels, and yet only 51% of these venues always had condoms available on-site [25]. This research points towards a model of providing prevention and care at social venues where many of these risky behaviors take place.

A recent systematic review suggests that informal sex work can be distinct from formal sex work, particularly in sub-Saharan Africa [8]. While the body of literature differentiating between the two is increasing, very few studies have examined the risk behaviors and programming needs of these distinct groups in depth, and none in Malawi [26, 27]. Our study demonstrates that in rural Malawi there are three distinct groups of women who frequent social venues: FSW, OFSW, and OHRW. Women in the OFSW group were



hypothesized to be more similar to the FSW group than the OHRW group, but when we compare the groups side-by-side it is evident that the OFSW group is unique. Women who engage in informal sex work are at an increased risk of becoming infected with HIV compared to women who do not, and may have distinct barriers to care and prevention services when compared to formal sex workers and non-sex workers [28].

One type of service offered in some districts is sex worker drop-in centers. These drop-in centers typically provide information and counseling on HIV and other STIs, on-site testing, free condoms and lubricant, HIV treatment and follow-up, and psychosocial services [29]. An interesting finding from our study is that OHRW (28%) had been to a drop-in center as often as the FSW (29%), both of whom were twice as likely to have gone to one as OFSW were (15%). Services provided outside venues, including within drop-in centers, need to be inclusive of all women to provide the most service delivery coverage and accessibility. Due to the low reported use of these drop-in centers, increasing their reach and engagement with all three groups should be emphasized.

In the only study of the treatment cascade among FSW in Malawi, from urban Lilongwe, 69% had a history of HIV care, 52% were currently receiving ART, and 45% were virally suppressed [4]. Self-reported current ART usage was much higher in the present study where 90, 76, and 81% of HIV-positive FSW, OFSW, and OHRW, respectively, reported being on ART. While viral suppression was not assessed, self-reported ART adherence is an established proxy for viral suppression, although it has known limitations [30]. In this study, 66, 41, and 77% of FSW, OFSW, and OHRW, reported being adherent to their ART. Self-reported ART adherence was especially low among OFSW, but adherence to ART in this study was generally higher than that reported previously among FSW in Lilongwe [4].

## Limitations

One limitation of our study was the small sample size of women, particularly in the OFSW and OHRW groups. Consequently, the confidence intervals were wider for some estimates. Stratifying the data likely helped improve precision. Additionally, all of our data are self-reported and could be susceptible to under reporting and misclassification, particularly HIV status and sex worker status. Many of the survey questions asked about sensitive topics that some participants may have been hesitant to respond to truthfully. All precautions for confidentiality and privacy were taken, but many of the venues were small and crowded with limited secluded space for interviews. Lastly, all participants from this study were sampled from venues on their busy nights. Women

who do not frequent venues or do not frequent them during those hours would not have been represented in this sample. Therefore, these results are only generalizable to other women in social venues.

## Conclusions

Interventions to improve access and utilization of HIV care and prevention services among women socializing at venues in rural Malawi should look to expand their reach. Many current implementing organizations focus exclusively on providing services to sex workers, but may not be adequately engaging other high-risk women at social venues with a greater prevalence of HIV than the general population. The predominant model of exclusively engaging women who self-identify as sex workers may miss opportunities to reach other high-risk women at social venues in need of HIV testing, prevention, treatment, and care. Further research on delivering venue-based HIV services to OFSW and OHRW is sorely needed to understand the effects of such approaches on improving service reach, modifying risk behaviors, and strengthening the HIV prevention-to-care continuum in these understudied groups.

**Supplementary Information** The online version contains supplementary material available at <https://doi.org/10.1007/s10461-021-03289-7>.

**Acknowledgements** We thank all of the women who participated in the Malawi PLACE study. We acknowledge all of the data collection staff and their supervisors for their tireless work on this project. A special thanks to members of the Malawi National AIDS Commission and CEDEP for their leadership and guidance. Finally, we are thankful to the Global Fund for providing the funds to expand to this full study from the pilot study completed under the LINKAGES project. The PLACE Malawi study was funded by the Global Fund through the Ministry of Health in Malawi under a grant (#031-MoH-PIU-16/17-SS-03) to the UNC Project and CEDEP in Lilongwe. Study funders approved the survey design, but were not involved in data collection, analysis, or interpretation, nor decisions related to publication. The corresponding author had full access to all study data and ultimate responsibility for the decision to submit for publication. The corresponding author received doctoral funding support from GlaxoSmithKline, but GlaxoSmithKline had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

**Author Contributions** Writing—review and editing: All Authors; Conceptualization and Methodology: Nicole Frascino, Jessie Edwards, Michael Herce, Joanna Maselko, Audrey Pettifor, Sharon Weir, and Brian Pence; Investigation, Project Administration, and Supervision: Sharon Weir and Nyanyiwe Mbeye; Funding Acquisition: Sharon Weir; Data Curation: Nicole Frascino and Sharon Weir; Formal Analysis, Software, Validation, Visualization, and Writing—Original Draft Preparation: Nicole Frascino.

**Funding** The PLACE Malawi study was funded by the Global Fund through the Ministry of Health in Malawi under a grant (#031-MoH-PIU-16/17-SS-03) to the UNC Project and CEDEP in Lilongwe.

## Declarations

**Conflict of Interest** The authors declare that they have no conflict of interest.

**Ethics Approval** The Malawi PLACE Study protocol, survey, and consent forms were reviewed and approved in Malawi by the National Health Sciences Research Committee (NHSRC, #15/7/1448). Analyses were approved by the University of North Carolina at Chapel Hill Institutional Review Board (#19-0909). The procedures used in this study adhere to the tenets of the Declaration of Helsinki.

**Consent to participate** All participants provided written informed consent to participate.

## References

1. National AIDS Commission. National HIV prevention strategy 2015–2020 [Internet]. 2014. Available from: <http://hivstar.lshtm.ac.uk/files/2016/05/Malawi-National-HIV-Prevention-Strategy-2015-2020.pdf>
2. National Statistical Office of Malawi. Malawi biological and behavioural surveillance survey report 2013–2014 [Internet]. Available from: [http://www.nsomalawi.mw/images/stories/data\\_on\\_line/demography/bbss/BBS%202013-2014%20Report.pdf](http://www.nsomalawi.mw/images/stories/data_on_line/demography/bbss/BBS%202013-2014%20Report.pdf)
3. 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 Infect Dis*. 2012;12(7):538–49.
4. Lancaster KE, Powers KA, Lungu T, Mmodzi P, Hosseinipour MC, Chadwick K, et al. The HIV care continuum among female sex workers: a key population in Lilongwe, Malawi. *PLoS ONE*. 2016;11(1):e0147662.
5. National AIDS Commission Malawi. PLACE report Malawi [Internet]. 2018. Available from: <https://www.fhi360.org/sites/default/files/media/documents/resource-linkages-malawi-place-report.pdf>
6. Government of Malawi, National AIDS Commission Malawi. Malawi national condom strategy, 2015–2020 [Internet]. Lilongwe, Malawi: ministry of health. 2017. Available from: [http://www.healthpolicyplus.com/ns/pubs/7184-7325\\_MalawiNationalCondomStrategyJuly.pdf](http://www.healthpolicyplus.com/ns/pubs/7184-7325_MalawiNationalCondomStrategyJuly.pdf)
7. Barnhart DA, Harling G, Muya A, Ortblad KF, Mashasi I, Dambach P, et al. Structural, interpersonal, psychosocial, and behavioral risk factors for HIV acquisition among female bar workers in Dar es Salaam, Tanzania. *AIDS Care*. 2019;31(9):1096–105.
8. Stoebenau K, Heise L, Wamoyi J, Bobrova N. Revisiting the understanding of “transactional sex” in sub-Saharan Africa: a review and synthesis of the literature. *Soc Sci Med*. 1982;2016(168):186–97.
9. Harcourt C, Donovan B. The many faces of sex work. *Sex Transm Infect*. 2005;81(3):201–6.
10. Malawi UNAIDS. Country factsheet [Internet]. Joint United Nations programme on HIV/AIDS. 2018 [cited 2019 Nov 21]. Available from: <https://www.unaids.org/en/regionscountries/counties/malawi>
11. WHO, CDC, PEPFAR, USAID, IAS. Key considerations for differentiated antiretroviral therapy delivery for specific populations: children, adolescents, pregnant and breastfeeding women and key populations [Internet]. Geneva, Switzerland: World Health Organization. 2017 [cited 2020 May 16]: [66 p.]. Report No.: WHO/HIV/2017.23. Available from: <http://www.who.int/hiv/pub/arv/hiv-differentiated-care-models-key-populations/en/>
12. WHO, UNFPA, UNAIDS, NSWP, World Bank, UNDP. Implementing comprehensive HIV/STI programmes with sex workers: practical approaches from collaborative interventions [Internet]. Geneva, Switzerland: World Health Organization; 2013 [cited 2020 May 16]: [196 p.]. Report No.: 978 92 4 150618 2. Available from: [http://www.who.int/hiv/pub/sti/sex\\_worker\\_implementation/en/](http://www.who.int/hiv/pub/sti/sex_worker_implementation/en/)
13. Patel P, Borkowf CB, Brooks JT, Lasry A, Lansky A, Mermin J. Estimating per-act HIV transmission risk: a systematic review. *AIDS*. 2014;28(10):1509–19.
14. Pitpitan EV, Kalichman SC, Eaton LA, Cain D, Sikkema KJ, Watt MH, et al. Co-occurring psychosocial problems and HIV risk among women attending drinking venues in a South African township: a syndemic approach. *Ann Behav Med Publ Soc Behav Med*. 2013;45(2):153–62.
15. Pitpitan EV, Kalichman SC, Cain D, Eaton LA, Carey KB, Carey MP, et al. Condom negotiation, HIV testing, and HIV risks among women from alcohol serving venues in Cape Town, South Africa. *PLoS ONE*. 2012;7(10):e45631.
16. Abler L, Sikkema KJ, Watt MH, Pitpitan EV, Kalichman SC, Skinner D, et al. Traumatic stress and the mediating role of alcohol use on HIV-related sexual risk behavior: results from a longitudinal cohort of South African women who attend alcohol-serving venues. *J Acquir Immune Defic Syndr*. 2015;68(3):322–8.
17. Kalichman SC, Simbayi LC. Sexual assault history and risks for sexually transmitted infections among women in an African township in Cape Town, South Africa. *AIDS Care*. 2004;16(6):681–9.
18. Pitpitan EV, Kalichman SC, Eaton LA, Cain D, Sikkema KJ, Skinner D, et al. Gender-based violence, alcohol use, and sexual risk among female patrons of drinking venues in Cape Town, South Africa. *J Behav Med*. 2013;36(3):295–304.
19. Sio TT, Chang K, Jayakrishnan R, Amitai A, Xu H, Zaller ND, et al. The impact of healthcare access on knowledge and willingness for HIV testing in Chinese female entertainment workers. *J Immigr Minor Health*. 2015;17(5):1322–9.
20. Pitpitan EV, Kalichman SC, Eaton LA, Sikkema KJ, Watt MH, Skinner D. Gender-based violence and HIV sexual risk behavior: alcohol use and mental health problems as mediators among women in drinking venues, Cape Town. *Soc Sci Med*. 2012;75(8):1417–25.
21. Sikkema KJ, Watt MH, Meade CS, Ranby KW, Kalichman SC, Skinner D, et al. Mental health and HIV sexual risk behavior among patrons of alcohol serving venues in Cape Town, South Africa. *J Acquir Immune Defic Syndr*. 2011;57(3):230–7.
22. Vellozo J, Watt MH, Abler L, Skinner D, Kalichman SC, Dennis AC, et al. HIV-risk behaviors and social support among men and women attending alcohol-serving venues in South Africa: implications for HIV prevention. *AIDS Behav*. 2017;21(Suppl 2):144–54.
23. Singh K, Sambisa W, Munyati S, Chandiwana B, Chingono A, Monash R, et al. Targeting HIV interventions for adolescent girls and young women in Southern Africa: use of the PLACE methodology in Hwange District, Zimbabwe. *AIDS Behav*. 2010;14(1):200–8.
24. Lewis JJC, Garnett GP, Mhlanga S, Nyamukapa CA, Donnelly CA, Gregson S. Beer halls as a focus for HIV prevention activities in rural Zimbabwe. *Sex Transm Dis*. 2005;32(6):364–9.
25. Sandøy IF, Blystad A, Shayo EH, Makundi E, Michelo C, Zulu J, et al. Condom availability in high risk places and condom use: a study at district level in Kenya, Tanzania and Zambia. *BMC Public Health*. 2012;26(12):1030.
26. Lancaster KE, Go VF, Lungu T, Mmodzi P, Hosseinipour MC, Chadwick K, et al. Substance use and HIV infection awareness among HIV-infected female sex workers in Lilongwe, Malawi. *Int J Drug Policy*. 2016;30:124–31.



27. Shea J, Bula A, Dunda W, Hosseinipour MC, Golin CE, Hoffman IF, et al. "The drug will help protect my tomorrow": perceptions of integrating PrEP into HIV prevention behaviors among female sex workers in Lilongwe, Malawi. *AIDS Educ Prev Off Publ Int Soc AIDS Educ*. 2019;31(5):421–32.
28. Wamoyi J, Ranganathan M, Kyegombe N, Stoebenau K. Improving the measurement of transactional sex in Sub-Saharan Africa: a critical review. *J Acquir Immune Defic Syndr*. 2019;80(4):367–74.
29. Pakachere Institute of Health and Development Communication. Linkages Project [Internet]. 2017. [cited 2020 Jan 5]. Available from: <https://www.pakachere.org/portfolio-view/linkages-project/>
30. Byrd KK, Hou JG, Hazen R, Kirkham H, Suzuki S, Clay PG, et al. Antiretroviral adherence level necessary for HIV viral suppression using real-world data. *J Acquir Immune Defic Syndr*. 2019;82(3):245–51.