

Reproductive Tract Infections among Female Sex Workers in Dar es Salaam, Tanzania

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Abstract

Background: Reproductive Tract Infections are among the world's major diseases associated with HIV. Female Sex Workers are at increased risk of reproductive tract infections and HIV because of the nature of their work. This study aims to estimate the prevalence of reproductive tract infections, HIV and co-infections among female sex workers.

Methods: The study was conducted in Dar es Salaam (capital and largest city of Tanzania). Female sex workers were recruited using the Respondent Driven Sampling.

From female sex workers, we collected data on background characteristics, sexual and behavioral practices and results from biological samples. Main analysis was univariate to get point estimates and 95% confidence intervals (CI) were adjusted for social network size and recruitment patterns using RDS-Analyst (Respondent Driven Sampling Analysis) computer software.

Results: We recruited 537 female sex workers; with almost three quarters aged less than 35 years. More than half of female sex workers started selling sex at less than 25 years of age. The estimated vaginal and anal sex condom use was about 85% and over 75% respectively. Alcohol and non-injection drug use was reported high, 68% and 61% respectively. The prevalence of any reproductive tract infections among FSWs was 64%, HIV 32%, Bacterial vaginosis 20% and gonorrhoea 10%. Also, the prevalence of double and triple co-infections was observed in 20% and 5% of female sex workers respectively.

Conclusions: The prevalence of reproductive tract infections and HIV among female sex workers in Dar es Salaam are very high. These results imply considering strategies targeting female sex workers population with a routine health education, mobile reproductive tract infections clinics tailored together with HIV and reproductive tract infections interventions.

Keywords: HIV; Co-infection; Sex worker; Reproductive tract infection; Tanzania; Respondent-driven sampling

Introduction

Reproductive Tract Infections (RTIs) and other Sexually Transmitted Infections (STIs) are among the leading prevalent morbidities causing long-term disability and if untreated ending to mortality [1]. In women of childbearing age, reproductive tract infections are second to maternal factors that cause disabilities or mortality [2].

Female Sex Workers (FSWs), especially in most of the low and middle-income countries, are considered to be among the Most at Risk Populations (MARPS). Among this group, the prevalence of STIs that include HIV is alarmingly high [3]. For example, literature from several low-income countries like those in sub-Saharan Africa, the prevalence of HIV among FSWs are as high as to over 50% [4-6].

Apart from HIV, other STIs like Gonorrhoea, Chlamydia, Syphilis, *Trichomoniasis*, Bacterial vaginosis, Herpes Simplex Virus (HSV), Candidiasis, Human Papillomavirus (HPV), and both Hepatitis B and C have been reported high from different regions [6,7]. Of these, the most common bacterial infections are Gonorrhoea, Chlamydia, Syphilis and *Trichomoniasis* [8]. A report in 2008 presented an increase of these STIs from 1995 to 2006 as follows: Gonorrhoea from 10% to 33.7%, Chlamydia from 5.1% to 20%, Syphilis from 1.5% to 42.1% and for *Trichomoniasis* from 10% to 76.6% [4].

Although most RTIs are believed to boost the transmission of HIV [8], co-infection between HIV and other RTIs like Gonorrhoea and Chlamydia

and other multiple infections are among the characteristics of FSWs in sub-Saharan Africa [9]. Therefore, the potential benefit of early detection and management of these infections (including co-infections) must be one of the strategies to control RTIs and HIV.

In Tanzania, there is inadequate information on some of the Most at Risk Populations like Female Sex Workers (FSWs). Although it is difficult to get clinical data on diagnosed STIs, self reported information among women aged between 15 to 49 years in Dar es Salaam suggests the prevalence of 2.3%. Furthermore, Tanzania is among the sub-Saharan countries with high HIV prevalence rates. While in Tanzania the prevalence of HIV among women aged 15 to 49 is about 5%, it is about 8% in Dar es Salaam region for the same sex and age [10]. Most of adult women are infected with HIV by unprotected sexual intercourse [11]. Therefore, in this paper, we present results on the magnitude of RTIs and co-infections with HIV among FSWs in Dar es Salaam.

Materials and Methods

Study design

A cross-sectional survey was conducted between April and August 2010 in Dar es Salaam city Tanzania. Dar es Salaam is a major city with a total population of about 2.5 million (population growth rate of 4.39%) that is projected to 5 million in 2020 [12]. In 2010, out of the total population aged between 15 to 49 years, 50.9% were women. Tanzania is among the

poorest countries in the world; with an average GDP of 7%. Although its economy depends very much on agriculture that absorbs more than 90% of its population, the major activity in Dar es Salaam is business.

Study sample

We studied women aged at least 15 years who reported exchanging money for sex in the past month, here and thereafter referred to as FSWs; part of a population that is considered to be hidden and “hard-to-reach”. There is little information regarding this sub-population and most of the time, FSWs are stigmatized and considered social deviants. To the best of our knowledge, the size of the FSWs in Dar es Salaam (and Tanzania in general) is not known.

Study procedures

Both, lack of sampling frame and hard-to-reach population warranted the use of a Respondent Driven Sampling (RDS) strategy; a modified snowballing sampling technique. We estimated the sample size of at least 500 FSWs. Recruitment started by identifying six seeds during formative research and through key contacts. These seeds reflected a number of key female sex workers characteristics. Each seed was given three coded coupons to recruit their peers in the study. However, in the course of time, two seeds did not ‘grow’ and we added four more seeds. There were two sites earmarked for screening, interviewing, counseling and testing activities. On each site, a team of eight staff was in place to attend all four activities. Participants who presented valid recruitment coupons were screened for illegibility and provided informed consent for participation into the study. At the end of the visit, each participant was given three coupons to recruit illegible peers (Figure 1). The maximum and mean numbers of waves attained were 16 and 5.7 respectively.

A face-to-face interview schedule was developed, pre-tested in a different setting and administered in Kiswahili language by female sociologists or medical personnel. It consisted of background information of a FSW, sexual behaviors, health seeking behaviours and knowledge of HIV and STIs; size estimation of network and collection of samples for STI/HIV testing.

Blood plasma samples and endocervical swab specimens were collected by competent laboratory technicians following Guidelines on Standard Operating Procedures for Laboratory Diagnosis and were analyzed at the National Laboratory located at National Institute for Medical Research NIMR. The following tests were performed:

HIV: All blood samples were screened using SD Bioline HIV-1/2 3.0 test (Standard Diagnostics, Kyonggi-do, South Korea). Confirmation was performed by Determine HIV1/2 test (Abbott Diagnostic Division, Hoofddorp, The Netherlands). For discordant specimens, the tie breaker test Unigold (Trinity Biotech, Bray, Ireland). A randomly selected sample of 10% of the samples was transferred to CDC, Atlanta for quality assurance.

Syphilis: Serological diagnosis of syphilis was performed using Rapid Plasma Reagin (RPR) to detect the presence of antibodies that produce *Treponema pallidum* bacteria.

Hepatitis B and C: Genedia Hepatitis B Elisa test kit and anti – HCV PLUS (Bio – Rad) were used to detect the antibodies for HBV and HCV in serum plasma respectively.

Gonorrhea and Chlamydia Trachomatis: Endocervical swab specimens were tested for the presence of *Neisseria gonorrhoea* and *Chlamydia trachomatis* using the Roche Amplicor GC/CT system according to the manufacturer’s recommendations.

Trichomoniasis: Detection was performed using the InPouch™ TV system.

Bacterial vaginosis and Candidiasis: Gram stained smears of vaginal exudates were evaluated for bacterial vaginosis using a scoring system with a 0-10 scale [13].

Quality control of testing for STIs: Quality control was assured and all samples were double tested in the Centers for Disease Control and Prevention (Atlanta) laboratories.

Statistical analysis

We used Microsoft Access program to capture data and double entry was performed to assess and correct mismatch values of all respective fields. Data were translated to STATA (Ver 10.0) and consistency checks were done using frequencies to find out-of-range values. Then, univariate analysis to get point estimates and 95% confidence intervals (CI) were adjusted for social network size and recruitment patterns using RDS-Analyst (Respondent Driven Sampling Analysis) computer software.

Ethical considerations

Ethical approval was applied for and granted (NIMR/HQ/R.8a/Vol. IX/872) by NIMR after rigor reviews of the protocol, study instruments and consent forms. Participation was voluntary and strictly confidential. Participants were allowed to withdraw from the study at any time or decline to answer any question. Consent form was read and a FSW was to sign the informed consent form after reporting understanding of the study procedure. We conducted interviews first and then study participants were free to proceed with biological tests or not.

Results

Description of study participants

We recruited 537 Female Sex Workers (FSWs) living in Dar es Salaam for at least three months before the survey. Table 1 shows the background information of these FSWs. The majority, 380 (74.1%), of these FSWs were young (less than 35 years); the overall mean age was 29.5 (SD=8.7) years. Less than one quarter, 105 (22.1%), either never went to school or had informal education training and slightly more than half, 271 (54.8%), reported to be currently married or cohabiting.

Sexual practices and risk behaviors

More than two thirds, 336 (67.7%), had their first sex when they were between 15 to 19 years and more than half, 279 (52.9%), started selling sex as young as less than 25 years. The majority of FSWs, 445 (84.8%),

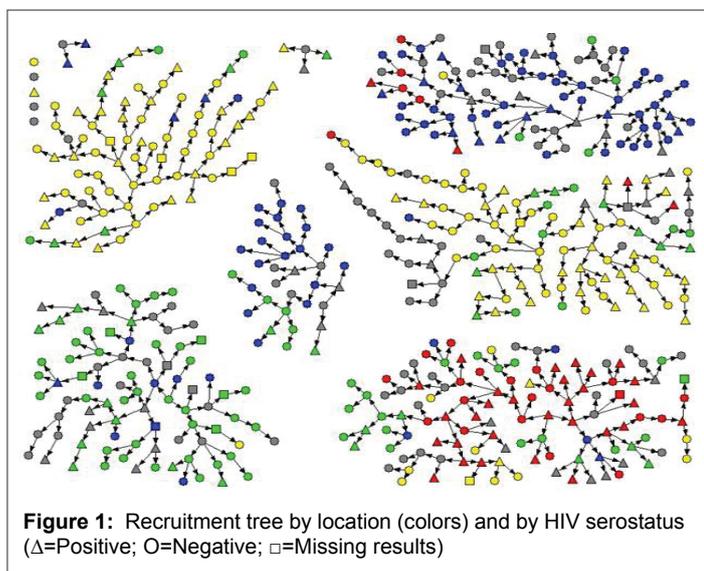


Figure 1: Recruitment tree by location (colors) and by HIV serostatus (Δ=Positive; O=Negative; □=Missing results)

Characteristic	Number of FSWs (%)
Current age (years)	
15-19	44 (9.9)
20-24	127 (24.1)
25-29	107 (18.8)
30-34	102 (21.3)
35-39	73 (12.0)
40+	83 (13.9)
Education	
None/Informal education	105 (22.1)
Primary education	339 (60.5)
Secondary education	89 (17.4)
Current marital status	
Never married	6 (1.0)
Married/cohabitating	271 (54.8)
Previously married	254 (44.3)

Table 1: Background Characteristics of FSWs in Dar es Salaam, Tanzania

reported condom use with partner during the most recent sexual act and among 22 FSWs who reported anal sex during the most recent act, six (23.8%) did not use a condom (Table 2).

Among all FSWs, 360 (67.7%) (95% CI 61.3%-72.8%) reported current (during the past 30 days) use of alcohol and 53 (61.2%) (95% CI 51.1%-79.3%) reported using non-injection drugs. Reported use of injection drug was low, 6 (1.3%).

The prevalence of RTIs

Out of 537 FSWs, clean samples and results were available for 433 (80.6%) study participants. The prevalence of any RTIs including HIV, among FSWs was 63.9% and 39.8% of FSWs had single infection. Co-infections of RTIs were available in 24.1% of FSWs.

The prevalence for each of the examined RTIs and HIV are presented in table 3. The highest prevalence was 31.6% for HIV and 20.2% for *Bacterial vaginosis* respectively. The lowest prevalence was 1.8% for syphilis.

Co-infection of RTIs with HIV

A summary of these respiratory tract co-infections with HIV is presented in table 4. The highest co-infection rates were in gonorrhoea and HIV; *Candidiasis* and HIV; and Hepatitis B and HIV.

Discussion

We used a respondent-driven sampling (RDS) technique to recruit FSWs to estimate the prevalence of HIV, major reproductive tract infections (RTIs) and to assess co-infections. RDS has been used extensively especially for hidden and hard-to-reach populations like men who have sex with men (MSM), Injecting Drug Users (IDUs) and FSWs [14].

In this study, we examined the prevalence of RTIs among FSWs in Dar es Salaam, Tanzania. Despite high condom use for both vaginal (85%) and anal sex (76%), the prevalence of any RTI including HIV among FSWs in the study was 64%; this prevalence is considered very high. The possible explanation could be variability in the use of condom by partner type (one time, steady and regular partner). This possible risk behavior needs further study. In this study, all RTIs excluding HIV were lower than those reported in Senegal [15]. Similar higher HIV prevalence has been reported among female sex workers' populations in some West and East African countries [15,16]. In this study, many FSWs report alcohol and non-injection drug use (68% and 61% respectively) that may also be associated with high prevalence of RTIs and HIV infection. Also, the heavy burden of HIV among FSWs could be explained by their occupational context, poverty, low education and other demographic backgrounds [17].

Sexual Practices	Number of FSWs (%)
Age at first sex (years)	
Less than 15	90 (17.1)
15-19	336 (67.7)
20+	79 (15.3)
Age at first selling sex	
Less than 20	198 (38.4)
20-24	81 (14.5)
25-29	126 (22.5)
30+	127 (24.6)
Safe vaginal sex (most recent)	
Used a condom	445 (84.8)
Not used a condom	80 (15.2)
Reported anal sex	
Ever	91 (16.7)
Never	444 (83.3)
Safe anal sex (most recent)	
Used condom	16 (76.2)
Not used a condom	6 (23.8)

Table 2: Reported Sexual Practices of FSWs, Dar es Salaam, Tanzania

Type of STI	Prevalence (95% CI)
Syphilis	1.8 (0.9, 2.8)
Hepatitis C	2.6 (0.1, 5.1)
Hepatitis B	6.3 (3.7, 8.8)
<i>Trichomoniasis</i>	4.5 (2.8, 6.2)
<i>Candidiasis</i>	12.0 (8.5, 15.6)
<i>Bacterial Vaginosis</i>	20.1 (15.0, 25.4)
<i>Chlamydia</i>	5.6 (2.6, 8.6)
<i>Gonorrhoea</i>	10.3 (7.0, 13.6)
HIV	31.6 (26.7, 36.5)

Table 3: Prevalence of RTIs/HIV among FSWs, Dar es Salaam, Tanzania

Type of RTI	Co-infection (%) with HIV
<i>Syphilis</i>	1.9 (0.3, 3.4)
<i>Hepatitis C</i>	1.6 (0.5, 2.6)
<i>Hepatitis B</i>	2.7 (1.5, 4.0)
<i>Trichomoniasis</i>	1.5 (0.7, 2.4)
<i>Candidiasis</i>	3.8 (1.4, 2.6)
<i>Chlamydia</i>	0.7 (0.1, 1.3)
<i>Gonorrhoea</i>	4.0 (1.8, 6.1)

Table 4: Prevalence (95% CI) of reproductive tract co-infections with HIV among FSWs

Bacterial vaginosis (BV) and *Candidiasis*, though not traditionally strongly considered STIs, were also high in this study [18]. While BV has been associated with the acquisition of gonorrhoea and *Chlamydia*, the prevalence *Candidiasis* in this study is comparable to similar studies of Kisumu, Kenya and in West Africa [19,20]. The prevalence of gonorrhoea was slightly lower than that reported in Ghana and Benin [20].

The lowest RTI prevalence was in syphilis. The prevalence of syphilis in Kenya (Kisumu and Nairobi) was almost twice as in this study [19]. Although some reports suggest a decline of syphilis in specifically in Southern and Eastern Africa due to AIDS mortality [21], additional reasons for a low prevalence of syphilis among FSWs found in this study are not clear.

We found significant highest prevalence of RTI double co-infections for HIV/Gonorrhoea, HIV/*Candidiasis*, HIV/Hepatitis B and for Gonorrhoea/bacterial vaginosis. Although data on co-infections in sub-Saharan Africa

is very scarce, there have been reports of HIV and Hepatitis B co-infection among FSW in India [22]. Although gonorrhoea is a non-inflammatory RTI, it has been suggested that it is a marker for unsafe sex linked with HIV acquisition [23].

Conclusion

To conclude, Female Sex Workers in Dar es Salaam, Tanzania, despite reporting moderate use of safe sexual practices, they possess alarming risk for HIV and other RTIs like *bacteria vaginosis*. The major co-infections are between HIV and *Gonorrhoea* or *Candidiasis*. The increased burden of any RTI of more than 60% suggests considering a review of syndromic approach in the management of reproductive tract infections. With high prevalence of RTIs, the benefit of having positive predictive value when applying syndromic approach may be beneficial as compared to the expected low sensitivity rate. Findings suggest unmet needs for interventions supporting behavior change and effective RTI care for FSWs and their male clients in order to reduce the transmissions of these infections including HIV. It is likely that most of these RTIs are missed using syndromic management. Therefore, accurate and affordable rapid-point-of-care tests and innovative interventions are needed to reduce the burden of RTIs in this high risky population of RTIs including HIV. Furthermore, although RTI and STI clinics do not discriminate FSWs, there is a need to examine strategies of how to target this hard-to-reach risky population in terms of routine health education and mobile STI clinics.

Limitations

This study has several potential limitations. First, the study was conducted in one major city of Dar es Salaam in Tanzania. Although these results could be comparable to similar areas, there must be a caution when making inferences based on these results. Second, we used face-to-face interviews in order to manage the possibility of illiteracy among respondents. Therefore, the use of interviewers may potentially lead respondents offering socially desirable answers causing desirability bias. Third, the study was cross-sectional making it difficult to assess the cause and effect of one RTI to the other when analyzing co-infections. Fourth, we were not able to assess and measure the consistency use of condom among study participants.

Author Contributions

MRK designed the study, collected and analyzed data, drafted and revised the manuscript. SRK designed and implemented the study, analyzed the data and revised the manuscript.

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