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SUBSTANTIVE REVIEW

Socio-Demographic Characteristics and Behavioral Risk Factors of Female Sex Workers in Sub-Saharan Africa: A Systematic Review

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Abstract Sex work remains an important contributor to HIV transmission within early, advanced and regressing epidemics in sub-Saharan Africa, but its social and behavioral underpinnings remain poorly understood, limiting the impact of HIV prevention initiatives. This article systematically reviews the socio-demographics of female sex workers (FSW) in this region, their occupational contexts and key behavioral risk factors for HIV. In total 128 relevant articles were reviewed following a search of Medline, Web of Science and Anthropological Index. FSW commonly have limited economic options, many dependents, marital disruption, and low education. Their vulnerability to HIV, heightened among young women, is inextricably linked to the occupational contexts of their work, characterized most commonly by poverty, endemic violence, criminalization, high mobility and hazardous alcohol use. These, in turn, predict behaviors such as low condom use, anal sex and co-infection with other sexually transmitted infections. Sex work in Africa cannot be viewed in isolation from other HIV-risk behaviors such as multiple concurrent partnerships—there is often much overlap between sexual networks. High turn-over of FSW, with sex work duration typically around 3 years, further heightens risk of HIV acquisition and transmission. Targeted services at sufficiently high coverage, taking into account the behavioral and social vulnerabilities described here, are urgently required to address the disproportionate burden of HIV carried by FSW on the continent.

Keywords Female sex workers · Sub-Saharan Africa · HIV · Behavior · Vulnerability and risk

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Introduction

Across sub-Saharan Africa, female sex workers (FSW) carry a disproportionate burden of HIV, with prevalence commonly 10–20-fold higher than among the general population. In Guinea and Benin, for example, national HIV prevalence in 2002 was about 3% compared with more than 40% among sex workers [1]. In almost all studies in southern Africa over the past decade more than half of FSW were HIV infected, with HIV prevalence reaching 86% in one study [2]. In East Africa around a third of FSW had HIV, though levels of up to 75% were documented in Kisumu, Kenya and Addis Ababa, Ethiopia in the early 2000s [3, 4]. Sex work remains an important contributor to the

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transmission dynamics of HIV within early, advanced and regressing epidemics in sub-Saharan Africa [5]. Yet relatively little has been done to control this and other sexually transmitted infections (STI) in sex work settings in the region. Current efforts to intervene are fragmented, with only small-scale projects and low overall coverage.

Empirical data on FSW in Africa remain patchy, with only a handful of systematic reviews published to date. Most reviews are global in focus, leaving specific regional and sub-regional patterns largely unexplored. Recent papers have addressed: global estimates of FSW population size [6, 7]; sex work as one of several risk factors for HIV in sub-Saharan Africa [5]; STI rates [8] and control [9] among FSW globally; HIV prevention interventions targeting FSW and other most-at-risk populations [10]; and sex work harm reduction [11]. No review yet provides detailed information on the social and behavioral aspects of sex work in sub-Saharan Africa, or examines the relationship between FSWs' vulnerability to HIV acquisition and the prevailing structural and occupational contexts of their work. Notwithstanding inevitable variations within the region, a clearer understanding of the lives and contexts of sex workers on the continent would help to inform the design, adaptation and implementation of more effective targeted interventions for this group.

This article summarizes a systematic review commissioned by the World Health Organization (WHO), which aimed to address the above evidence gaps. It synthesizes available literature on the patterns and settings of sex work in sub-Saharan Africa, as well as key socio-demographic features of sex workers, including HIV status. The sections thereafter review, firstly, how these characteristics of sex work impact on FSWs' vulnerability to HIV, and secondly, their key behavioral risk factors for HIV. Our discussion follows a conceptual framework formulated by social theorists writing on sexuality and HIV prevention [12, 13]. This framework calls not only for a focus on HIV/AIDS-related 'risk behaviors'—quantified, for example, in terms of the number of unprotected sex acts or of shared needles—but also for examination of the broader social, cultural, and economic contexts within which such behaviors occur (see Fig. 1, adapted from the WHO Sex Work Toolkit [14]).

No single term or definition adequately encompasses the full range of sex work exchanges in sub-Saharan Africa, nor are the groups encompassed by such nomenclature necessarily synonymous with the sex worker populations that impact on infectious disease dynamics. Whatever the challenges in naming and defining the boundaries of sex work, working definitions are needed for the purposes of epidemiological surveillance, provision of targeted services, and policy-making. Complicating the search for a clear definition of sex work in this region is the widespread occurrence of transactional sex: the more socially accepted exchange of material goods within sexual relationships, including the provision of food, cash, cosmetics, transport, items for children, school fees, or somewhere to sleep [15–18]. These relations pose significant challenges to the design of effective HIV prevention interventions, especially as women in these relationships seldom self-identify as sex workers, if at all, nor are they necessarily viewed as such by their 'clients' or the broader community [19, 20]. In transactional sex, participants are in fact usually constructed as 'girlfriends' and 'boyfriends', rather than as 'sex workers' and 'clients'. The giving of gifts or money forms part of a broader set of expectations within such relationships—"The best way to show your love is to give presents" and the size of a gift demonstrates the extent of one's love [16]. For purposes of focusing the parameters of the review, this article adopts the definition of sex work proposed by UNAIDS in 2000 (which implicitly excludes instances of transactional sex): "any agreement between two or more persons in which the objective is exclusively

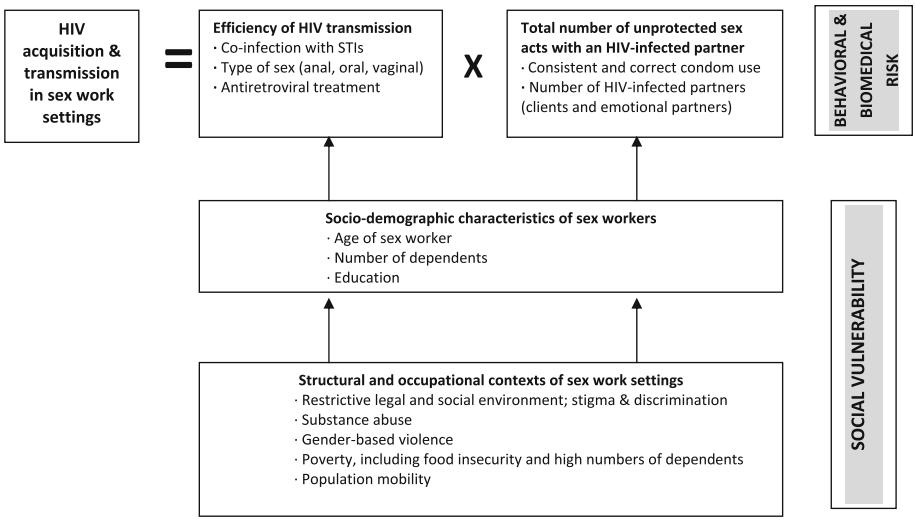

Fig. 1 Multilevel model of the contextual, socio-demographic, behavioral and biomedical risk factors for HIV infection in sex workers

limited to the sexual act and ends with that and which involves preliminary negotiations for a price" [21].

Methods

Data were collated from both qualitative and quantitative research studies among FSW and their clients. The databases Medline, Web of Science and Anthropological Index were searched for relevant English articles published between January 2000 and April 2010. To be eligible, articles had to contain socio-demographic or behavioral information about FSW in sub-Saharan Africa. Articles on groups at high-risk, such as female bar workers, were excluded.

Search terms used in Medline (Pubmed) were: "prostit*" or "sex work" or "sex worker" or "sex workers", and "Africa" (MeSH term or any field). Articles were located in Web of Science using the terms "sex work" or "prostitution", and then filtered to include only sub-Saharan African countries. Anthropological Index was searched using the key terms "prostitution" or "prostitute". Several studies were reported in multiple publications; only those used for extracting socio-demographic and sexual behavior data about the study population are included here.

The search identified 1,200 articles (Fig. 2). Following the screening of article titles, abstracts and, in some cases, the full text of articles, 128 articles remained for inclusion in the review. Ninety-four of these articles described studies that had more than 50 participants. A single reviewer extracted quantitative data from these articles on sex worker socio-demographics, sexual behavior and HIV status (supplementary Tables 1 and 2). The remaining articles (34) were reviewed for additional, qualitative information, and provide more nuanced—often explanatory—data in the text.

Results

Patterns of Sex Work in Sub-Saharan Africa

Sex Work Settings

Globally, sex work takes place in a wide variety of settings, ranging from established, formal brothels to more informal venues such as bars, hotels, roadside truck-stops, or at home. Where sex work is more formal, managers or controllers ("pimps") may act as gatekeepers or intermediaries between the sex worker and client, with contracts stipulating what portion of the sex work fee is ceded to these intermediaries, either as rent, or for drugs and protection.

In sub-Saharan Africa, sex work takes all of the above forms (supplementary Table 1). It is not typically based in the large-scale brothels that are common in Asia—with

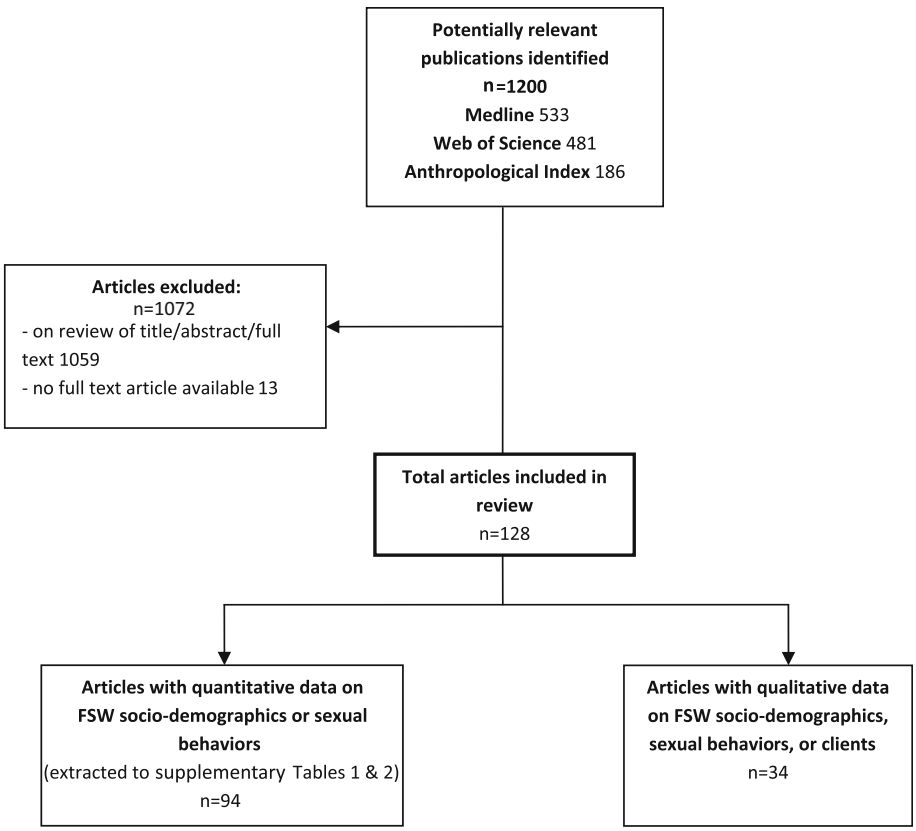

Fig. 2 Flow chart of identification and selection of studies

some exceptions, largely in West Africa, especially Nigeria [1, 3, 22–30]. In one Kenyan study, only 6% of the FSW interviewed worked in brothels; these were run by a group of women as a business [24]. East African studies and some studies in West Africa found a notable proportion of FSW working from home (supplementary Table 1). Overall, bars and other drinking venues, streets and hotels are most commonly identified as places for soliciting clients. Sex sometimes occurs at the site of solicitation, especially if this is outdoors, or it may take place elsewhere, for example, sex may be negotiated in a bar but occur at the sex worker's home [31, 32]. Street sex workers in Zambia reported often driving with their client to a secluded area and having sex in the car, while nightclub-based sex workers recounted having sex in the nightclub toilet or behind a building [33]. When sex takes place in the client's space, for example in his car or room, sex workers' vulnerability to violence or forced unprotected sex is often magnified [34].

Venue of work appears to be linked to sex workers' social status and hierarchies of income [35, 36]. For example, sex workers of higher socio-economic status in Uganda earn money from selling alcohol and sex in established bars on the main street, while their poorer contemporaries tend to work in back-street bars, rely fully on sex work income and are less able to negotiate safe sex [35]. In South Africa, at the top of the hierarchy are better-paid sex workers at escort agencies, then those at hotels and finally the poorest work on the streets [36].

Finally, sex work in this region predominantly occurs without intermediaries, with FSW accepting money directly from the client, a setup that potentially gives them better control over their resources and the number of clients they accept. An interesting exception is the presence of middlemen on the trans-African highway in East Africa, who commonly arrange sex workers for truck drivers, and receive some payment from both parties for this intercession [37]. Intermediaries also feature in Cape Town, South Africa, as 'pimps' playing a protective role for street-based FSW, performing tasks such as safeguarding their money, facilitating their access to health services and noting the registration numbers of clients' cars [34].

Clients

Overall, we found few surveys of the clients of FSW in sub-Saharan Africa, possibly because accessing these groups is difficult. Innovative methodologies have been applied to overcome this challenge—such as 'exit interviews', where clients in West Africa were interviewed while leaving brothels [38]. What *is* apparent from available literature is that while clients of FSW are often drawn from specific groups of men, overall, they represent a broad cross-section of society. Nevertheless, particular situations do increase demand for sex work and generate specific client groups, for example, mobile men separated from their families and social networks for extended periods of time, such as seasonal agricultural workers [15], truck drivers, men on board ships [39] and in the military or employed as migrant workers. However, clients are not only from these transient groups; they often are also frequently residents of the surrounding local areas, a pattern that may sustain local HIV diffusion pathways [40].

As the examples above suggest, a clustering of large numbers of male clients occurs where occupational and masculine norms predict sex work. In single-sex hostels, still common in mining operations particularly in southern Africa, miners live in compounds separated from their family and other social support. They also have a regular income, which is relatively high compared with the household income of adjacent communities, and there is usually ready access to alcohol in these settings. Drinking and seeking the company of women are among the few ways in which miners are able to ease the stresses of dangerous work and isolated living conditions [32, 41].

Our review found substantial variation in the average number of clients per FSW (supplementary Table 2). Broadly, a large number of studies reported around one client per day, with the remainder having considerably more, as high as a mean 34 clients per week [42]. A Kenyan study found higher client numbers for FSW in Nairobi urban townships (a median nine clients per week), than in rural towns (only four per week) [24]. Direct comparisons across study sites are difficult to make, however, as client number is recorded in a range of ways, capturing daily, weekly and monthly averages. Distinctions are also often made between 'regular' clients and 'one-time' or 'casual' clients, with occasional blurring of the categories 'regular client' and 'partner/boyfriend'.

Based on market theory, client number is contingent on factors such as: the localized demand for paid sex, the price of sex exchanges and the number of women entering or exiting sex work. But male attitudes and behaviors, along with women's low social status, also shape men's demand for paid sex and ensure a steady supply of clients [19, 32]. Further, where shifts in economic conditions reduce alternative income-earning options for women, some FSW may shift from part- to full-time sex work, consequently increasing the number of clients they accept. Between 2000 and 2005, FSW in a Kenyan study had increased their mean number of sexual partners from 2.8 to 4.9 per week, largely for this reason [43]. Few articles directly addressed the relationship between client number and HIV risk. A cross-sectional study in the Congo found that FSW with fewer clients per week were actually more likely to be HIV-infected than those with more clients and suggested that FSW who were HIV positive had reduced their workload

due to HIV-related illnesses [44]. Clearly, further prospective assessment on this issue is required.

Estimating the Size of Sex Worker Populations

Only a handful of studies provide data on the size of sex worker populations in sub-Saharan Africa [6, 45–47]. A 2007 systematic review of 16 studies among the general population found that about 7% of women infected with HIV reported having been paid for sex, compared to 3% of uninfected women. The corresponding figures for men reporting having paid for sex were 31 and 18% [5]. In the port city of Diego-Suarez in Madagascar, use of 'capture–recapture' techniques estimated that 2,684 women were sex workers (12% of the population aged 15–49) [45], illustrating the concentration of sex workers in areas with large groups of transient men. On the main trucking route in eastern Africa, from a combination of geographical information systems and analysis of sex workers' diaries, approximately 5,600 sex workers were estimated to be working at 39 identified hotspots [40].

Size estimates have drawn on a variety of methods; those taken from population surveys tend to be higher than estimates generated by use of specialized enumeration techniques (such as 'capture–recapture') [6]. Combined methodologies may yield more valid estimates. While enumeration techniques are steadily improving, counting the number of people who sell sex remains difficult, not least of all because the population is highly mobile and because defining sex worker groups is so complex. This is particularly true of sub-Saharan Africa, given the considerable overlap between sex work and 'transactional sex', the latter reported by as much as 20% of women attending an antenatal clinic in South Africa [17].

Estimates of population size are also complicated by the large number of 'part-time' sex workers [23, 24], who are less likely to self-identify as a 'sex worker' because the job does not constitute their sole or primary source of income. More importantly, where women selling sex do not consider themselves as 'sex workers', their vulnerability to HIV may be heightened [48]. Professional sex workers in Burkina Faso, for example, adhered to a strict 'no condom, no sex' policy, unlike their 'non-professional' counterparts working in bars or brewing beer but selling sex to supplement their income [49].

Unpacking Sex Workers' Vulnerability to HIV

Socioeconomic and Occupational Contexts of Sex Work

Overall, most sex work in the region takes place within environments that have little or no systematic promotion of safer sex, scant control over clients' behavior and compelling incentives for a high client turnover. Virtually throughout Africa, FSW experience intense stigma, discrimination and consequent social marginalization, which in turn deepen their vulnerability to HIV acquisition, among other health risks [50]. They face numerous barriers to accessing health and social services, including STI and HIV testing and treatment, post-exposure prophylaxis following rape, and access to condoms [51]. These barriers are further entrenched where sex work is illegal, as it is virtually continent-wide, with the sole exception of Senegal. Criminalization of sex work prevents FSW from reporting violence to the police or seeking legal recourse after rape or sexual assault [52, 53]. Indeed, violence is a pervasive theme in the lives of FSW virtually across the region, with long-term consequences including stress, depression and low self-esteem [54, 55]. In a survey of sex work in urban and rural Kenya, a significant portion reported being raped (35%) or physically assaulted (17%) by a client [24]. A Namibian study found that 72% of FSW interviewed had experienced abuse, including by clients (18%), intimate partners (16%), and the police (9%) [31]. There is increasing documentation of police harassment and brutality against sex workers across Africa, which involves assault, unlawful arrest, rape, extortion, and demands for sex or money as bribes [48, 52, 54, 56]. These dangers are especially apparent for informal sex workers, who are generally more isolated, such as those who work on the streets or from home [55].

Factors Promoting Entry to Sex Work

Many young African women who trade sex for food, money or shelter come from disadvantaged backgrounds, are poorly educated, divorced, and lack the skills required for other types of formal or informal employment. A startling proportion of FSW in West and East Africa have received no formal education—well more than 10% in most of these studies and above a third in several. Economic and food insecurity may make sex work the sole survival option for women, particularly those with dependents or whose parents have died [32]. Food insecurity, in particular, may predict unsafe sexual behavior among sex workers, as found in Nigeria [22, 35].

The effect of poverty on the decision to sell sex is not altogether straightforward, however. Some FSW, more accurately described as 'entrepreneurs', have sought financial independence from men by saving and investing money from selling sex to buy their own bars, from which they obtain additional income [35]. Other studies cite non-economic motivations, such as a desire to escape the drudgery of farming and domestic work, forced marriage, boredom, conflict and abuse, or to secure independence from traditional gender norms [35, 57]. In the wake of

conflict or social disruption, women may be pushed into sex work. This was documented in the Democratic Republic of the Congo, following political instability and war in the mid-1990s, where homeless girls and women living on the streets, who had been abandoned, orphaned or widowed, took up sex work to survive [44].

FSW in sub-Saharan Africa very commonly have a background of marital disruption [35]. Most studies reported that between one and two-thirds of FSW were divorced or separated. In a large study in Senegal, 63% of sex workers were divorced and cited consequent economic factors and lack of occupational choice as reasons for entering sex work [58]. A study in Kenya found that half of the FSW interviewed who had ever moved residence had done so following divorce, either looking for work as a single woman, or trying to escape divorce-related stigma [59].

Although only reported by a handful of studies (mainly in east and southern Africa), the evidence suggests that typically more than two-thirds of FSW have children and sometimes also adult dependents [60]. Additional children may be born in the course of sex work—contraception use among sex workers is by no means universal [60]. More than 90% in a Kenyan survey had one or more children [24], and 61% of sex workers working in bars and other drinking venues were supporting one or more family members [61]. A Ugandan qualitative study found that FSW ascribed their choice of sex work to limited options following teenage pregnancy, school dropout and relationship dissolution [35, 48].

Age and Length of Time in the Sex Work Industry

In the studies reviewed, the average age of sex workers mostly fell between 24 and 31 years, with estimates lower among urban sex workers in East African countries such as Ethiopia and Kenya [4, 24] and higher averages recorded in Senegal [58, 62, 63], and some studies in Ghana (median 37 years [42]) and Kenya (mean 35 and 41.1 years [64, 65]). Of concern, several studies documented the existence of very young sex workers: in the Congo, 28% of FSW in a cross-sectional study were between 14 and 18 years [66], and 33% had entered the sex industry before the age of 14. In Nigeria, 16% of FSW working in brothels in Lagos were found to be younger than 20. In the studies reviewed, women began sex work, on average, in their early twenties, with a few studies reporting an even lower mean age. Among out-of-school youth aged 15–24 years in Northwest Ethiopia—an area with among the highest HIV prevalence in the country—22% of males reported ever purchasing sex, while 13% of women had ever sold sex [67]. Girls living near to areas with an especially high demand for sex workers may enter the trade at a younger age. Examples of this can be found in two Kenyan studies where urban sex workers in Nairobi and Kisumu were younger and had begun sex work an average of 4 years before their rural counterparts [24, 59].

With few exceptions [43, 62, 68], FSW in the studies reviewed had been working in the sex industry for an average of less than 3–4 years. A study of FSW in seven cities in Nigeria found that 40% had been sex workers for less than a year [26], a similar figure recorded for FSW in Benin and Ghana [25]. In terms of how age and length of time as a sex worker relate to vulnerability to HIV, studies in Asia have found an association between being new to sex work (having sold sex for less than a year) and being infected with an STI [69]. Similarly, a study in Madagascar found that after adjusting for differences in sexual behavior, younger sex workers were at significantly raised risk of chlamydial and gonococcal infection compared to older women. This was explained as likely due both to biological factors (greater cervical ectopy and immature reproductive tracts) and to social factors that promote risky behavior in young women (greater vulnerability to gender power imbalances, violence and inconsistent condom use) [70, 71]. In sub-Saharan Africa, the particularly high risk for HIV acquisition faced by adolescent girls and young women [72] is surely heightened in those beginning sex work at a young age.

Some studies suggest a more complex relationship between age of sex worker, duration of sex work and vulnerability to HIV, however, and have generated conflicting evidence on this issue. Studies in Senegal [62] and Togo [29] found that older rather than younger FSW were at higher risk for HIV, possibly related to the comparatively longer time spent in the industry and consequent cumulative exposure to HIV [29]. These contradictions pose particular challenges for appropriate targeting of FSW populations, and suggest the need for tailoring interventions to match the complex interactions between age, duration of sex work and HIV risks in different settings.

High turn-over of FSW stems from women actively seeking ways to exit sex work, often doing so by drawing on social networks established through fellow sex workers or clients, but then re-entering if these plans fail [60]. Around half of the FSW in an Ethiopian study had quit and then re-entered sex work. These cycles often entailed stopping sex work while living with a client with whom a stable relationship had developed, but then returning to sex work following a breakup or the birth of an additional child [60].

Sex Work and Population Mobility

Any discussion of sex work in sub-Saharan Africa is incomplete without considering the role of population

mobility in defining sex work patterns. This takes expression in two ways: firstly, mobile or migrant women entering sex work owing to the vulnerability associated with migration itself; and secondly, FSW moving in response to shifts in sex work demand.

Several studies found that women in transit or temporarily displaced due to war or violence were more likely to report having received money or goods for sex than their non-mobile counterparts [4, 73, 74]. In West African countries in particular, and in other countries marred by conflict such as the Democratic Republic of the Congo, typically more than half of FSW are foreign nationals [3, 75–77]. In Benin, for example, 58% of FSW had lived in the area for less than 6 months [78]. Many homeless youth who are sex workers in urban settings in Africa are foreigners [44, 79–81]. Further, within sub-Saharan Africa, the geographical areas most heavily affected by HIV are often those linked with high long-term mobility, adjacent to main transport routes or in border regions [40, 82], suggesting that such mobility predicts high-risk sexual behavior, to some extent.

The theme of being "tricked" into becoming sex workers by being lured to an area on the promise of a secure job, appears across the region but also globally [83]. Women and girls who are refugees or internally displaced can be deceived or coerced into sex work to gain access to food, shelter and personal safety—matters of survival that likely render protection against HIV acquisition a low priority. Furthermore, migrants in general face obstacles to accessing HIV information, antiretroviral treatment and prevention commodities such as condoms, particularly when newly arrived in an area and may be turned away by providers on account of their status as foreigners [84].

Sex workers commonly move around in a quest to: follow seasonal trade opportunities; access a wider or different client base (attempting to avoid regular clients who may expect sex without payment); improve working conditions; recover from illness; or avoid violence and stigmatization [85]. Sex workers on major highways in Africa tend to move in tandem with fluctuating accommodation and leisure preferences of truckers. One study found that sex workers spent a quarter of the nights each month away from their usual area of work, often travelling with truckers along the highway in east Africa [40]. FSW in mining areas may also move frequently, following the rotation of paydays on the mines [86]. Among women working in food and recreational facilities in gold mining communities in Tanzania, most were born outside the region—84% had moved into the area in the previous 2 years. About a quarter of these women had syphilis and 42% were HIV infected, while HIV prevalence in adjacent communities was higher than in other parts of the region [87].

Finally, the relatively high loss-to-follow-up in studies among sex workers is perhaps another indication of the transient nature of this population [88–91]. Overall, large shifts in sex worker populations and settings, which complicate service provision, demonstrate the potential for localized HIV epidemics to spread along transport routes and to adjacent communities.

Behavioral Risk Factors for HIV Infection Among Sex Workers

Sex work vulnerability stemming from the contextual factors described above takes tangible expression in sexual behaviors, which in turn predict levels of biological risk. From a biomedical perspective, the risk for HIV infection is determined by the efficiency of HIV transmission and the total number of unprotected sex acts with an HIV-infected partner (Fig. 1). Not surprisingly, behavioral and other proxy markers of this equation have been shown to be associated with HIV infection. In the sex worker context these include inconsistent condom use, higher client number, duration of sex work, STI co-infection, and type of sexual activity (e.g., anal intercourse) [62, 92]. The sections that follow briefly examine each of these components in turn, completing the framework set out in Fig. 1.

Unsafe Sex

Although very few studies reported actual number of unprotected sex acts, a large body of evidence from sub-Saharan Africa shows that the risk for HIV infection is lower among sex workers who use condoms consistently [4, 92]. Overall, evidence suggests that where sex workers are poorly organized and have few alternative sources of income, they are less able to refuse a client who is unwilling to use a condom. Likelihood of condom use therefore may be undermined by competition and lack of cohesion among sex workers in a particular area [93]. Pro-condom campaigns will have diminished impact unless FSW are able to "present a united front" in refusing clients who reject condom-use [57].

Indeed, refusal by clients remains the most important reason for condom non-use [43, 94]. In a study in Ghana, women cited client refusal (73%) and client brutality (43%) as reasons for not using condoms [94]. About one in five sex workers in Antananarivo, Madagascar, reported that in the past month they had wanted a client to use a condom but were too afraid to ask [95]. Nearly three quarters of sex workers in that study also reported having had sex with a client who refused their request for condom use, and few believed that their co-workers would decline a client who rejected condoms. Condom-use may also be influenced by controllers, or "pimps". A study in Ethiopia found that 7%

of non-use of condoms was due to instructions from the owner of their working place [4].

A finding consistent across several studies is that clients offer sex workers more money for sex without a condom [48, 66, 94, 96]. A study in Kinshasa found that about a quarter of sex workers reported having unprotected sex for extra money, charging up to 3.5 times more for unprotected sex [66]. Further determinants of condom use include low level of education (of either sex workers or clients), and use of alcohol or other substances [94]. In Pretoria, South Africa, about half the sex workers reported having being too intoxicated by recreational drugs to negotiate condom use [97].

Most condom measures—including those used in the studies above—are subject to reporting bias. This is shown by studies that validated self-reported data on condom use through testing for prostate-specific antigen (PSA) on vaginal swabs (which indicates recent unprotected sex or incorrect condom use). More than a third of sex workers in Madagascar who reported protected sex and 21% who reported no recent sex had detectable PSA on vaginal swabs [98]. Corresponding figures in a study in Mombasa, Kenya, were 11 and 6% [99]. Further, with few exceptions, most studies report only on male condom use. High acceptability of the female condom among FSW has been found in Zimbabwe [2] and in rural Malawi, where 80% of FSW in one study preferred them to male condoms [100].

Condom use in many settings varies markedly by type of partner, being lower among regular clients, boyfriends and husbands than among non-regular clients [30, 43]. Much of this appears to be due to sex workers' *own* opposition to using condoms in these relationships, rather than partner reluctance [95]. Several reasons have been offered for this opposition, including a desire to distinguish between interactions with clients and those with emotional partners; the belief that a steady partner is HIV negative; and the wish to avoid appearing mistrustful in emotionally significant relationships, as would be implied by a request for condom use [101]. Emotional partners and more regular clients are also often regarded by FSW as 'clean' and 'safe', in contrast to unknown and 'emotionally sterile' casual clients, who are therefore seen as 'dirty' and 'unsafe' [54, 102].

Beyond the issue of limited condom use, further dangers emerge in FSWs' interactions with boyfriends or spouses, however, as these men often engage in other high-risk behaviors [62]. Almost half of the FSW interviewed in a study in Pretoria, South Africa, reported that their boyfriends had concurrent partners [97]. Further, most (70%) boyfriends of FSW in a study in Guinea and Benin reported having been clients of one or more sex workers other than their girlfriends [1]. HIV prevalence among boyfriends of FSW has also been shown to be higher than that among FSW clients: twice as high in a study in Benin (16.1% among boyfriends versus 8.3% among clients) [103], and even higher in Ghana (32.1% among boyfriends versus 4.9% among clients of mobile sex workers and 15.8% among clients of home-based sex workers) [104]. These patterns suggest that sex work in sub-Saharan Africa cannot be viewed in isolation from HIV-risk behaviors in the general population, such as multiple concurrent partnerships.

For FSW who are HIV infected, consistent condom use remains a significant challenge. A cohort study of HIV-positive FSW working at truck-stops in South Africa found extremely high STI incidence, suggesting that unprotected sex was common, even after an intensive condom promotion and counseling intervention [105]. In general, large evidence gaps remain in relation to "prevention for positives" for FSW, and evidence on whether HIV testing and counseling (HTC) among sex workers increases condom use is mixed [106–108]. Some studies have suggested that HTC for FSW may have the same impact on sexual behavior as in the general population, namely, decreasing risky behavior, particularly after receipt of a positive result [109, 110]. In a cross-sectional study of over 1,000 registered FSW in Senegal, however, low condom use was found to be associated with a prior HIV-negative test [62], although no further evidence on this association was found in the literature we reviewed. Clearly, this is one area where further research is needed and where interpretation of limited findings requires some caution. What is perhaps more concerning is that overall, despite increased availability of HTC services across sub-Saharan Africa, as much as 60% of sex workers are unaware of their status [111]. In one study, almost half of the FSW interviewed learned their status only during pregnancy [94].

Substance Abuse and Unsafe Sex

Drinking patterns in much of Africa are characterized by sporadic heavy episodes of drinking, often in the form of weekend binging. Global opinion is gradually accepting the view that these patterns of drinking have independent effects on sexual decision-making, and on condom-negotiation skills and correct condom-use [112]. Studies have shown that women with heavy episodic drinking patterns (more than five drinks on one occasion) are more likely to use condoms inconsistently and incorrectly; experience sexual violence; and acquire an STI, including HIV [113, 114]. The links between substance abuse and sex work may, however, be difficult to disentangle, since in some instances the former may explain women's entry to the sex industry itself.

Use of alcohol among clients and sex workers at the time of purchasing sex is common, though only few studies

have adequately measured this association. Research in three cities in South Africa found that alcohol and other drugs are commonly used by FSW to lower inhibitions, increase courage to approach clients and help them cope [34, 115]. In a Ethiopian study, out-of-school youth who reported chewing *khat* were six times more likely to exchange sex for money than non-users [67]. High alcohol use was found among female food and recreational workers in areas of Tanzania adjacent to mines, and half of these women sold sex [87]. Another study in Nairobi, Kenya, found that while 35.3% of home-based FSW consumed alcohol daily, much higher percentages of FSW who were club-based (53.3%) and bar-based (60%) did so [116]. As these examples suggest, the nature of the sex work locale itself may, in part, predict the drinking patterns of FSW and consequently, their HIV risk behavior [48]. In some settings, such as Lusaka, Zambia, FSW have been found to deliberately eschew alcohol while working, however, in order to "maintain control over themselves" and avoid unsafe sex [48].

Co-infection with STIs

The burden of STIs other than HIV among FSW in sub-Saharan Africa is high, with half to two-thirds typically having a curable STI at any one time. In some settings, 10% or more have an active genital ulcer and over 30% have reactive syphilis serology [88, 92, 95, 117, 118]. Gonorrhea and Chlamydia infection may be found in a third or more of sex workers, trichomoniasis is common, and many women have multiple infections [23, 42, 78]. Where testing has been done, as reported by a study in Tanzania, about two-thirds of FSW have evidence of herpes infection [82]. Significantly, FSW with ulcerative STIs, such as herpes simplex virus type 2 and chancroid, are more likely to transmit HIV, particularly in settings where men are uncircumcised, although an STI in either partner facilitates HIV transmission. Sex workers commonly report that economic necessity or fear of violence makes it difficult for them to avoid or refuse male clients with an obvious STI, such as a genital ulcer [24].

Anal and Oral Sex

Of concern, the majority of sources reviewed did not report on anal or oral sex practices among FSW. Some evidence points to a much higher prevalence of anal sex than is often assumed for sub-Saharan Africa [64]. Several studies reported that less than 5% of FSW had ever practiced anal sex, while a few reports had levels of around 40% [64, 119–121]. In Meru, Kenya, 41% reported anal sex [64], which was overwhelmingly initiated by clients, and brought FSW a higher fee than vaginal sex. Notably, almost a quarter of FSW believed the practice to carry a lower risk for HIV/STI than vaginal sex.

In one study, compared with other women, sex workers who had anal sex were 3.5 times more likely to acquire HIV [89]. Substituting oral sex or hand-stimulation for sexual acts that have a higher HIV risk such as anal and vaginal sex is a potential strategy for reducing the risk to sex workers. In Hillbrow, South Africa, sex workers who had ever performed oral sex (more commonly reported by older women) were found to be at reduced risk for HIV than those not reporting this practice [92].

Conclusions

While sex work has a considerable presence and a long history across all societies, the HIV epidemic has brought sex worker vulnerability to the fore, largely illustrated by massive differences between the HIV prevalence in these women and the surrounding general population. Much of the elevated risk experienced by FSW is integrally linked to the circumstances and settings in which sex work takes place in sub-Saharan Africa. Despite country-specific variations in the way that sex work is organized, a number of commonalities are nonetheless evident across the region. Similar factors motivate women to enter sex work: while poverty and the experience of a disadvantaged background are unsurprisingly common, other factors feature equally prominently, such as seeking financial independence or escaping boredom, abuse or marital breakdown. The literature consistently portrays the lives of FSW in sub-Saharan Africa as marked by the effects of harmful legislation and human rights violations, which include coercion, stigma, poor access to information and prevention services, as well as frequent exposure to violence and hazardous alcohol use. High mobility and turn-over of FSW further heighten their overall vulnerability, making it extremely difficult for them to actively protect themselves (or to be protected) from infection with HIV and other STIs or, indeed, to prevent onward transmission to partners and clients.

Conceptually—but also programmatically—some of the biggest challenges for policy makers and researchers in Africa in addressing this vulnerability are the diverse forms of sex work and their overlap with sexual networks in the general population. The difficulty of distinguishing 'sex work' from transactional sex in all its various manifestations demonstrates this vividly. Writing on sex work in Uganda, one author claimed, "there is no clear line between commercial sex and "ordinary" sexual relationships" [35]—a description that holds true for much of the continent, and which suggests that a Western understanding of sex work cannot easily be applied to sub-Saharan Africa [16, 19].

These issues are receiving growing attention in the social science literature, especially through exploration of the social lives of sex workers and the various resources, networks and ties they can use to make sex work safer [35, 48, 60, 74]. The fact remains, however, that the majority of studies on FSW in sub-Saharan Africa in the past decade have been epidemiological in orientation, driven by concerns around the HIV epidemic and role of sex workers as a 'core group'. This is particularly true of studies from the earlier part of the decade of literature reviewed here, which often failed to give adequate attention to issues of context. Aside from these shortcomings, many knowledge gaps still remain.

Not enough systematic surveillance has been undertaken of HIV prevalence in FSW and their clients (both in countries with generalized epidemics and in those with low-level epidemics, where the measure of HIV prevalence in sex workers is the cornerstone of HIV surveillance). The mapping of sex work locations and estimations of population size have also been neglected. This kind of information is an important prerequisite for program planning and advocacy to secure adequate services for FSW and their clients [122]. Available sources provide scant coverage of the issue of FSWs' dependents—a striking omission given that sex work itself is often motivated by the need to support dependents [60]. Further research is needed on how interruptions in a sex work 'career' impact on vulnerability to HIV. What we do know is that transitioning in and out of sex work renews the pool of FSW needing sexual health interventions and messaging, outreach, and screening for HIV and other STI [69]. High turn-over also hinders peer worker follow-up and the building of peer-FSW relations. The prevention needs of new (and returning) FSW, which may differ from those of FSW who have remained in the industry, should be taken into account when designing interventions, and strategies for targeting these distinct groups of FSW should be developed accordingly.

This study is limited by its focus only on FSW and their clients, especially as the presence of sizeable populations of male and transgender sex workers in sub-Saharan Africa is increasingly becoming apparent [123]. A focus on FSW, does however, reflect the overwhelming concentration of published studies on sex work in this region. As with any research on highly marginalized and stigmatized populations, particularly those who are vulnerable to police harassment, there is a risk of attracting unwanted harmful attention to these populations, concerns that are legitimately shared by sex workers themselves [33]. Given that sex work is illegal virtually throughout Africa and that FSW experience high levels of stigma, violence and social exclusion, the importance of the 'do no harm' principle in research with these populations should not be underestimated.

In closing, several factors have hampered efforts to address HIV transmission in sex work settings on the continent. There is insufficient recognition by public health authorities, policy makers and politicians that sex work is an important social and public health challenge demanding urgent attention. Politically—and consequently in budgetary allocations—the issue is currently a low priority. Large projects demonstrating the effectiveness of HIV prevention in African sex work settings could reinforce the ability to advocate for high-coverage of such services in the region—as occurred in several Asian countries. Moreover, as we have learned from almost three decades of the HIV pandemic, unexpected progress is possible.

Authorities in sub-Saharan Africa may well be won over by sound assessments of local sex work situations, and by the implementation of results-oriented and evidence-based interventions, that take into account the behavioral and social vulnerabilities described in this review. Structural interventions, including the decriminalization of sex work, support for sex workers to build their own organizations, and programs to help empower sex workers through generating alternate sources of income (e.g., microfinance) [65] could all make substantial contributions to reducing the social vulnerability of FSW. Importantly, mitigating the health and psychological consequences of sex work will succeed only if interventions are based on a detailed understanding of the actual lives of the women involved [48, 54]. Intervention success depends also on whether researchers, program implementers and policy makers alike fashion their response on an underlying respect for the rights of both sex workers and their clients.

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