1. Title page

Sexual health needs of female sex workers reached by two NGOs in Côte d'Ivoire: considerations for the future implementation of PrEP

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HIV prevention; sexual and reproductive health; people-focused approach; pre-exposure prophylaxis (PrEP); sex work; mixed-methods research

3. Abstract

Objectives

In West Africa, most countries have mixed HIV epidemics; new tools such as pre-exposure prophylaxis (PrEP) should target in priority most affected populations, particularly female sex workers (FSWs). This paper describes sexual and reproductive health (SRH) needs of FSWs in Côte d'Ivoire to inform the future implementation of PrEP in this population.

Methods

The ANRS 12361 PrEP-CI cross-sectional and mixed-methods study was designed and implemented with two Ivorian community-based organizations.

1000 FSWs completed a standardized questionnaire assessing women's sociodemographic characteristics, sexual practices and behaviors, use of community health services, *a priori* acceptability of PrEP.

Twenty-two in-depth interviews and eight focus group discussions were conducted at prostitution sites. FSWs were interviewed about risky practices and sexual behaviors, experiences with violence and discrimination, attitudes regarding HIV and sexually transmitted infections (STIs), and barriers to SRH services.

Results

FSWs were highly exposed to HIV despite their use of condoms with clients. The large majority did not use condoms with their regular partner, despite their acknowledged concurrent sexual partnerships. Some accepted condomless sexual intercourse for a large sum of money.

Moreover, FSWs faced many unmet needs regarding SRH beyond HIV prevention and treatment. Inconsistent condom use exposed FSWs to STIs and undesired pregnancies. However, the prevalence of contraceptive use was low due to fear of contraception causing sterility. FSWs faced obstacles in accessing SRH care and preferred advice from their peers or self-medication.

Conclusions

Implementing PrEP among FSWs in West Africa, such as in Côte d'Ivoire, constitutes an opportunity to consider the chronic follow-up of HIV-negative FSWs. PrEP initiation should not condition access to SRH services; conversely, SRH services could be a way to attract FSWs into practicing HIV prevention. Our results highlight the importance of developing a people-focused approach that integrates all SRH needs when transitioning from PrEP efficacy trials to implementation.

4. Article Summary

Strengths and limitations of this study

- Mixed-method study that allows to describe and better understand challenges of implementing PrEP among FSWs
- Strong collaboration with NGOs to reach FSWs who participated in the study
- Risk of selection bias as included FSWs, recruited through NGOs, could be more likely to know about HIV prevention and to access SRH care

5. Main text

INTRODUCTION

Numerous recent efficacy trials have shown highly conclusive results of pre-exposure prophylaxis (PrEP) as an HIV prevention strategy, with a significant reduction in HIV acquisition among men who have sex with men (MSMs), injecting drug users, transsexual women and serodiscordant couples worldwide (1–5). Since 2015, oral PrEP has been recommended by the World Health Organization (WHO) for populations at substantial risk of contracting HIV (6). However, the WHO noted the need for additional operational and social sciences research on creating demand for oral PrEP; improving adherence; understanding the social and behavioral impact of PrEP; and integrating PrEP services with other services (6).

In West Africa, most countries have mixed HIV epidemics, with a relatively low prevalence in the general population (compared to that in Eastern and Southern Africa) but severely affected key populations, particularly female sex workers (FSWs) and MSMs (7). In Côte d'Ivoire, the prevalence of HIV was estimated to be 29% in FSWs in 2012 (8) and 19% among MSMs (8). The National Program against HIV/AIDS (PNLS) requested operational research and data on the relevance of PrEP in order to better consider its future integration in the national algorithm of HIV prevention. A PrEP demonstration project (ANRS 12324 CohMSM) is currently being implemented among MSMs. Our research team was invited to explore the situation among FSWs in this country as a potential target for a PrEP program, knowing that PrEP was not yet available.

Although PrEP is effective when taken properly, the FEM-PREP (9) and VOICE (10) trials conducted among women from the general population in Southern and Eastern Africa showed low adherence to the treatment, resulting in a low or even null effect of PrEP. Similarly, PrEP implementation trials conducted among FSWs in Africa showed varying results regarding retention. In Benin, the retention rate after 10 months was 66% (11) and the overall retention rate after a complete follow-up of 28 months was 48% (12). In South Africa, it was 22% after 12 months (13) despite a high declared acceptability of PrEP before the implementation (14). Moreover, PrEP constitutes a new HIV prevention tool but does not prevent sexually transmitted infections (STIs) or unwanted pregnancies. It is therefore necessary to consider the overall needs of target populations in terms of sexual and reproductive health (SRH) (15).

In this context, in order to design a future PrEP program targeting FSWs, the ANRS 12361 PrEP-CI pilot study was implemented to explore additional needs that should be considered within such a program and to better describe FSWs currently reached by peer educators. This paper aims to describe the work and social environment of FSWs, their SRH needs and possible barriers for accessing care in two different settings in Côte d'Ivoire.

METHODS

Study setting

The ANRS 12361 PrEP-CI cross-sectional and mixed-methods study was designed and implemented with two Ivorian community-based organizations between September 2016 and March 2017. Aprosam works within the city of San Pedro and in the surrounding areas, particularly in villages close to farming businesses (coffee and cocoa exploitation). Espace Confiance operates in several districts of Abidjan, the economic capital of Côte d'Ivoire (Koumassi, Marcory, Treichville, Zone 4 and Port-Bouët with its beaches). Both of these nongovernmental organizations (NGOs) deliver HIV prevention and testing

services directly at prostitution sites (outreach activities) and provide HIV and SRH care services through a community clinic, for MSMs and FSWs.

Quantitative analysis of a survey questionnaire

From October 2016 to January 2017, a convenient sample of 1000 FSWs completed a 45-item standardized paper questionnaire that assessed their sociodemographic characteristics (age, nationality, level of education, number of children), their sexual practices and behaviors (duration and location of sex work, usual price of sexual intercourses, condom use with clients and regular partners, assault/coerced sexual intercourse), their knowledge and use of community health services (medical consultations, hepatitis B immunization, declared STIs, sex work during menstruations, use and knowledge of contraception, undesired pregnancies, abortion), *a priori* acceptability of a PrEP offer (perception of the risk to contract HIV, knowledge of any medicine (traditional or modern) to prevent HIV infection, interest in a modern medicine for HIV prevention, acceptance of a medical follow-up every three months), HIV infection (HIV testing, knowledge of HIV status of the regular partner).

The purpose of the quantitative study was not to be representative of all FSWs in Côte d'Ivoire but rather to represent FSWs who could be reached by the two partner NGOs and who could potentially benefit from PrEP in a future program. Therefore, the eligibility criteria for the quantitative survey included being 18 years or older, working at a prostitution site at the time of the survey, and never being tested for HIV or previously testing HIV-negative, as we performed a test to determine how many women were exposed to HIV and not diagnosed. In case of a positive result, in order to calculate incidence among this population, dried blood spot (DBS) sampling was performed to determine the window of infection through a recent infection testing algorithm adapted to the Ivorian context. FSWs visiting community clinics of the two NGOs for an HIV test were also included.

Recruitment of participants for this study was made possible by the Aprosam and Espace Confiance organizations' networks of peer educators and their access to the population. Peer educators enrolled FSWs who met eligibility criteria and agreed to participate, after reading an information sheet and signing a consent form. They carried out data collection in dedicated health centers and prostitutions sites during face-to-face interviews.

We compared the sociodemographic characteristics, sexual behaviors and reproductive health of participants surveyed in Abidjan and San Pedro. Due to the fact that it is not exactly a randomly taken sample but rather a convenient sample of women reached by the two NGOs, statistical tests such as Pearson's chi-square test or Fisher's exact test could not be formally used and were therefore not reported. Missing data were excluded from percentage calculations. All analyses were performed with Stata software (StataTM 12.0 College Station, Texas, USA).

Qualitative analysis of interviews

In addition to the quantitative survey, a qualitative study was conducted from November 2016 to December 2016 among a convenient sample of 66 FSWs recruited during the outreach activities of peer educators and with the aim to reach a maximum of different profiles of women (in terms of age, number of years working as FSWs, type of prostitution site).

Data were collected by a sociodemographer who carried out 22 in-depth interviews and eight focus group discussions (FGDs) that took place at prostitution sites in and around Abidjan and San Pedro. FSWs were interviewed about their sociodemographic characteristics (age, nationality, level of education, number of children, number of dependents, partner/husband), sex work (entry into prostitution, duration and location of sex work, usual price of sexual intercourses, mobility, regular clients, work during menstruations, future perspectives), risky practices and sexual behaviors (condom use depending on the type of practices, main perceived risk of unprotected sex, current possession of condoms, negotiation of (un)protected sex with clients and regular partners), community dynamics (relationships with the pimp, the owner of the prostitution site, other FSWs, peer educators from

NGOs, source of help in case of money, health or administrative issues), experiences with violence and discrimination (physical/moral violence from clients, partners, authorities, experiences of stigmatization, barriers in accessing health care or administrative procedures), knowledge and attitudes regarding HIV and STIs (perception of the risk to contract HIV depending on the type of practices, perception of the global risk to contract HIV and means used for prevention, frequency and location of HIV testing, physical signs of STIs and means used for treatment) , barriers to health care (untreated health issues, locations of care seeking), use of drugs and alcohol, barriers to and need for SRH services (knowledge and screening of cervical cancer, hepatitis B and C, tuberculosis, knowledge and use of contraception including emergency contraception, knowledge and recourse to social workers), *a priori* acceptability of a PrEP offer (knowledge of any medicine (traditional or modern) to prevent HIV infection, interest in a modern medicine for HIV prevention, acceptance of a medical follow-up every three months, issues arisen after the presentation of PrEP) .

Each in-depth interview and FGD was transcribed and uploaded into NVivo software (QSR International Pty Ltd. Version 11 Pro, 2016). The qualitative analysis followed two principles. First, a cross-sectional review, based on questions derived from the discussion guide, allowed for a thematic analysis. Main themes explored for this article were related to the access to care (visit of community health centers, use of mobile clinics, referral by peer educators, barriers in access to care and stigmatization) and to the potential interest, utility of PrEP and obstacles (unprotected sexual intercourses with clients and partners, risk perception and women's priorities, mobility and working periods, access to condoms, use of contraception, anticipation of high-risk sex and violent clients). We remained open to new themes as they emerged from the data in an inductive manner (e.g., condom breakage and self-medication). Second, we reviewed each interview or FGD as a whole in order to identify the chain of events leading each woman to not access healthcare or to not use condoms, for example. Interviews were translated verbatim from French to English by the authors.

Patient and public involvement

No patients were involved in the research design nor in the conduct of the study. Peer educators of six different community NGOs were involved in the development of the research questions during a workshop. The two selected NGOs in Abidjan and San Pedro participated in the design, recruitment and conduct of the study. Data from the quantitative survey and qualitative interviews were disseminated among the community through peer educators, who helped in the interpretation of results.

Ethical considerations

Research authorizations were obtained from the National Committee of Research Ethics within the Ivorian Ministry of Health and Public Hygiene (reference number: 057/MSHP/CNER-kp, delivered on June 28, 2016). Confidentiality was maintained, and data were anonymized. Informed consent was obtained by the investigator before each interview or questionnaire.

RESULTS

Main characteristics of participants

The characteristics of FSWs who participated in the quantitative survey are presented in Table 1. The median age was 25 (IQR=22-30) years in San Pedro and 24 (IQR=21-28) years in Abidjan. Compared to FSWs reached in Abidjan, those reached in San Pedro were less educated, more often Ivorian, more likely to be the mother of at least one child, were paid less money, and they worked less regularly but much more frequently in more than one city. FSWs in San Pedro were also more often in a relationship, and the interviews showed that their boyfriend was often their pimp.

Peer-educators conducted the survey during their on-site activities, which already consistently extended their working time. For logistic reasons, it was not possible to monitor the number of FSWs present on site, potentially eligible, examined for eligibility and included in the survey. Therefore we are not able to provide participation rates. However, peer educators reported that most FSWs confirmed for eligibility did accept to answer the questionnaire. The survey was stopped when we reached the expected number of 1000 FSWs (600 in Abidjan and 400 in San Pedro) and all FSWs included in the survey were analyzed.

Out of 66 interviewed FSWs, 26 agreed to provide their age: the median age was 28 (IQR=22-33) years. It became evident during the interview process that three FSWs were underage (<18). The interview participants were mostly Ivorian (n=44); the remaining third (n=22) was Nigerian. On each prostitution site visited, we decided to perform in-depth interviews or focus group discussions, depending on the practicality of the site (ambient noise, opportunity of privacy) and the time allowed. Every time, according to the type of interviews to be performed, one to three FSWS agreed to be interviewed individually or five to eight FSWs agreed to be interviewed as a group. Only two participants refused to be recorded as they were afraid to be recognized.

Table 1. Main characteristics of participants in the quantitative survey

Variables	All women n (%) n=1000	San Pedro n (%) n=400	Abidjan n (%) n=600
Median age (IQR) years	25 [21 – 29]	25 [22 – 30]	24 [21 – 28]
Age (years)			
≤ 24	470 (47.0)	168 (42.0)	302 (50.3)
[25 – 34]	431 (43.1)	181 (45.2)	250 (41.7)
≥ 35	99 (9.9)	51 (12.8)	48 (8.0)
Level of education			
No school	220 (22.1)	115 (28.9)	105 (17.6)
Primary school	382 (38.4)	163 (40.9)	219 (36.7)
Secondary school/University	393 (39.5)	120 (30.2)	273 (45.7)
Missing	*5*	*2*	*3*
Nationality			
Ivorian	690 (69.0)	312 (78.0)	378 (63.0)
Foreign	310 (31.0)	88 (22.0)	222 (37.0)
Has a boyfriend/husband			
Yes	714 (71.9)	317 (80.7)	397 (66.2)
No	279 (28.1)	76 (19.3)	203 (33.8)
Missing	*7*	*7*	*0*
Number of children			
0	426 (43.1)	132 (33.3)	294 (49.7)
1	301 (30.5)	122 (30.8)	179 (30.2)
2	155 (15.7)	82 (20.7)	73 (12.3)
≥ 3	106 (10.7)	60 (15.2)	46 (7.8)
Missing	*12*	*4*	*8*
Frequency of sex work			
Every day or almost every day	743 (75.3)	275 (69.3)	468 (79.5)
Sometimes	243 (24.7)	122 (30.7)	121 (20.5)
Missing	*14*	*3*	*11*
How many years sex work has been practiced			
≤ 2	479 (47.9)	176 (44.0)	303 (50.5)
≥ 3	521 (52.1)	224 (56.0)	297 (49.5)
Practiced sex work in more than one city			
Yes	268 (26.9)	198 (49.7)	70 (11.7)
No	727 (73.1)	200 (50.3)	527 (88.3)
Missing	*5*	*2*	*3*
Where/how clients are contacted[1]			
Brothel	302 (30.2)	114 (28.5)	188 (31.3)
Beach	129 (12.9)	71 (17.7)	58 (9.7)
Bar/“maquis”	471 (47.1)	200 (50.0)	271 (45.2)

Street	145 (14.5)	47 (11.8)	98 (16.3)
By phone (through hotel owners)	216 (21.6)	123 (30.7)	93 (15.5)
Hotel	265 (26.5)	156 (39.0)	109 (18.2)
Home	131 (13.1)	66 (16.5)	65 (10.8)
Number of clients during last day of work			
≤ 4	706 (70.8)	233 (58.3)	473 (79.2)
≥ 5	291 (29.2)	167 (41.7)	124 (20.8)
Missing	*3*	*0*	*3*
How much did the last client pay [in FCFA (USD)]			
≤ 1999 (~3.50)	238 (23.8)	152 (38.0)	86 (14.3)
[2000 – 4999] (3.50 – 8.75)	287 (28.7)	138 (34.5)	149 (24.8)
[5000 – 9999] (8.75 – 17.50)	241 (24.1)	69 (17.2)	172 (28.7)
≥ 10000 (17.50)	234 (23.4)	41 (10.3)	193 (32.2)
Ever suffered assault/coerced sexual intercourse			
Yes	115 (11.7)	41 (10.5)	74 (12.6)
No	866 (88.3)	351 (89.5)	515 (87.4)
Missing	*19*	*8*	*11*

[1]Most FSWs meet clients in more than one location: the total is not equal to 100%.

High HIV exposure despite the use of condoms

Overall in the questionnaire, 79% of FSWs in San Pedro and 92% of FSWs in Abidjan reported consistent condom use with their clients (Table 2). However, the question about regular use of condoms could not fully capture actual condom use; there were several situations where FSWs had unprotected sexual intercourse. 23% would accept condomless sex for a large sum of money. This exposure to unprotected sex was reported as well by several FSWs during the qualitative interviews and was explained by the critical need for money.

"*And when you look back at your week, you didn't even make 2000 francs. You begin to think about it. Ah! Honestly, I do accept* [unprotected sex]." (FGD, San Pedro)

Several interviewed women also attested that violent clients had assaulted them and refused to use condoms.

"They brutalize us. Often, they don't wear any condom. They force us. Often even, young junkies, they can come upon us. And they assault us." (In-depth interview, San Pedro, 28 years old).

Moreover, 94% of FSWs in San Pedro and 89% of FSWs in Abidjan reported not systematically using condoms with their regular partner, even though only 10% and 21%, respectively, knew their partner's HIV status. This practice was reported during interviews as well, even though the women explained that they perceived a risk associated with condomless intercourse. During a focus group discussion that took place in a slum in San Pedro, above a bar where FSWs meet clients, interviewed women were discussing about their regular partners. One of them stated that her boyfriend asked her to not use any condoms to prove her trust.

"*This guy, he tells you I'm faithful to you. I want us to have sex without condoms to show trust. That's why I think that the scary person is your boyfriend, not the client*." (FGD, San Pedro)

Another one explained the lack of trust in her partners was balanced by the fact that they would protect her from violent clients.

"Love is the only weapon where you sleep with your enemy (laughs). I mean, he's your closest enemy. He's the one who can kill you because he's not with you only. But you say, he's my official. You need him because he protects you." (FGD, San Pedro)

It seemed that the women were not in a strong negotiation position, and accepted to have condomless sex despite knowing their partners had concomitant relationships.

Furthermore, 51% of FSWs in San Pedro and 43% of FSWS in Abidjan had received their last HIV test less than 6 months before. However, 7% in San Pedro and 15% in Abidjan had never been tested before the survey.

So, if condom use was high in general, most FSWs were still exposed to HIV: 59% had at least one instance of condomless intercourse over the previous week. FSWs' responses to the first question assessing condom use might refer to "typical use" as opposed to specific circumstances.

During qualitative interviews, we presented PrEP as a medicine that could protect them against HIV if properly taken and would imply to have a regular medical follow-up. PrEP was not yet available in Côte d'Ivoire at the time of the interviews and women had never heard about it. However, several questions emerged in relation with concrete matters such as side-effects, cost, current availability in pharmacies, compatibility with pregnancy, appropriate reaction if one or more pills are forgotten, etc. Many interviewed women considered PrEP as useful to prevent HIV transmission from their partners in particular, as they felt obligated to not use any condoms with them.

"*Danger itself, it comes from the one beside me. That pill is welcome, because by taking it I protect myself against the one beside me*." (FGD, San Pedro)

PrEP was presented similarly, although more briefly, in the questionnaire. The large majority of surveyed FSWs (98.6%) showed interest in a medicine that could provide efficient protection against HIV, even if it required a medical follow-up every three months (99.4%).

Table 2. Use of condoms and HIV exposure in the quantitative survey

Variables	All women n (%) n=1000	San Pedro n (%) n=400	Abidjan n (%) n=600
Condom use with clients			
Never	9 (0.9)	3 (0.8)	6 (1.0)
Sometimes	29 (3.0)	17 (4.4)	12 (2.1)
Often	86 (8.9)	58 (15.1)	28 (4.8)
Always	837 (87.0)	304 (79.2)	533 (92.1)
Does not know/does not want to answer	2 (0.1)	2 (0.5)	0 (0.0)
Missing	*37*	*16*	*21*
Use of condom with boyfriend/husband			
Never	370 (53.2)	157 (50.5)	213 (55.3)
Sometimes	115 (16.5)	61 (19.6)	54 (14.0)
Often	123 (17.7)	49 (15.8)	74 (19.2)
Always	62 (8.9)	19 (6.1)	43 (11.2)
Does not know/does not want to answer	26 (3.8)	25 (8.0)	1 (0.3)
Missing	*18*	*6*	*12*
Acceptance of condomless sexual intercourse in exchange for a large sum of money			
Never	764 (77.4)	251 (63.9)	513 (86.4)
Sometimes	79 (8.0)	52 (13.2)	27 (4.5)
Often	92 (9.3)	55 (14.0)	37 (6.2)
Always	12 (1.2)	6 (1.5)	6 (1.0)
Does not know/does not want to answer	40 (4.0)	29 (7.4)	11 (1.9)
Missing	*13*	*7*	*6*
At least one instance of condomless intercourse over last 7 days[1]			
Yes	220 (58.8)	152 (72.0)	68 (41.5)
No	154 (41.1)	59 (28.0)	95 (57.9)
Does not want to answer	1 (0.2)	0 (0.0)	1 (0.6)
Missing	*625*	*189*	*436*
Last HIV test (months)			
< 6	458 (45.9)	230 (50.9)	255 (42.6)
[6 – 12[	239 (24.0)	98 (24.6)	141 (23.6)
≥ 12	182 (18.2)	69 (17.3)	113 (18.9)
Never	114 (11.4)	26 (6.5)	88 (14.7)
Does not know/does not want to answer	4 (0.4)	3 (0.7)	1 (0.2)

Missing	*3*	*1*	*2*
Knowledge of boyfriend/husband's HIV status			
Yes	121 (17.4)	33 (10.6)	88 (23.0)
No	573 (82.3)	279 (89.1)	294 (768)
Does not want to answer	2 (0.3)	1 (0.3)	1 (0.3)
Missing	*18*	*4*	*14*
Interest in a medicine protecting against HIV			
Yes	982 (98.6)	394 (99.0)	588 (98.3)
No	11 (1.1)	2 (0.5)	9 (1.5)
Does not know	3 (0.3)	2 (0.5)	1 (0.2)
Missing	*4*	*2*	*2*
If yes, would agree to a medical follow-up every 3 months			
Yes	964 (99.4)	391 (99.7)	573 (99.1)
No	5 (0.5)	1 (0.3)	4 (0.7)
Does not know	1 (0.1)	0 (0.0)	1 (0.2)
Missing	*12*	*2*	*10*

[1]This variable was added during the survey; for this reason, some participants did not answer the question.

Beyond HIV, many unmet SRH needs exist

In total, 43% of the survey participants had at least one unwanted pregnancy, and 50% had at least one abortion in their lifetime (Table 3). Only 39% of surveyed FSWs were using a contraceptive method other than condoms; among them, most FSWs in Abidjan mentioned taking the pill (70%) compared to only 33% of FSWs in San Pedro, where 35% declared using an implant. Unfortunately, child desire was not asked in the quantitative survey, which does not allow us to calculate the unmet need for contraception among FSWs. However, as a proxy, it appeared that most of the interviewed FSWs did not want a child at the moment.

"*My main risk, it is to not get pregnant because I'm still a schoolgirl. If I get pregnant, who will take care of it* [the baby]*?"* (In-depth interview, Abidjan, 18 years old)

However, women explained during interviews that they feared becoming sterile because of contraceptive means, especially the pill.

"They [peer educators from the community-based NGO] told me about the pill, but I refused because I don't have children yet. I don't want to have problems in the future." (In-depth interview, Abidjan, 18 years old)

"*That's what makes me tired. I'm afraid because I don't have children yet. That's my problem, otherwise for diseases, well, there are condoms.*" (In-depth interview, San Pedro, 19 years old)

Moreover, only half of the survey participants knew about emergency contraception, among which 36% knew only nonmedical means.

Additionally, 36% of survey participants practiced sex work during menstruation, mainly using tampons (62%) or cold water (24%) to stop the bleeding.

Finally, 79% of FSWs in San Pedro and 55% of FSWs in Abidjan reported contracting an STI over the past 12 months. Even though half of the questionnaire survey participants thought they were very exposed to HIV infection, the interviewed FSWs often declared being preoccupied by other diseases as well, such as STIs or cancer.

"But we, every time, when we go in the bush, it's not only AIDS that kills. There are several diseases. *Today we talk about cervical cancer. So I think it's not only AIDS we should get protected from. We have to protect ourselves from many diseases that are sexual*." (FGD, San Pedro)

Despite the work of peer educators at prostitution sites, few surveyed FSWs visited the dedicated community clinics, with 76% in San Pedro and 61% in Abidjan consulting a health practitioner over the past year, among which 40% in San Pedro and 17% in Abidjan went to a dedicated facility. In interviews,

some FSWs reported the inconvenient opening times and/or location or the fear of being identified as an FSW in the clinic area as reasons for not visiting these clinics. In the event of condom breakage, FSWs usually relied on self-medication. For example, a young woman described the beverages she would use for a vaginal douche.

"*I'm going to buy Coke with Nescafe. It's for cleaning everything falling down."* (In-depth interview, Abidjan, 17 years old)

They act similarly in case of suspicion of an STI.

"*Before going to the clinic, we try traditional plants and medicines first*." (FGD, San Pedro)

Table 3. Sexual and reproductive health in the quantitative survey

Variables	All women n (%) n=1000	San Pedro n (%) n=400	Abidjan n (%) n=600
Had at least one undesired pregnancy			
Yes	416 (42.9)	173 (45.1)	243 (41.5)
No	554 (57.1)	211 (54.9)	343 (58.5)
Missing	*30*	*16*	*14*
Had at least one abortion			
Yes	488 (50.2)	195 (50.4)	293 (50.0)
No	485 (49.8)	192 (49.6)	293 (50.0)
Missing	*27*	*13*	*14*
Use of contraception other than condom			
Yes	391 (39.1)	193 (48.3)	198 (33.0)
No	608 (60.8)	206 (51.5)	402 (67.0)
Does not know	1 (0.1)	1 (0.2)	0 (0.0)
If yes, which contraceptive method[2]			
Pill	204 (52.0)	65 (33.5)	139 (70.2)
Injectable	91 (23.3)	55 (28.5)	36 (18.2)
Implant	83 (21.2)	68 (35.1)	15 (7.6)
Other method[1] (nivaquine, spice, traditional medicine, etc.)	24 (6.1)	13 (6.7)	11 (5.6)
Knowledge of emergency contraception			
Yes	472 (48.4)	195 (50.8)	277 (46.9)
No	497 (51.0)	183 (47.7)	314 (53.1)
Does not know	6 (0.6)	6 (1.5)	0 (0.0)
Missing	*25*	*16*	*9*
If yes, type of emergency contraception known[2]			
Morning-after pill	304 (64.1)	100 (49.7)	204 (74.7)
Other[1] (antibiotic, coffee, soda, salted water, and lemon)	170 (35.9)	101 (50.3)	69 (25.3)
Sex work during menstruation			
Yes	363 (36.4)	154 (38.5)	209 (34.9)
No	635 (63.6)	246 (61.5)	389 (65.1)
Missing	*2*	*0*	*2*
If yes, tool used for sex work during menstruation[2]			
Wash with ice-cold water	86 (24.0)	37 (24.2)	49 (23.7)
Piece of ice	26 (7.3)	11 (7.2)	15 (7.3)
Tampon	222 (62.0)	105 (68.6)	117 (57.1)
Other tools[1] (hot water, soapy water, cotton, etc.)	49 (13.7)	12 (7.8)	37 (17.9)
Self-reported STI (last 12 months)			
Yes	639 (64.7)	312 (78.8)	327 (55.2)
No	349 (35.3)	84 (21.2)	265 (44.8)
Missing	*12*	*4*	*8*
Last medical consultation			
Less than 3 months	195 (19.6)	101 (25.4)	94 (15.7)
3 – 12 months	475 (47.7)	202 (50.8)	273 (45.6)
More than a year	258 (25.9)	79 (19.8)	179 (29.9)
Never consulted	68 (6.8)	16 (4.0)	52 (8.7)

Missing	*4*	*2*	*2*
If ever consulted, site of the last consultation with a doctor/nurse			
Dedicated facility	225 (26.3)	141 (40.5)	84 (16.6)
Public facility	415 (48.6)	123 (35.3)	292 (57.7)
Private facility	213 (24.9)	83 (23.8)	130 (25.7)
Does not know	1 (0.1)	1 (0.3)	0 (0.0)
Missing	*74*	*34*	*40*

[1]"Other" categories describe participants' specific answers.
[2]Several possible answers.

DISCUSSION

Both the quantitative and qualitative results showed that FSWs were highly exposed to HIV despite their use of condoms. There were in fact a variety of situations in which the surveyed FSWs had condomless sex. First, the large majority did not use condoms with their regular partner despite their acknowledged concurrent sexual partnerships. They experienced coercion on the part of their male partners, questioning their faith in the relationship. Having condomless sex is a proof of trust that is difficult to negotiate, and women experience low decision-making power when facing the primacy of men's sexual pleasure (17), in a context where gender norms reinforce male domination over women (18). Second, some FSWs accepted condomless sexual intercourse for a large sum of money, especially when they had had few previous clients. Financial need associated with low prices of sexual intercourses and irregular weekly earnings drove some FSWs to engage in condomless sex as a way to earn more. Third, the violence or the threat thereof that FSWs faced sometimes prevented them to negotiate condom use. Different studies showed that women who are victims of abuse are less likely to use condoms with their clients than those who are not (19,20). It has been suggested that sexual and physical assaults from clients can lead to condom breakage (21). Performing an illegal activity can also compel women, especially in the street, to negotiate quickly with clients at the expense of condom use. The situation appeared even worse in some rural areas around San Pedro, where the interviewed FSWs revealed that they could not buy any condoms in the village, as there was no point of sale. According to WHO, the main criteria to implement PrEP in a population is the high incidence of HIV in that population (6). Thus, in a complementary study within the PrEP-CI project (not yet published), we calculated the incidence among the 1000 surveyed FSWs: through a recent infection testing algorithm adapted to the Ivorian context, we found that the incidence among surveyed FSWs was 2.2% (1.5% in Abidjan and 3.2% in San Pedro) (16). In this context, it appears that PrEP could be an appropriate tool for preventing HIV in this population.

The majority of interviewed and surveyed FSWs had low awareness and knowledge of PrEP before our study but most of them were highly willing to use this medicine despite the constraint of regular medical follow-up. Participants felt PrEP would give added protection against infection, in particular with regular partners. A study in Kenya had similar findings and suggested to promote PrEP through outreach activities for sex workers (22). However, a PrEP implementation trial in South Africa showed low adherence despite high declared acceptability before the implementation (14). For this reason we were attentive to challenges that might hinder PrEP uptake and adherence for FSWs.

Our results showed that FSWs faced many unmet needs regarding SRH beyond HIV prevention and treatment. Inconsistent condom use exposed FSWs to STIs (23,24) and undesired pregnancies (25), which could increase their mortality and morbidity (26). The prevalence of contraceptive use was low in the surveyed population despite their high risk of undesired pregnancy due to the common fear of contraception causing sterility (27). Furthermore, using ice or tissues to continue sex work during menstruation has been proven to be a source of bacterial infections (28). These needs could be

addressed in the community clinics of the two NGOs. However, as shown in other studies, FSWs faced many obstacles in accessing SRH care, because of the high costs or distance of the sites (29), the stigmatizing and discriminating attitudes of some health practitioners, the FSWs' social and economic marginalization, and restrictive laws related to their activity (30). FSWs thus preferred advice from their peers or self-medication. Moreover, peer educators from both NGOs expressed that public policies and international donors in Côte d'Ivoire currently focus on the identification and referral of new cases of HIV-positive FSWs, while HIV-negative women have limited access to care as stated above. A PrEP program requires a medical follow-up every three months and thus implies to consider the chronic follow-up of HIV-negative women. Integrating SRH services (such as contraception or STI testing and treatment) into a PrEP program could be a way to attract them into care and follow-up, as surveyed and interviewed FSWs expressed concerns about other diseases and health needs than just HIV prevention and care.

In addition, FSWs in San Pedro appeared to be in a more precarious situation than those in Abidjan due to their lower education level, higher number of children, irregularity of work, multiplicity of clients and work locations, and the lower price of sexual intercourse. They were also more likely to have condomless intercourse, notably for a large sum of money, and to report having had an STI over the past year. This can be explained by the fact that a large percentage of FSWs in San Pedro came to the area during the period of coffee and cocoa exploitation (September-December), which brought many migrant workers; this results in less stability and security. The high mobility of these women generates "seasons of risk" (31), i.e., times when an individual might face an increased risk of HIV infection. It is paramount to take this into account when implementing daily PrEP for these women (32); they are the population most likely to regularly suspend their PrEP use. Developing mobile clinics that deliver HIV and SRH care services directly at prostitution sites could mitigate the issue of FSWs' mobility and address barriers in access to care, such as distance between prostitution sites and clinics or stigmatization associated with their activity.

FSWs' needs for PrEP cannot be understood without additionally considering the broader contexts in which their risk of exposure to HIV is situated: the context of their work, their relationships and their concerns about family planning or stigmatization, etc. This is important information to consider if a PrEP program is to successfully serve this at-risk population. In order to address women's experiences and concerns, a global SRH care package delivered through both community clinics and mobile clinics on prostitution sites appear essential. Several studies related to PrEP and SRH needs of FSWs showed as well that combination prevention approaches are necessary. First, as pointed by a study in Zimbabwe (33), women need to perceive the risk of getting infected by HIV and to be able to access health services in order to take PrEP daily. Second, as shown by Dhana *et al.* in a systematic review (34), there is a lack of coordination between SRH and HIV services dedicated to FSWs in Africa; service delivery models should integrate SRH services. Our results bring two considerations. First, in order to minimize stigma related to entry into care, services for HIV-positive and services for HIV-negative should not be dissociated. Second, rather than a PrEP program with additional services, a paradigm shift toward a patient-focused approach is needed, offering SRH services in which PrEP is an option but not mandatory. Not taking these issues into account might result in low adherence and impact the efficacy of a PrEP program.

A strength of this study is the use of mixed-method allowing us to better describe and understand challenges of PrEP implementation among FSWs in Côte d'Ivoire, as well as the strong collaboration with two NGOs helping us to reach the FSWs. Yet, this study has some limitations. First, as it focused on FSWs reached by two NGOs, the included population was probably more likely to know about HIV prevention and to access SRH care. In addition, our sample did not include occasional or undeclared

FSWs. As such, the results cannot be extrapolated to all FSWs working inside or around Abidjan and San Pedro but can provide an operational perspective for developing healthcare services. A matter of concern, pointed out by field workers and data collected, are the young underage FSWs (three interviews were conducted with FSWs aged less than 18 on the beaches of Abidjan). Ivorian law authorizes HIV testing for teenagers aged 16 and 17, without parental consent. What about other care and services that cannot be delivered to them in the absence of consent?

CONCLUSIONS

Implementing PrEP among FSWs in West Africa, such as in Côte d'Ivoire, is not only about providing a new prevention tool but is also an invitation to consider the chronic follow-up of HIV-negative FSWs. A global care package should be offered to FSWs, including HIV prevention and care, STI screening and treatment, contraception, menstrual management counseling and HBV screening, vaccination and medical treatment. In addition, PrEP initiation should not limit access to SRH services; conversely, SRH services could be a way to attract FSWs to HIV prevention. Beyond reducing the risk of HIV among FSWs and their partners, PrEP provides an opportunity to improve their health condition more globally.

While current policies focus on only HIV-infected women and on the importance of testing new FSWs, our results highlight the importance of developing a people-focused approach, as opposed to an "HIV-focused approach", that integrates all SRH needs when transitioning from PrEP efficacy trials to implementation (15).

6. Conflict of interest statement

There are no conflicts of interest.

7. Author Statement

JL, SE and CD designed the ANRS 12361 PrEP-CI study. JMM and MN implemented the quantitative survey with the support of CA and SK. VB conducted the qualitative interviews. VB and JL developed the research question addressed in this paper. VB did the qualitative analysis, and MN did the statistical analysis. VB wrote the manuscript with the support of JL, MP and MN. All authors contributed to the interpretation and presentation of the findings. All authors approved the final version of the manuscript for submission.

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10. Data sharing statement

Dataset are available upon request on Zenodo.

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