



HIV and induced abortion among migrants from sub-Saharan Africa living in Île-de-France: Results of the PARCOURS study

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ABSTRACT

Introduction: HIV heavily affects sub-Saharan African women living in France and can impact reproductive decisions. It was investigated whether HIV was associated with induced abortion in pregnancies held after migration by women from sub-Saharan Africa living in Île-de-France.

Methods: We used data on ANRS Parours, a retrospective life event survey conducted in health facilities in the metropolitan region of Paris, between February 2012 and May 2013, with migrants from sub-Saharan Africa. Data on the history of pregnancies were collected among women living with HIV (HIV group) and those attending primary care centers (reference group). We investigated 242 women in the reference group, who had 729 pregnancies, and the 277 women in the HIV group, who had 580 pregnancies. The association between abortion and HIV was evaluated using clustered logistic models, successively adjusted for women and pregnancy characteristics, for the whole sample, and stratified by pregnancy intendedness.

Results: In the reference group, 11.0 % of pregnancies were terminated in abortion, the same situation as 14.1 % in the HIV group ($p = 0.124$). HIV was not associated with abortion in the crude and adjusted models. However, after adjustments, HIV exhibited a non-significant trend towards reducing the likelihood of abortion, particularly when considering the intendedness of pregnancy variable.

Conclusions: Factors that shape the overall context of women's lives and pregnancies, which are shared with the reference group, may have a more significant impact on reproductive decision-making than HIV alone. Health services must pay attention to the intendedness of pregnancies, providing advice and support on the prevention of mother-to-child transmission to women living with HIV who intend to become pregnant, in addition to strengthening the provision of family planning and the prevention of unintended pregnancies.

1. Introduction

Although nowadays protocols for the prevention of mother-to-child transmission (PMTCT)¹ are widely available (Tsague and Abrams, 2014), being diagnosed with HIV can still be one of the factors that influence the voluntary termination of pregnancy (MacCarthy et al., 2014; de Bruyn, 2012). However, there is little information about whether HIV impacts reproductive decisions in migrants.

HIV/AIDS heavily affects sub-Saharan African people living in

France. In 2018, the majority of new diagnoses (56 %) occurred in people born abroad, of which 66 % were born in sub-Saharan Africa. The proportion of people born abroad newly diagnosed with HIV was higher among women (81 %) than among men (43 %) (Santé Publique France 2019).

In 2015, women born in sub-Saharan Africa accounted for 6 % of all live births in France. These women had a higher maternal mortality ratio (26.9 per 100,000 live births) compared to those born in France, with a relative risk of 3.4 (95 %CI 2.2–5.1), which indicates social inequities in

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¹ PMTCT: prevention of mother-to-child transmissionWLHA: women living with HIV/AIDSWNLHA: women not living with HIV/AIDS

maternal health and suboptimal prenatal care in this population (Saugrain, 2017). Furthermore, although virtually all women from sub-Saharan Africa are tested for HIV during pregnancy in France (Tran et al., 2019), a French (Jasseron et al., 2008) and an European cohort (Favarato et al., 2018) indicate that migrants, in general, are diagnosed later during pregnancy, which can influence its outcome.

A cohort held in France showed that 62.9 % of pregnancies among women living with HIV/AIDS (WLHA) were finished by abortion (Bongain et al., 2002). However, the association between HIV and abortion is still controversial in the literature. Although studies carried out in Vietnam (Bui et al., 2010), Brazil (Pilecco et al., 2014; Pinho A de et al., 2017; Barbosa et al., 2009), and the United Kingdom (Boisson, 2002) indicate the existence of an association between HIV and abortion, others done in Italy (Ammassari et al., 2013) and the United States of America (Massad et al., 2004), did not found a statistically significant association. Research in sub-Saharan African countries such as Ivory Coast (Schwartz et al., 2015; Brou et al., 2009), Nigeria (Ikechebelu et al., 2002; Bankole et al., 2014), and Zambia (Bankole et al., 2014) also did not find an association between HIV and abortion. Furthermore, even studies that found an association between HIV and abortion suggest that it may be partially explained by other factors, such as the number of sexual partners (Barbosa et al., 2009). Others indicate that, although abortions are more frequent among WLHA than among women living with HIV/AIDS (WNLHA), they are mostly done before diagnosis (Pilecco et al., 2014), which may suggest that this association happens due to the differential access to family planning services.

Considering the above, the objective of this study was to assess whether HIV is associated with induced abortion in pregnancies held after migration by women from sub-Saharan Africa living in Île-de-France (metropolitan region of Paris).

2. Material and methods

2.1. Sampling procedures

Data came from the PARCOURS survey, a cross-sectional study based on a life-event history approach, with a stratified probability sample. It was conducted between February 2012 and May 2013 and included two groups of migrants from sub-Saharan Africa living in Île-de-France: 926 people receiving HIV/AIDS care (HIV group) and 763 attending primary care centers (reference group). The inclusion criteria were being born in sub-Saharan Africa, aged 18 to 59, being diagnosed more than three months before the interview for the HIV group, or having neither an HIV nor a hepatitis B diagnosis, for the reference group. The sample size was calculated considering a statistically significant risk threshold of 5 % with a power of 80 % for specific indicators of sexual risk behaviors and social situations. More details on sampling design and data collection are described at Clinical Trials (<http://clinicaltrials.gov>) under register NCT02566148. The French National Commission for Data Protection and Liberties (CNIL, decision DR-2011-484) approved this study, and informed consent was obtained from all interviewees.

In this paper, only pregnancies that occurred after arrival in France and women who declared having pregnancies after the migration were analyzed (pregnancies occurring in the year of migration were excluded because, due to data collection limitations, it is not possible to determine whether they occurred before or after migration). Data from the HIV group before diagnosis were also excluded. Thereby, the final analytical sample included 242 women in the reference group, who had 729 pregnancies after migration, and 277 women in the HIV group, who had 580 pregnancies after migration and HIV diagnosis.

2.2. Measures and statistical analysis

The proportion of abortion was estimated using two measures as follows: the number of women who reported having had at least one abortion divided by the total number of women who had at least one

pregnancy (considering sample design and weights) and the number of pregnancies that resulted in induced abortion divided by the total number of pregnancies. The analysis was carried out based on the understanding that there are characteristics common to pregnancies and linked to the woman, while others are specific to the context of each pregnancy.

Initially, women in the HIV group were compared to those in the reference group regarding sociodemographic variables using a Chi-square analysis, considering the sample weights and design (Table 1). Variables such as age at interview (18–34, 35–44, 45–59), level of education (none/elementary school, high school, university or more), the practice of religion at the time of the interview (yes or no), and the number of partners throughout life (1–2, 3–5, 6 or more) were included in this analysis. Hereafter, context-related characteristics of each pregnancy were also evaluated for both groups, using a clustered Chi-square analysis. These determinants included induced abortion (yes or no), age at pregnancy (until 24, 25–34 and 35 or more), contraception use at pregnancy beginning (yes or no), intendedness (intended, mistimed, or unwanted), type of relationship (long-term only or other relationship arrangements), number of previous children (0, 1–2, 3 or more – including children born before arrival in France/before diagnosis – for the HIV group), history of induced abortion (yes or no – including abortions that occurred before arrival in France/before diagnosis – for the HIV group) and time since migration (1–2 years, 3–6 years and 7 years or more) (Table 2).

A cluster logistic model was used to determine the association between HIV and induced abortion. Cluster analysis was selected due to the greater likelihood of similar outcomes in pregnancy occurring within the same woman than between different women. In model 1, the crude association between HIV and induced abortion was evaluated. In model 2, this association was adjusted for variables related to women (age at interview, level of education, religion, and the number of partners). In model 3, variables from model 2 were included in addition to those related to the specific context of pregnancy (age, contraception, intendedness, type of relationship, number of previous children, history of induced abortion, and time since migration). As the interaction between the intendedness of pregnancy and HIV status was detected, stratified analysis by intendedness of pregnancy was performed to

Table 1
Sociodemographic characteristics of migrant women from Sub-Saharan Africa living in Île-de-France who had at least one pregnancy after migration, according to the HIV and reference groups. PARCOURS study, 2012/2013, France.

	HIV (n = 277) ^{a,b}	Reference (n = 242) ^b	p ^c
Abortion			
No	60.5 % (164)	66.5 % (165)	0.327
Yes	39.5 % (113)	33.5 % (77)	
Age at interview			0.086
18–34 years old	29.2 % (79)	31.6 % (78)	
35–44 years old	51.8 % (145)	38.7 % (79)	
45–59 years old	19.0 % (53)	29.7 % (85)	
Level of education			0.537
None/Elementary school	21.1 % (56)	20.9 % (52)	
High School	57.4 % (162)	52.4 % (132)	
University or more	21.5 % (59)	26.7 % (58)	
Religious practice			0.064
No religion	3.1 % (29)	7.5 % (12)	
Regular/Not regular	96.9 % (244)	92.5 % (225)	
Number of lifetime partners			<0.001
1–2	18.2 % (46)	42.7 % (102)	
3–5	39.9 % (111)	33.9 % (87)	
6 or more	41.9 % (120)	23.5 % (53)	

^a Only women who had already had the HIV diagnosis at pregnancy were considered.

^b Sample size may differ due to missing values.

^c Comparison between women in the HIV and in the reference groups using a Chi-square test, considering the weights and sample design.

Table 2

Context-related characteristics of pregnancies occurring after migration among women from Sub-Saharan Africa living in Île-de-France, according to the HIV and reference groups. PARCOURS study, 2012/2013, France.

	HIV (n = 580) ^{a,b}	Reference (n = 729) ^a	p ^c
Induced abortion			
No	85.9 % (498)	89.0 % (649)	0.124
Yes	14.1 % (82)	11.0 % (80)	
Age at pregnancy			
Until 24 years old	10.2 % (59)	20.2 % (147)	0.001
25 to 34 years old	59.8 % (347)	54.2 % (395)	
35 years old or plus	30.0 % (174)	25.6 % (187)	
Contraceptive use at the beginning of the pregnancy			
No	79.9 % (462)	82.6 % (602)	0.397
Yes	20.1 % (116)	17.4 % (127)	
Intendedness of the pregnancy			
Intended ^d	69.3 % (399)	73.8 % (537)	0.003
Mistimed ^e	12.0 % (69)	15.5 % (113)	
Unwanted	18.7 % (108)	10.7 % (78)	
Type of relationship			
Long term only	85.3 % (495)	94.4 % (688)	<0.001
Other relationship arrangements ^f	14.7 % (85)	5.6 % (41)	
Number of children born alive before the considered pregnancy^g			
0	25.7 % (149)	26.5 % (193)	0.865
1–2	52.8 % (306)	50.9 % (371)	
3 or more	21.5 % (125)	22.6 % (165)	
Induced abortion before the considered pregnancy^h			
No	72.4 % (420)	77.5 % (565)	0.182
Yes	27.6 % (160)	22.5 % (164)	
Time since migration			
1–2 years	18.4 % (107)	18.7 % (136)	0.137
3–6 years	38.3 % (222)	32.1 % (234)	
7 or more years	43.3 % (251)	49.2 % (359)	

^a HIV group only.

^b Sample size may differ due to missing values.

^c Only pregnancies that occurred after HIV diagnosis were considered.

^d Comparison between pregnancies held by women in the HIV group and by women in the reference group using a clustered Chi-square test.

^e Pregnancies had at the right time or wanted earlier.

^f Pregnancies wanted later or by women who did not think about getting pregnant.

^g Long term relationship+other, short relationship, transactional, short relationship+transactional or no relationship at all.

^h It included children born before arrival in France/before diagnosis (for the HIV group).

ⁱ It included abortions that occurred before arrival in France/before diagnosis (for the HIV group).

understand how the association between HIV and abortion behaved in each subgroup (Table 3). Regression estimates were reported as odds ratio (OR) with 95 % confidence intervals (CIs). Analyses were performed in Stata 16 (Stata Corp).

3. Results

Among the respondents, 77 in the reference (33.5 %), and 113 in the HIV group (39.5 %) declared having at least one induced abortion after arrival in France, without a statistically significant difference ($p = 0.327$). While women in the reference group were more evenly distributed across different age groups at the time of the interview, those in the HIV group were more concentrated in the 35 to 44 age range. Women in the HIV group more frequently reported practicing religion irregularly/regularly and had a higher number of partners compared to those in the reference group. Both groups did not differ in terms of education level (Table 1).

Pregnancies in the HIV group were more frequently terminated in abortion (14.1% vs. 11.0 %), occurred at older ages, were more frequently unwanted and less frequently intended, less often resulted from long-term relationships only, were more frequently preceded by previous abortions, and occurred within a shorter time since migration compared to pregnancies in the reference group. Both groups did not show statistically significant differences in terms of contraceptive use at the beginning of pregnancy and number of live-born children prior to the index pregnancy (Table 2).

Table 3 presents the association between abortion and HIV in three ways – crude (model 1), adjusted for woman characteristics (model 2), and adjusted for woman and pregnancy characteristics (model 3) – both for the whole sample and stratified by intendedness of pregnancy. In models that consider the whole sample, no statistically significant association between HIV and abortion was identified. In the stratified models, there appears to be a differentiated effect according to the

Table 3

Association between HIV and induced abortion in pregnancies occurred in migrant women from Sub-Saharan Africa living in Île-de-France after arrival in France evaluated through unadjusted and adjusted cluster logistic models, for the whole sample and stratified by pregnancy intendedness. PARCOURS study, 2012/2013, France.

	Whole sample OR (CI95 %)	Stratified by intendedness – intended ^a OR (CI95 %)	Stratified by intendedness – mistimed ^b OR (CI95 %)	Stratified by intendedness – unwanted OR (CI95 %)
Model 1				
Reference	1	1	1	1
HIV	1.34 (0.92–1.93)	2.18 (1.08–4.41)*	0.51 (0.17–1.51)	0.53 (0.25–1.12)
Model 2				
Reference	1	1	1	1
HIV	0.98 (0.67–1.43)	1.56 (0.77–3.17)	0.27 (0.08–0.92)*	0.41 (0.19–0.90)*
Model 3				
Reference	1	1	1	1
HIV	0.67 (0.41–1.10)	1.43 (0.71–2.87)	0.27 (0.07–1.01)	0.47 (0.20–1.08)

OR=Odds Ratio. CI95 %=Confidence Interval 95 %. *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$ (two-tailed test). Model 1: unadjusted logistic model, using pregnancy as primary sample unity (PSU). Model 2: an adjusted logistic model for variables related to women (age at interview, level of education, religious practice, number of lifetime partners), using pregnancy as PSU. Model 3: an adjusted logistic model for variables related to women and to the specific context of pregnancy (age at pregnancy, contraceptive use at the beginning of the pregnancy, intendedness of pregnancy, type of relationship, number of children born alive before the considered pregnancy, induced abortion before the considered pregnancy and time since migration) using pregnancy as PSU.

^a Pregnancies were had at the right time or wanted earlier.

^b Pregnancies wanted later or for women who did not think about getting pregnant.

categories of pregnancy intendedness: when pregnancies are intended, HIV seems to increase the chances that the pregnancy will end in abortion (in unadjusted analysis), and when they are mistimed or unwanted, HIV seems to reduce the chances that they will be aborted, compared to pregnancies of women in the reference group. However, especially after adjustments, these effects do not hold up, and this is due to the small number of outcomes in some categories (Table 3).

4. Discussion

Considering the pregnancies that occurred after arrival in France in migrants from sub-Saharan Africa, no differences in induced abortion were found in pregnancies in the HIV (after diagnosis) and reference groups. Our results also suggest a differential effect of pregnancy intendedness categories (intended, mistimed, and unwanted) on the observed association, but our sample size did not allow us to adequately assess this effect.

The finding that pregnancies that occurred after HIV diagnosis were not more frequently aborted than pregnancies of the reference group reinforces previous studies (Ammassari et al., 2013; Massad et al., 2004), especially those carried out in sub-Saharan African countries (Schwartz et al., 2015; Brou et al., 2009; Ikechebelu et al., 2002; Bankole et al., 2014). Literature indicates that although WLHA have a higher lifetime abortion rate compared to WNLHA, the majority of those abortions occur before their HIV diagnosis. This is due to the fact that the same circumstances that render them vulnerable to HIV infection, such as lack of social support and limited healthcare access, also impact their decision to terminate a pregnancy (Pilecco et al., 2014). This could account for the absence of disparity between pregnancies held by WLHA and the reference group as observed in our study, as we exclusively focused on the post-diagnosis period. Also, qualitative research has indicated that HIV does not remove WLHA's reproductive intentions (Cooper et al., 2007; Vilella et al., 2012; Pilecco et al., 2015). Thereby, although the fear of mother-to-child transmission, or of leaving a child orphaned, can be combined with social disapproval, discouraging WLHA from having children after diagnosis, the willingness of experiencing motherhood, associated with social and cultural norms that encourage motherhood, can keep WLHA's desire to have children (Cooper et al., 2007; Vilella et al., 2012; Orner et al., 2011). So, for migrants from sub-Saharan Africa, for many of which motherhood is a cultural imperative (Lang-Baldé and Amerson, 2018) and abortion is morally condemned (Orner et al., 2011), HIV may have less influence on reproductive decisions than other factors. Individual and social characteristics and cultural expectations, similar between WLHA and women in the reference group, may be more relevant in the decision to terminate a pregnancy, such as social pressure to have a child, financial situation, (lack of) social support, presence and quality of the relationship with a partner, and desire of not to have (other) children (Pilecco et al., 2014; Vilella et al., 2012; Orner et al., 2011; Gruskin et al., 2008; Chi et al., 2010; Orner et al., 2010; Barbosa et al., 2012; Zachek et al., 2019).

Indeed, after adjustments, HIV showed a tendency, although not statistically significant, towards a reduction in the practice of abortion, especially with the inclusion of the intendedness of pregnancy variable in the model. Previous research has highlighted the importance of pregnancy intendedness for abortion among Sub-Saharan African migrants living in Île-de-France (Pilecco et al., 2020). In the stratified analysis, it is evident that this trend is particularly driven by mistimed and unwanted pregnancies. Possible explanations for this finding are related to how healthcare services address the reproductive intentions of WLHA. Previous studies have indicated that health services fail to contemplate women's desire for pregnancy (Gruskin et al., 2008; United Nations, Fund for Population Activities, David and Lucile Packard Foundation (Los Altos Calif) 2008). The emphasis on condom use to prevent (re)infection limits discussion about the intention of motherhood (Silva NEK et al., 2006). However, when WLHA present as pregnant in health settings, the narrative shifts, focusing on embracing the

pregnancy and starting PMTCT (Barbosa et al., 2012). This same level of support may not have been extended to their counterparts in the reference group, which could explain the difference found in our study. Moreover, considering the potential for preventing mother-to-child transmission, pregnancy can be viewed as a positive outcome, allowing WLHA to envision new plans for their future, shifting the focus away from HIV (Cooper et al., 2007). Therefore, it is crucial that future studies with larger and specifically designed samples investigate the role of pregnancy intendedness in the association between HIV and abortion among migrants.

Finally, it is worth mentioning that, in France, migrants access healthcare services through different systems depending on their documentation status, resulting in varying coverage and financing. (Gionco and Celoria, 2018). Everyone has publicly and free-of-charge access to abortion services, as well as screening and treatment for HIV, even those in more unstable situations. Therefore, we could suppose that migration does not have a significant influence on the practice of abortion, both among WLHA and in the reference group. However, literature indicates that, despite initially having better health than non-migrants, the health of migrants deteriorates more rapidly due to challenging living conditions and, in particular, less frequent utilization of healthcare services (Hamel and Moisy, 2018). The utilization of healthcare services is even lower among undocumented migrants (André and Azzedine, 2016). Furthermore, previous studies have shown the importance of the settlement process in the proportion of pregnancies terminated by induced abortion among Sub-Saharan African migrants living in Île-de-France (the *Parcours Study Group* et al., 2020). In our study, although pregnancies among WLHA occurred slightly more recently than those in the reference group, both groups did not differ significantly in terms of the percentage of pregnancies occurring during the critical period of settling in a new country, which refers to the first two years after arrival. Nevertheless, this variable was taken into account in the models' adjustments due to its theoretical importance.

This study was the first to investigate the impact of HIV on induced abortion occurrence among migrants from sub-Saharan Africa living in France. Although our sample is representative of women who attend health services, it does not represent all migrant women. It can be suggested that the reproductive demands of migrants who do not attend health services are even more neglected. Furthermore, the fact that the sample was not calculated specifically for the outcome (induced abortion post-migration) may have implied a lack of power to identify associations and made it even more difficult to interpret the studied interaction. Limitations in the comparability of the two groups can be attributed to the different moments observed: while in the reference group, the entire post-migration period is considered, in the HIV group, only the post-migration and post-diagnosis period was analyzed. Thus, this difference was minimized with the adjustment for time since migration and age at the time of pregnancy. The retrospective nature of the studied events may have resulted in recall bias, which we believe is minimized by the fact that the association of interest involves significant events in the lives of women (HIV diagnosis and pregnancies). An additional problem may have been collecting the intendedness of pregnancy after it had an outcome. Women who did not want to become pregnant could have reinterpreted this intention once they had a child, tending to report that the pregnancy was intended (Joyce et al., 2000; Bankole and Westoff, 1998). The same could have happened with mistimed births (Sedgh et al., 2014). In this sense, a study held in the U.S. that compared the intentionality of pregnancy in the year of occurrence and in four years after that showed that concordance levels were consistent when the outcome was abortion. However, when the outcome was birth, more pregnancies were declared as intended (Rocca et al., 2019). Lastly, an important limitation of this study is that the way the data was collected does not allow us to determine the temporality of events in cases where pregnancies occurred in the same year as the HIV diagnosis. Out of the 98 pregnancies that occurred in the year of HIV diagnosis, in 79 cases, the reason for testing was the pregnancy itself. In

these cases, it was impossible to determine whether this diagnosis was made at a gestational stage that still allowed for the possibility of abortion. Despite this limitation, it is worth noting that out of these pregnancies, 10.1 % ended in abortion.

5. Conclusions

Knowledge of the factors that shape the reproductive demands of migrant women is important so that destination countries can adequately address them. In this sense, our findings suggest that, among pregnancies held after migration by sub-Saharan Africa living in Île-de-France, HIV was not statistically associated with abortion. Therefore, other factors that shape the context of life and pregnancy, and that are shared with WNLHA, may be more important in these women's reproductive decision-making process. Important feature health services should be aware of is the intendedness of pregnancy. Health services should strengthen the provision of family planning and the prevention of unintended pregnancies. Especially in cases in which WLHA intend to become pregnant, the services need to adequately advise and inform them about the effectiveness of the PMTCT, so they can freely decide how and when to have children.

CRediT authorship contribution statement

Flávia B. Pilecco: Conceptualization, Methodology, Formal analysis, Writing – original draft. **Andrainolo Ravalihasy:** Methodology, Data curation, Formal analysis, Writing – review & editing. **Agnès Guillaume:** Conceptualization, Methodology, Writing – original draft, Supervision. **Annabel Desgrées du Loû:** Conceptualization, Methodology, Writing – original draft, Supervision, Project administration, Funding acquisition.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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