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RESEARCH NOTE

Fertility and HIV Status: Sub-Saharan African Women in France

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Abstract

The aim of our study was to analyse the association between HIV status and fertility among migrant women who arrived in France from sub-Saharan Africa. We used data from the PARCOURS survey conducted by the French National Agency for Research on AIDS and Viral Hepatitis (ANRS, Agence Nationale de Recherche sur le Sida et les hépatites virales), based on a sample of 954 women who arrived in France during their reproductive years (aged 15 to 49). To assess the impact of demographic, socioeconomic, and health factors on fertility rates, a Poisson regression model was applied.

The analysis showed that women who arrived in France before the age of 30 had a significantly lower fertility rate than those who arrived between 30 and 34. Additionally, HIV-negative migrant women had a significantly higher total fertility rate than HIV-positive women (4.09 children per woman versus 3.20). The period of arrival in France was also significantly associated with fertility rates. Women arriving aged 15–49 before 1996 had significantly lower fertility rates than those arriving between 2005 and 2013, reflecting the influence of French migration policies and socio-economic context. Fertility decisions are influenced by factors at both micro-levels (such as education and autonomy in decision-making) and macro-levels (including media influence and place of residence), highlighting the complexity of reproductive behaviour, especially within the migration context.

Our study emphasises the associations between HIV status, age at arrival, abortion history, and other factors in understanding the determinants of fertility among sub-Saharan African migrant women. These findings provide valuable insights for the development of health policies and services tailored to the specific reproductive health needs of this population.

Keywords

fertility, migrant women, sub-Saharan Africa, HIV status, Poisson regression

JEL codes: I0, I1, I3

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Introduction

The high fertility rates among women in sub-Saharan Africa, coupled with elevated morbidity – particularly due to HIV infection – pose significant challenges to their reproductive health (Mkwashapi et al. 2023). These women, who undergo multiple life changes linked to their migration history, social integration, and access to healthcare, also face specific epidemiological challenges. Among these, HIV infection is particularly central due to its profound impact on reproductive health. Current research indicates that HIV significantly influences both the structure and level of fertility in the countries of origin of these populations (UNAIDS 2020).

This influence can be explained by both biological and behavioural mechanisms. Biologically, HIV directly affects the fertility of infected women, notably by increasing the risk of fetal loss; additionally, HIV infection is frequently accompanied by other sexually transmitted infections (Zaba and Gregson 1998). Behaviourally, HIV infection modifies reproductive intentions, contributing to decreased fertility within this population. Nonetheless, sub-Saharan Africa continues to exhibit the highest fertility rates globally, averaging 4.6 children per woman (World Bank 2021).

These demographic and epidemiological specificities persist in migration contexts, where migrant women from sub-Saharan Africa relocating to high-income countries such as France confront distinct sexual and reproductive health challenges (Desgrées-du-Loû et al. 2015). In France, they are at heightened risk of HIV infection due to factors related to their migration status, risky sexual behaviour, and social inequalities. Data reveal that migrants account for over 40% of new HIV diagnoses in Europe, and more than half of newly diagnosed migrant women receive a late diagnosis, exacerbating the impact on their reproductive health (Owusu et al. 2023).

For example, in 2013, 31% of new HIV diagnoses in France were among migrants from sub-Saharan Africa, despite this group comprising only about 1% of the French population (Cazein et al. 2015). Furthermore, studies indicate that some HIV infections among these migrants occur post-arrival in France, as evidenced by the presence of viral strains predominantly circulating in Europe (Desgrées du Loû et al. 2017; Lucas et al. 2012). These findings underscore the importance of deepening our understanding of the links between migration, reproductive health, and morbidity, particularly in contexts where health policies must be tailored to meet the specific needs of this population.

Additionally, the socio-demographic characteristics of migrant women-such as age at arrival in France, marital status, education level, religion, and region of origin-also influence their fertility. Adserá and Ferrer (2014) highlight the impact of age at migration on fertility among migrant women, noting that those who migrated during their late teens exhibit particularly high fertility rates, suggesting that age at migration plays a pivotal role in shaping reproductive dynamics during the post-migration period. Similarly, cultural differences and family planning practices, which vary by region of origin within sub-Saharan Africa, affect the reproductive trajectories of migrant women (Mönkediek and Bras 2018; Kraus 2019; Ng 2024). The potential influence of HIV status on fertility must also be carefully evaluated in conjunction with these socio-demographic factors.

This article presents an in-depth demographic analysis of the relationship between fertility and HIV status among sub-Saharan African migrant women in France, with a particular focus on the Paris Region (Île-de-France), where this population is highly concentrated. The study aims to examine variations in fertility trends according to HIV status and to identify

the socio-demographic factors that mediate this relationship. Specifically, it seeks to address the following questions:

- Do migrant women living with HIV exhibit different fertility rates compared to their HIV-negative counterparts?
- What role do socio-demographic characteristics – such as age, marital status, education level, religion, region of origin, and age at migration – play in mediating this relationship?
- How do cultural norms and family planning practices specific to sub-Saharan African regions of origin influence fertility within migration contexts?

Employing an analytical approach that integrates demographic and epidemiological methods, this study endeavours to deepen understanding of the complex interrelations between migration, fertility, and reproductive health. The objective is to elucidate these connections in order to inform health policy and enhance reproductive healthcare and HIV prevention services tailored to migrant women. Through this analysis, we explore both individual and structural mechanisms that shape fertility patterns, alongside the implications of inequalities in healthcare access within migration settings. Consequently, comprehending the determinants of fertility in this particular population is essential for designing effective reproductive health services and implementing appropriate public policies in the host country.

Some authors advocate for understanding immigration broadly as a socially constructed phenomenon and a significant social determinant of health (Castañeda et al. 2015). HIV status plays a central role in shaping this relationship. Firstly, HIV infection has a direct biological impact on fertility, notably by increasing the risk of fetal loss and complications arising from concomitant infections (Zaba and Gregson 1998). Secondly, it affects reproductive behaviour, often manifesting as reduced fertility among HIV-positive women (Dulli et al. 2019; Kharsany and Karim 2016; Schwartz et al. 2017; Diallo et al. 2010).

This study aims to contribute to the existing literature by empirically analysing the fertility patterns of women who migrated from sub-Saharan Africa to France, stratified by HIV status. The findings are expected to provide a foundation for the development of culturally sensitive reproductive health policies and for the implementation of targeted interventions designed to improve healthcare access and reduce health disparities within this population.

Data and methods

Data sources

Information on fertility and reproductive health among sub-Saharan African migrants in France is available from several data sources. This study utilises data from the ANRS "Parcours" survey conducted in 2012–2013, a retrospective life-history survey administered in healthcare facilities within the Paris region.

The survey recruited three distinct groups of respondents, each representing a specific population of migrant women from sub-Saharan Africa residing in the Paris region:

- Women living with HIV/AIDS
- Women diagnosed with chronic hepatitis B
- Women free from these infections who had consulted general practitioners (GPs) in the Paris region.

The focus on sub-Saharan African migrants stems from their significant contribution to immigration flows to France and their heightened vulnerability to particular chronic and

infectious diseases, such as HIV and hepatitis B. To examine the association between HIV status and fertility, while controlling for socio-demographic characteristics, we analysed individual-level data from women who migrated to France between the ages of 15 and 49, irrespective of their HIV status.

Study sample

Our analytical sample comprised women who were of reproductive age (15–49 years) at the time of migration to France. Data were collected on their region of origin, HIV status (diagnosed post-migration), number of live births, and other socio-demographic and cultural characteristics at arrival and over time. This age range corresponds to the standard demographic definition of reproductive age, facilitating comparison across studies and populations (UN 2019; Gregson et al. 2001; Heuveline and Poch 2007; Hargreaves and Glynn 2002; Bärnighausen et al. 2012). Its use is methodologically appropriate for fertility studies due to its biological relevance and distinct reproductive behaviour patterns (Behringer et al. 2013).

From the initial PARCOURS survey sample of 1,035 women who arrived in France between 1972 and 2013 and were aged 18 to 59 years at the time of interview, we selected all women who migrated during their reproductive years (n = 954) with complete data records.

Variable of Interest

The primary variable of interest is parity (the number of live births), stratified by the woman's age group. This measure, available for most respondents regardless of HIV status, allows for the estimation of age-specific fertility rates. Analysing these rates facilitates an understanding of fertility patterns and the identification of influencing factors.

Independent Variables

The explanatory variables included in the analysis of fertility among sub-Saharan African migrant women in France were selected based on their established importance in understanding fertility determinants and their association with HIV status. The key variables examined – such as age at interview, educational attainment, region of origin, religion, age at migration, marital status at migration, period of migration, and primary reason for migration – are detailed in Table 1.

Table 1. Description of model variables

Variable	Description	Categories
Live births	Birth numbers converted to age-specific fertility rates	Numerical values
Risk of transmitting HIV to a child	HIV status of the respondent	HIV+ HIV-
Level of education	Respondent's level of education	No education/Primary Secondary Higher

Variable	Description	Categories
Region	Region of sub-Saharan Africa where the respondent was born	West Africa
		Central Africa
		East Africa
		South Africa
Religion	Respondent's religious affiliation	Christian
		Muslim
		Other
		Does not profess any religion
Age of migration	Age of the respondent at the time of arrival in France	15-19 years old
		20-24 years old
		25-29 years old
		30-34 years old
		35-39 years old
		40-44 years old
		45-49 years old
Marital status	Marital status of the respondent at the time of arrival in France	Does not have a spouse/partner
		Has a spouse/partner in France
		Has a spouse/partner in another country
Period	Arrival period in France	Before 1996
		In 1996-2004
		2005-2013
Reason for migration	The main reason why the respondent left her country	Try one's luck, find a job
		Family reunification
		It's not safe in your own country
		Studies
		Health related reasons

Source: Compiled by the authors based on data from the ANRS-Parcours 2012-2013 survey

Statistical Analysis

The data analysis was conducted in three stages. First, we performed a descriptive analysis to compile a socio-demographic profile of the respondents included in the sample. This stage enabled us to present the main characteristics of the sample, including age, education level, region of origin, religion, marital status, and reasons for migration. Approximately 20% of women had primary education or less, 58.5% had secondary education, and 23.4% had higher education. This information is crucial for contextualising the results and understanding the population's characteristics.

In the second stage, we examined the relationship between the dependent variable (age-specific fertility rates) and each explanatory variable (such as age at arrival, education

level, and marital status). This step helped identify potential interactions and prepare for the multivariate analysis. Women who arrived in France between the ages of 20 and 34 constituted the majority of the sample, with a peak at age 29 (26.1%).

To assess the effects of explanatory factors, we employed a Poisson regression model (Giannantoni and Gabrielli 2015). This method allows analysis of the relationship between respondent characteristics and fertility (Les transitions démographiques… 2001), assuming that the number of births follows a Poisson distribution with a mean given by the following equation:

$$P(Y = y) = \frac{\mu^y e^{-\mu}}{y_i},$$

where the parameter μ is both the mathematical expectation and the variance of the variable Y: $E(Y) = \text{var}(Y) = \mu$.

The Poisson distribution is often used in demography to analyze fertility to model the occurrence of rare events over time or space. The Poisson regression model is appropriate for our case because we want to explain the variation of the count variable Y as a function of a vector $X = (X_1, X_2, ..., X_p)^T$ of explanatory variables, which can be quantitative or qualitative.

In the context of our study, we will model the mathematical expectation of a count variable Y, which may represent the number of events observed in a given period of time or in a given space, as a function of the values p of explanatory variables $X_1, X_2, ..., X_p$. The variables (Y_i, X_i), where $X_i = (X_{i1}, X_{i2}, ..., X_{ip})^T$, $i = (1, 2, ..., n)$ are independent of X_i and obey the Poisson distribution with parameters μ_i, defined as follows:

$$\mu_i = E(Y_i \mid X_i) = e^{\beta_0 + \beta_1 x_{i1} + ... + \beta_p x_{ip}} = e^{\eta i}.$$

Or in another form:

$$\log \mu_i = \log[E(Y_i \mid X_i)] = \text{In}(\mu_i) = \beta_0 + \beta_1 x_{i1} + \ldots + \beta_p x_{ip} = e^{\eta i}.$$

The Poisson regression model offers several advantages over linear regression in the statistical analysis of fertility, as noted by B. Schoumaker (2001). These include its suitability for modelling discrete fertility measures, such as the number of children born and the number of births in the last five years, which typically follow a Poisson distribution. Additionally, it accounts for heteroscedasticity in the dependent variable, thereby overcoming limitations inherent in linear regression. Through its log-linear specification, the model allows us to move beyond the assumption of additive effects and incorporate the duration of exposure to the risk of birth using an offset term to correct for bias. It is precisely due to these advantages that the Poisson regression model was selected for this study.

Our dependent variable is fertility, measured as the number of live births per woman. However, in Poisson regression, we model the count of events (births) directly rather than the rate itself. The intensity reflects the frequency of these events, which is influenced by the explanatory variables. Thus, although we refer to "fertility," we are fundamentally modelling the number of births, which justifies the use of Poisson regression.

The serological status of respondents was determined at the time of the survey, limiting our ability to ascertain the exact timing of infection. Nonetheless, we estimate the risk of infection using proxy variables such as risky behaviours (number of sexual partners, contraceptive use) and living conditions (access to healthcare, etc.). These variables enable us to approximate the likelihood of HIV infection despite the inability to pinpoint the precise timing of infection.

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + ... + \beta_n X_n + \varepsilon,$$

where:

Y is the dependent variable, which in our case represents the intensity of the demographic process under study (for example, age-specific fertility rates);

$X_1, X_2, ..., X_n$ – explanatory variables such as age, HIV status, education level, marital status, etc.

$\beta_0, \beta_1, \beta_2, ..., \beta_n$ are the corresponding regression coefficients measuring the effect of each explanatory variable on the dependent variable.

ε is the random error of the model.

In our analysis, we employed Poisson regression because the dependent variable – namely, the number of live births – is an integer count that determines age-specific fertility rates. Poisson regression is particularly well-suited for modelling count data and enables the estimation of regression coefficients that quantify the relationship between explanatory variables and the dependent variable, accounting for the frequency of event occurrence (Hilbe 2011; Greenland 1989).

This analytical approach allows us to gain a clearer understanding of the factors associated with fertility outcomes among sub-Saharan African migrant women, as well as the impact of HIV status in the context of migration. It provides both measures of association and adjusted estimates of the effects of explanatory variables. Migrants from sub-Saharan Africa account for a considerable proportion of individuals living with HIV in France. Notably, the significant presence of the HIV-1 subtype – predominantly circulating in Europe and largely absent in sub-Saharan Africa – suggests that many infections are acquired in France, outside migrants' original social networks. Findings from the ANRS PARCOURS study (Desgrées-du-Loû et al. 2015) reveal that 44% of male and 30% of female migrants contract HIV after their arrival in France. These figures underscore the significant role of post-migration transmission in shaping the HIV epidemiology of this population group.

Results

Socio-demographic characteristics of respondents

Our study shows that sub-Saharan African women migrants in France have diverse socio-demographic characteristics: while almost one in five (20%) has primary education or no education, the majority (58.5%) have secondary education and almost a quarter (23.4%) have higher education. Geographically, the respondents mainly come from West (53.1%) and Central Africa (43.6%), while East and Southern Africa account for only 3.3% of the respondents. Their migration path, which most often begins between the ages of 20 and 34 (the peak of migration – 26.1% – occurs at around 29 years of age), is divided into three main waves (before 1996: 41.4% of respondents; 1996-2004: 22.1%; 2005-2013: 36.5%), and the motives are divided approximately equally between family reunification (36.3%), economic opportunities in the host country (32.9%) and other reasons (30.8%). Their religious (65.3% Christian, 30.9% Muslim) and family composition (51.3% had a husband/partner at arrival) reflects the heterogeneity of this population group, whose characteristics require differentiated admission policies.

The data (Table 3) reveal the complex reality regarding social support and health among migrant women of reproductive age. Almost half (47.7%) rely primarily on their family

Table 2. Characteristics of sub-Saharan African women migrants who arrived in France in 1972–2013

	N = (954)	
	%	*n*
Level of education		
No education/Primary	18.1	173
Secondary	58.5	558
Higher	23.4	223
Number of children born		
No children	70.5	673
One	23.2	221
Two	05.8	55
Three	0.4	4
Four	0.1	1
Region of birth		
West Africa	53.1	507
Central Africa	43.6	416
East and South Africa	3.3	31
Religious affiliation		
Christianity	65.3	622
Islam	30.9	295
Other / Does not profess any religion	3.9	37
Age of arrival in France		
15-19	10.3	98
20-24	21.6	206
25-29	26.1	249
30-34	20.0	191
35-39	13.0	124
40-44	5.8	55
45-49	3.3	31
Marital status at time of arrival		
Single	48.7	465
Has a husband/partner	51.3	489
Arrival period in France		
Before 1996	41.4	211
1996-2004	22.1	395
2005-2013	36.5	348
Reasons for migration		
Desire to try a chance / Work	32.9	314
Family reunion	36.3	346
Refugee/Study/Health	30.8	294
Total		**954**

Source: Compiled by the authors based on data from the ANRS-Parcours 2012–2013 survey

as their immediate social network, a quarter (25%) on their spouse, and 15.2% on friends. A total of 12.2% reported having no social connections at all. In economic terms, 51.2% have two or three sources of income, a third (33.2%) have only one, and 15.6% have four or more. Their perception of their health status shows that 25.8% consider their health to be very good, 42.5% good, and 31.8% not very good. As for HIV status, 53.6% of respondents are HIV positive. Reproductive health raises serious concerns: 82.7% had not used contraception in the year preceding the survey – a figure that is all the more significant given that 39.6% had previously had an abortion (in a context where this practice is usually prohibited in the migrants' home countries), and 31.1% had a history of stillbirth. These data highlight the particular vulnerability of this population group, which is socially isolated, economically unstable, and faces complex health problems.

Table 3. Characteristics of female migrants from sub-Saharan Africa who arrived in France in 1972–2013 (*continued from Table 2*)

	N = (954)	
	%	*n*
Social connections		
Family	47.7	455
Husband/Partner	25.0	238
Friends, acquaintances	15.2	145
No connections	12.2	116
Sources of income		
One	33.2	317
Two or three	51.2	488
Four or more	15.6	149
Health status		
Very good	25.8	246
Good	42.5	405
Not very good	31.8	303
HIV status		
Positive	53.6	511
Negative	46.4	443
Use of contraception		
No	82.7	789
Yes	17.3	165
Abortions		
There were none	60.4	576
There were	39.6	378
Stillbirths		
There were none	68.9	657
There were	31.1	297
Total		**954**

Source: Compiled by the authors based on data from the ANRS-Parcours 2012–2013 survey

A comparative analysis of fertility rates by age at arrival and HIV status (Figure 1) reveals different reproductive trajectories. HIV-negative women initially have a higher fertility rate (4.09 children on average) than HIV-positive women (3.20), but after the age of 34, this trend reverses. Women living with HIV exhibit a particular pattern: an increase until age 24, a peak between 25 and 34 (possibly due to improved access to antiretroviral therapy and medical care in France), followed by a marked decline until age 49. In contrast, HIV-negative women show a steady decline in fertility after age 34, suggesting a combined effect of reproductive ageing and possible sociocultural adaptation during the post-migration period. This discrepancy raises questions about the complex interaction between HIV infection and fertility, which likely combines biological (such as the impact of the virus on ovarian reserve), institutional (quality of health care), and sociocultural (ideas about motherhood) factors. A multivariate analysis including duration of residence in France, educational level, and access to reproductive health services would have enabled a more precise assessment of the specific impact of HIV status, rather than relying solely on simple pairwise correlations. These results highlight the need for differentiated support for migrant women's reproductive intentions, depending on their HIV status and stage in the migration process.

Figure 1 presents a comparison of fertility rates among migrant women by age at arrival in France and HIV status. A general downward trend is observed across the groups, with fertility rates decreasing from 4.09 among HIV-negative women to 3.20 among HIV-positive women.

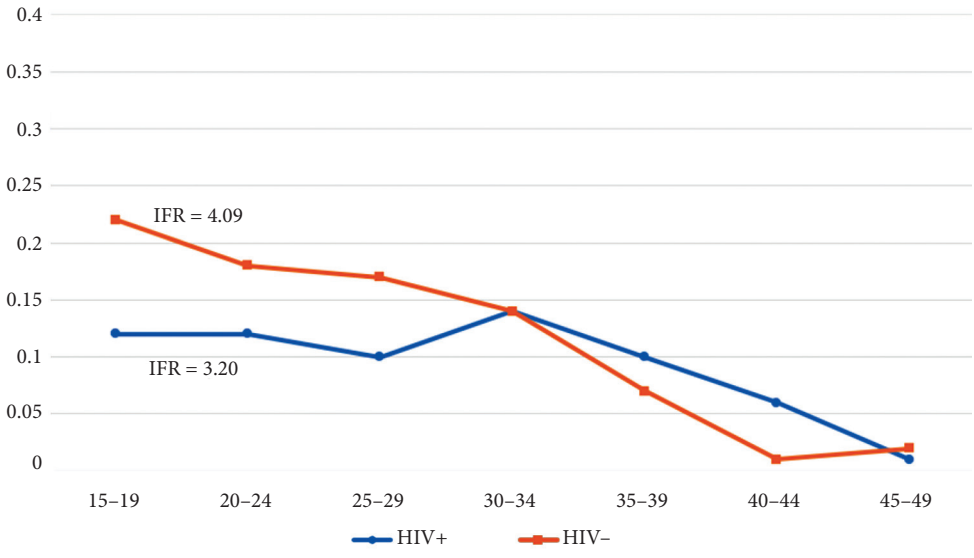

Figure 1. Age-specific fertility rates by HIV status of migrant women. *Source:* compiled by the authors based on data from the ANRS-Parcours 2012–2013 survey

Figure 2 shows the age-specific fertility rates of respondents according to their HIV status and region of origin. The graphs reveal clear differences among migrant women from various regions (East, South, Central, and West Africa), depending on their HIV status (HIV-posi-

tive or HIV-negative). HIV-negative migrant women from East and Southern Africa display higher fertility rates among 20–34-year-olds compared to respondents from other regions. In contrast, fertility rates among migrant women from Central and West Africa remain relatively stable across all age groups. These interregional differences raise questions about the biological and socio-cultural factors influencing fertility in different regions of origin.

Within the HIV-negative group, respondents from East and Southern Africa have higher fertility rates in the 20–24, 25–29, and 30–34 age groups than migrants from other regions. These patterns may be shaped by a range of factors, including access to healthcare, sexual behaviour, contraceptive use, and respondents' socioeconomic characteristics. However, it is also possible that the observed trends are due to the small number of observations for this group (31 respondents, or 3% of the entire sample), which were further divided by HIV status.

These findings underscore the importance of accounting for regional context and women's health status when analysing fertility. Policies aimed at addressing fertility should be adapted accordingly. For example, in East and Southern Africa, targeting young HIV-negative women may be effective, whereas in Central and West Africa, a broader, more inclusive approach may be required.

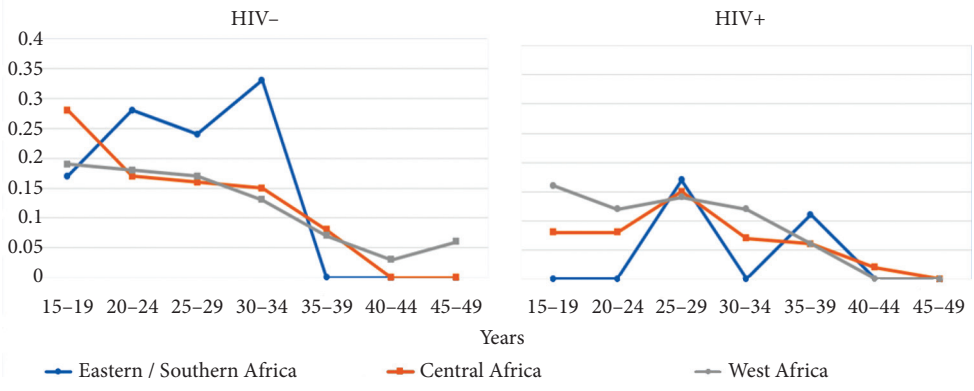

Figure 2. Age-specific fertility rates of migrant women, by HIV status and region of origin. *Source:* compiled by the authors based on data from the ANRS-Parcours 2012–2013 survey

Figure 3 shows age-specific fertility rates by religion and HIV status of respondents.

In the HIV-negative group, there is a general trend of decreasing fertility rates with increasing age across all religious affiliations. Respondents identifying as Christian or Muslim exhibit higher fertility rates at all ages compared to those who identify with other religions or as atheists.

In the HIV-positive group, although a similar downward trend is observed, the differences between religious groups are less pronounced, and the highest fertility rates are not found among the youngest age group. This may suggest that HIV-positive status affects fertility irrespective of religious affiliation.

Figure 4 shows fertility rates by age group for HIV-negative and HIV-positive respondents, distinguishing between those who are single and those who have a spouse or partner in France or abroad. Among HIV-negative respondents, there is a clear trend of relatively

low fertility rates among single individuals aged 30 and above. For those in partnerships, peak fertility rates occur in the 30–34 age group for those with a partner in France and in the 35–39 age group for those with a partner abroad.

The situation differs markedly for HIV-positive respondents. In this group, the variation in fertility rates by marital status is less pronounced than among HIV-negative individuals.

These observations underscore the importance of considering HIV status when analysing fertility trends. Marital status is also a significant factor, as the data indicate it has a notable influence on fertility rates.

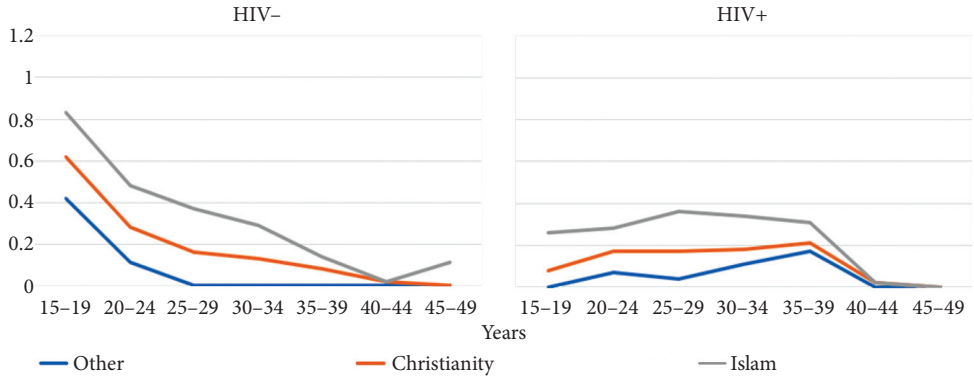

Figure 3. Age-specific fertility rates of migrant women, by HIV status and religious affiliation. *Source:* compiled by the authors based on data from the ANRS-Parcours 2012–2013 survey

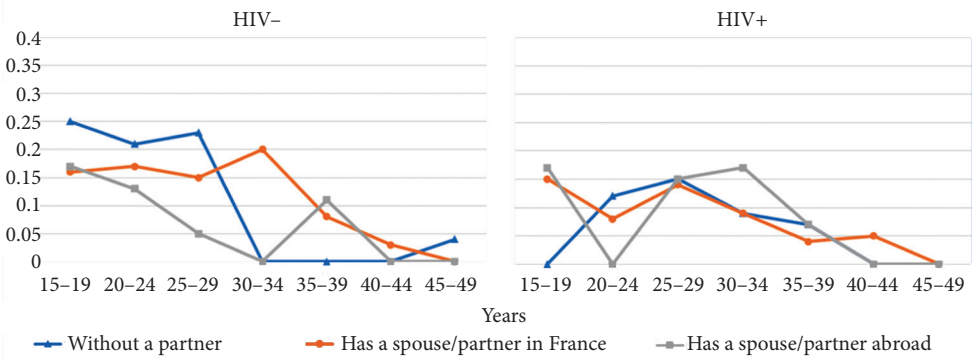

Figure 4. Fertility rates of migrant women by HIV status and marital status. *Source:* compiled by the authors based on data from the ANRS-Parcours 2012–2013 survey

Figure 5 shows fertility rates by age group according to education level and HIV status. The left-hand graph (HIV-negative) displays a general trend of decreasing fertility rates with increasing levels of education, indicating a negative relationship between education and fertility. It is noteworthy that respondents with secondary and higher education tend to postpone childbearing: peak fertility rates occur in the 25–29 and 30–34 age groups, respectively.

The high fertility rates at younger ages among respondents with secondary and higher education are likely due to the small number of observations in these categories.

In the HIV-positive group, similar trends are observed, though with some differences. HIV-positive respondents with higher levels of education tend to have lower fertility rates overall, suggesting that HIV status significantly influences reproductive decision-making.

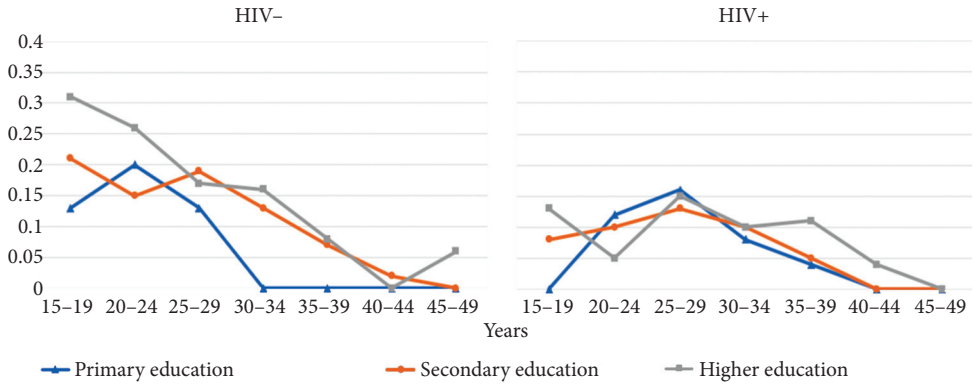

Figure 5. Fertility rates of migrant women according to HIV status and education level. *Source:* compiled by the authors based on data from the ANRS-Parcours 2012–2013 survey

Figure 6 illustrates differences in fertility rates among women of various age groups, based on their HIV status and self-assessed health status. Among HIV-positive women, there is a general trend of declining fertility with increasing age, which is consistent with typical fertility patterns. Interestingly, women who rated their health as "very good" exhibit higher fertility rates than those in other health categories.

Among HIV-negative women, fertility rates increase in the 25–29 age group and then decline significantly thereafter. This pattern may be influenced by a range of social and medical factors, which warrant further investigation.

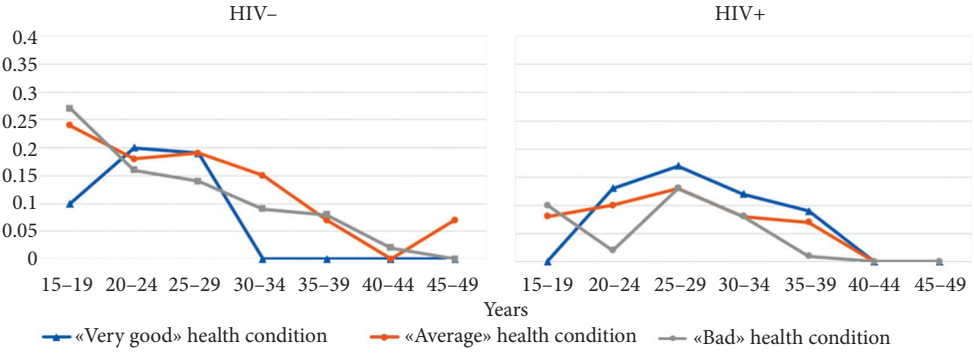

Figure 6. Birth rates of migrant women depending on HIV status and self-assessed health status. *Source:* compiled by the authors based on data from the ANRS-Parcours 2012–2013 survey

Figure 7 clearly illustrates changes in fertility rates by age group, according to HIV status and time of arrival in France. Among HIV-negative women, there is a general trend of declining fertility rates across all age groups over time. This may be attributed to a combination of factors, including increased access to sex education and contraception.

The pattern differs among HIV-positive women. Those who arrived before 1996 and between 1996–2004 exhibited lower fertility rates than those who arrived between 2005–2013, shortly before the ANRS-Parcours survey was conducted. This may reflect an initial increase in fertility linked to the introduction of antiretroviral therapy, followed by a decline likely influenced by growing awareness of family planning and HIV prevention.

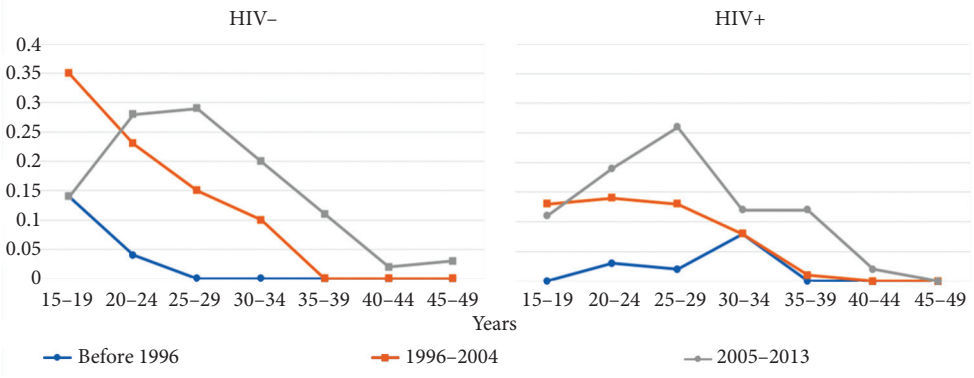

Figure 7. Fertility rates of migrant women according to HIV status and time of arrival in France. *Source:* compiled by the authors based on data from the ANRS-Parcours 2012–2013 survey

Table 4 presents the results of a Poisson model constructed to analyse the association between fertility among sub-Saharan African migrant women in France and various socio-demographic variables, with particular attention to HIV status. The results are based on data from the 2012–2013 ANRS-Parcours survey.

An analysis of fertility rates by HIV status reveals several key trends. The model indicates a gradual and significant decline in fertility with increasing age. Compared to women aged 15–19, those aged 25–29 show lower fertility ($\beta = -0.366$, $p = 0.041$), with the decline becoming more pronounced after the age of 30 and reaching its strongest effect in the 45–49 age group ($\beta = -3.274$, $p = 0.001$). These findings are consistent with well-established demographic patterns regarding age-related fertility decline.

HIV status emerges as a significant factor affecting fertility. HIV-negative women have significantly higher fertility than their HIV-positive peers ($\beta = 0.232$, $p = 0.042$). This disparity may be attributed to a combination of biological factors, medical influences (e.g. side effects of antiretroviral therapy), and behavioural aspects (such as reduced fertility intentions due to health concerns or social pressures).

The region of origin (East and Southern Africa vs Central and West Africa) does not appear to be a decisive factor, as no statistically significant differences in fertility were observed between women from these regions. Similarly, religious affiliation (Christian, Muslim, or other) does not have a significant impact on fertility. With regard to education, although women with higher educational attainment have a slightly positive coefficient ($\beta = 0.154$), the lack of statistical significance ($p = 0.34$) suggests that education is not a determining factor in this context.

Table 4. Results of the Poisson model assessing the relationship between fertility and socio-demographic variables, including HIV status

Explanatory variables	Estimate	Std. Error	z value	Pr(>|z|)	Level of significance
(Intercept)	-1.88538	0.62104	-3.036	0.002399	**
Age of arrival in France (Ref: 15-19 years)					
20–24 years	-0.32476	0.18205	-1.784	0.074439	.
25–29 years	-0.36631	0.17939	-2.042	0.041154	*
30–34 years	-0.75263	0.20202	-3.726	0.000195	***
35–39 years	-1.41379	0.26160	-5.404	6.51e-08	***
40–44 years	-3.17168	0.72624	-4.367	1.26e-05	***
45–49 years	-3.27414	1.01513	-3.225	0.001258	**
HIV status (Ref: HIV+)					
HIV-	0.23202	0.11417	2.032	0.042134	*
Region (Ref: East and South Africa)					
Central Africa	-0.01462	2.959e-01	-0.093	0.925836	
West Africa	-0.05801	2.833e-01	-0.227	0.820482	
Religion (Ref: Other)					
Christianity	0.03556	5.109e-01	0.025	0.980288	
Islam	0.22963	5.164e-01	0.422	0.673248	
Level of education (Ref: Primary / No education)					
Secondary	-0.03501	1.549e-01	-0.163	0.870629	
Higher	0.15412	1.787e-01	0.952	0.341215	
Marital status at time of arrival (Ref: Married/union in France or abroad)					
Have never had a husband/ partner	0.25548	0.13100	1.950	0.051154	.
Arrival period in France (Ref: (1996–2004)					
Before 1996	-1.08234	0.19715	-5.490	4.02e-08	***
2005–2013	0.50750	0.12132	4.183	2.88e-05	***
Social Connections in France (Ref: Family)					
Husband/Partner	0.24375	0.14763	1.651	0.098727	.
Friends, acquaintances	-0.16962	0.17510	-0.969	0.332683	
No connections	-0.18592	0.18682	-0.995	0.319653	
Number of sources of income (Ref: two-three)					
One	0.12302	0.11770	1.045	0.295934	
Four or more	0.02359	0.17890	0.132	0.895091	
Use of contraception in the last 12 months (Ref: No)					
Yes	0.32428	0.12808	2.532	0.011344	*
Were there any abortions (Ref: No)					
Yes	-0.34873	0.12413	-2.809	0.004964	**
Were there any stillbirths (Ref: No)					
Yes	-0.05224	0.12262	-0.426	0.670091	

Source: ANRS-Parcours 2012-2013 survey data

Women who arrived in France without a husband or partner exhibited slightly higher fertility than those who arrived with a spouse or partner ($\beta = 0.255$, $p = 0.051$), although this effect was not statistically significant. This finding may reflect family formation occurring after migration. The period of migration is a key determinant. Women who arrived before 1996 had significantly lower fertility rates ($\beta = -1.08$, $p < 0.001$), likely due to longer residence in France and biological ageing. Conversely, those who arrived between 2005 and 2013 exhibited significantly higher fertility ($\beta = 0.507$, $p < 0.001$), possibly reflecting postponed childbirth until after settling in a new environment.

Social ties – such as family, spouse, or friends – do not appear to be major determinants of fertility. Contraceptive use was associated with higher fertility ($\beta = 0.324$, $p = 0.011$), a counterintuitive result that may relate to contraceptive initiation following childbirth. Having had an abortion was linked to lower fertility ($\beta = -0.348$, $p = 0.005$), potentially reflecting fertility control strategies and/or reproductive health consequences of abortion. Stillbirth had no significant effect on subsequent fertility rates.

This analysis highlights the roles of HIV status, age, and period of arrival as key determinants of fertility among sub-Saharan African migrant women in France. The absence of significant effects from variables such as education or geographic origin raises questions about the specific characteristics of this population.

Discussion

Our results highlight the complexity of fertility determinants among sub-Saharan African migrant women in France, illustrating the interplay of demographic, health, and socio-economic factors. The analysis reveals a strong association between HIV status and reproductive behaviour, while also underscoring the diversity of migration trajectories and integration experiences within the host country.

A key finding is the high prevalence of HIV within this group, which reflects not only the epidemiological context of their countries of origin but also the increased vulnerability experienced during the post-migration period (Lawson and Zablotska-Manos 2024). The combination of structural factors – such as inequalities in access to healthcare, economic insecurity, and challenges in integration – alongside specific migration pathways influences both the risk of HIV infection and reproductive decision-making. The low utilisation of modern contraceptive methods, coupled with sometimes delayed HIV diagnosis, highlights the urgent need to expand access to reproductive health and family planning services (Jarolimova et al. 2025; Omoz-Oarhe et al. 2023; Duff et al. 2011).

Furthermore, the predominance of migrants from Western Africa (53.1%) and Central Africa (43.6%) in the sample reflects historical migration patterns to France. However, these averages obscure significant differences depending on region of origin and individual migrant histories. Women from East and Southern Africa, although a minority (3.3%), may exhibit distinct reproductive dynamics owing to specific cultural traditions and healthcare systems prevalent in those regions.

Our findings also confirm that fertility among migrant women is influenced by both age at arrival and duration of residence in France. The initial years following migration are often marked by a decline in fertility, indicating a postponement of childbirth, consistent with other studies on migrant reproductive behaviour (Toulemon 2004; Toulemon and Mazuy 2022; del Rey and Grande 2015). This transition is likely driven by factors

such as adaptation to new living conditions, economic stabilisation, and improved access to contraception. Conversely, fertility tends to increase among women who have resided in France for longer periods, reflecting a gradual assimilation to the reproductive norms of the host society.

Education appears to be a significant factor shaping fertility behaviour. Consistent with trends observed in other migration contexts, women with higher levels of education tend to have lower fertility. This can be attributed to better knowledge of, and easier access to, contraception, as well as a focus on delayed career development (Kulu et al. 2017). This finding underscores the importance of public policies that promote education and the empowerment of migrant women as integral components of reproductive health strategies.

Another crucial factor is marital or partnership status. Research conducted in Norway and elsewhere indicates that the fertility of migrant women is influenced by their partner's origin: fertility rates tend to be higher in couples where both partners are migrants, compared to couples in which one partner is native to the host country (Tønnessen 2020). This reflects the enduring influence of cultural norms and family-related values on reproductive trajectories. However, our results show that, contrary to expectations, the proportion of births within unions between migrant women and their French partners has not increased significantly since 2000, suggesting relative stability in marital patterns.

The regression analysis corroborates these findings. The decline in fertility with age, reflected by the negative coefficients in our Poisson model, aligns with established demographic patterns (Goldstein et al. 2009). However, the association between fertility and HIV status highlights a critical public health concern. Women living with HIV have lower fertility than their HIV-negative counterparts, a difference likely influenced by concerns about viral transmission, related medical complications, and the effects of antiretroviral therapy on reproductive health. Moreover, disease duration plays a decisive role: the longer a woman has been living with HIV, the greater the decline in her fertility. This has important implications for the prevention of mother-to-child transmission and the provision of medical support to HIV-positive women (Cooper et al. 2007; Marston et al. 2017).

Finally, our results provide evidence of the influence of past reproductive health experiences on reproductive trajectories. The negative association between previous abortion and subsequent fertility suggests that voluntary termination of pregnancy may not only reflect reproductive choice but also indicate particular vulnerability, especially due to possible complications or difficulties in accessing contraception. In contexts where abortion remains illegal or severely restricted in the countries of origin of many migrant women, this issue poses a significant public health challenge and raises important questions about how best to support women facing unwanted pregnancies (Rozée 2009; Godeau et al. 2008).

Overall, this study highlights the diverse factors shaping fertility among sub-Saharan African migrant women in France, in relation to their HIV status. This population is far from homogeneous, with varying reproductive trajectories influenced by age at arrival, length of residence, education level, marital status, and cultural norms. These findings underscore the need for a comprehensive approach to reproductive health, combining improved access to healthcare, increased awareness of reproductive rights, and the integration of migrant health characteristics into public health policy.

Conclusion

In conclusion, our findings, based on the Poisson regression model, identified several factors significantly associated with fertility among sub-Saharan African migrant women in France, with variations according to HIV status. HIV-negative status is linked to significantly higher fertility rates, suggesting that HIV infection may adversely affect fertility through mechanisms such as anovulatory cycles, amenorrhea, or even complete absence of menstruation. Furthermore, women living with HIV face numerous challenges-including stress, weakened immune function, weight loss, and co-morbid sexually transmitted infections-that may contribute to infertility (Kraus 2019).

HIV/AIDS impacts fertility not only through clinical effects but also via psychosocial factors, including stigma, discrimination, and loss of social status. Additionally, migrants who arrived in France before 1996 exhibit significantly lower fertility rates compared with those arriving between 2005 and 2013, emphasising the importance of period of arrival-related factors such as improved access to reproductive health services and better socio-economic integration.

The different types of social ties in France (spouse, friends/acquaintances) or the absence thereof did not have a significant impact on the fertility of migrant women, although respondents with "spouse" ties tended to exhibit higher fertility rates. Notably, migrant women with a history of abortion had significantly lower fertility rates than those who did not report such an experience. This suggests that abortion may influence fertility decisions among migrant women and could also contribute to infertility.

These findings offer valuable insights for analysing and interpreting the determinants of fertility among sub-Saharan African migrants in France. They highlight the importance of considering factors such as age at arrival, HIV status, period of arrival, and abortion history when designing policies and services tailored to the specific needs of this population. Such approaches are essential to safeguarding women's health and supporting the realisation of their reproductive intentions under conditions favourable to both themselves and their children. Nevertheless, further in-depth analysis and contextual understanding are required, as gender dynamics remain crucial and women's mobility particularly increases the risk of HIV infection.

It is also important to acknowledge that fertility may be influenced by numerous factors beyond the scope of this study, including migrants' economic status, access to healthcare, and migration policies in the host country. Therefore, our results should be interpreted within the broader context of demographic and societal factors.

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