Incidence and predicting factors of pregnancy post-ART initiation in nine West-African countries

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Introduction

- In sub-Saharan Africa, women of reproductive age constitute the most HIV-affected population.
- Since antiretroviral therapy (ART) has become widely available, HIV-infected women health status has improved and the pregnancy rate post-ART has risen.
- The objective of this study was to estimate the incidence and predicting factors of pregnancy after ART initiation in eight West-African countries over a 10-year period.

Methods

This retrospective cohort analysis was conducted within the International epidemiologic Databases to Evaluate AIDS (IeDEA) West Africa collaboration. (http://www.iedea-hiv.org)

- All HIV-infected women aged <50 years, starting ART for their own health according to country-specific protocols between 2002-2011, and not reported pregnant at ART initiation were eligible for analysis.
- Ever becoming pregnant as reported in the database after ART initiation was the main outcome.
- Poisson regression analysis accounting for countries heterogeneity was used to estimate pregnancy incidence post-ART and to identify its predicting factors.
- Incidence rate ratios were adjusted on baseline CD4 count; age, Body Mass Index & hemoglobin at ART initiation; first ART regimen; calendar year of ART start; time following ART initiation and country.

Table 1. Baseline characteristics according to women's experience of pregnancy. The IeDEA West Africa Collaboration, 1998-2011.

	Women ever becoming pregnant (N=2,142)	Women never becoming pregnant (N=25,347)	Total (N=27,489)	p-value
Age in years, median (IQR†)	29.6 (26.5-32.8)	33.5 (28.8-39.3)	33.0 (28.5-38.8)	<0.0001*
Baseline CD4 count (cells/µl), median (IQR)	189 (105-282)	169 (82-264)	170 (84-266)	<0.0001*
Hemoglobin (g/dl), median (IQR)	10.2 (9.0-11.3)	10.1 (8.8-11.3)	10.1 (8.9-11.3)	0.0085*
WHO or CDC clinical stage (%)				<0.0001**
A,B/I,II	1,457 (68.0)	15,503 (61.2)	16,960 (61.7)	
AIDS/III,IV	413 (19.3)	6,120 (24.1)	6,533 (23.8)	
Missing	272 (12.7)	3,724 (14.7)	3,996 (14.5)	
Regimen at ART initiation (%)				<0.0001**
2NRTIs¥+Nevirapine	1,568 (73.2)	15,695 (61.9)	17,263 (62.8)	
2NRTIs+Efavirenz	373 (17.4)	7,116 (28.1)	7,489 (27.2)	
2NRTIs+PI§	142 (6.6)	1,836 (7.2)	1,978 (7.2)	
3NRTIs	19 (0.9)	354 (1.4)	373 (1.4)	
Other regimens	40 (1.9)	346 (1.4)	386 (1.4)	

† Interquartile range, ¥*Nucleoside reverse transcriptase inhibitors,* §*Protease Inhibitors*
* Kruskal-Wallis test **Chi square test
ART: antiretroviral therapy; CDC: US Centers for Disease Control; WHO: World Health Organization

Results

Overall 27,489 HIV-infected women contributed for 75,403 women-year of follow-up to this analysis **(table 1)**

- At baseline, median age was 33 years [IQR: 28.5-38.8] and median CD4 cell count was 170 cells/µl [IQR: 84-266]. During follow-up, 2,337 pregnancies were reported after ART initiation: 1,961 women reported one pregnancy, 167 and 14 women reported two and three pregnancies, respectively. Median time to first pregnancy after ART initiation was 24.2 months [IQR: 11.9-42.6].
- **The crude incidence rate of pregnancy was 3.1 per 100/women-year [95%CI: 3.0-3.2].** Pregnancy incidence rate was highest among women aged 16-24 years (4.7 per 100/women-year; 95%CI: 4.2-5.2); adjusted incidence rate ratio was 14.4 (95%CI: 10.6-19.5) when compared to women aged 40-49 years. Additionally, incidence rate of pregnancy was associated with baseline values of CD4 cells, hemoglobin, first ART regimen and HIV disease clinical stage **(table 2).**
- **The pregnancy probability by the fourth year on ART was 17% among women aged 29 or less at ART initiation (figure 1)**

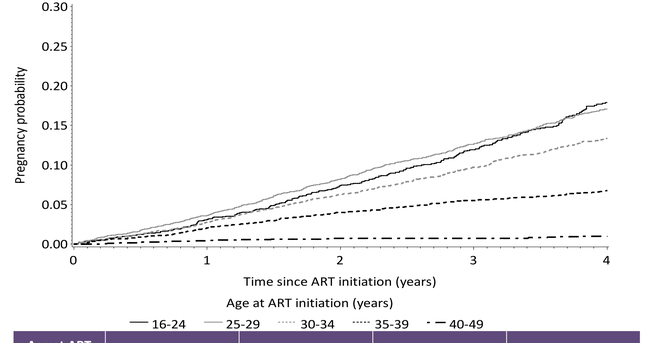
Table 2. Pregnancy incidence according to country and women's baseline characteristics. The IeDEA West Africa Collaboration, 1998-2011.

	Number of first pregnancies	Incidence of first pregnancy	Overall number of pregnancies	Pregnancy incidence
Country				
Côte d'Ivoire	662	2.43 (2.25-2.62)	756	2.75 (2.56-2.95)
Benin	96	2.16 (1.77-2.64)	114	2.54 (2.07-3.00)
Burkina Faso	316	3.58 (3.20-3.99)	354	3.98 (3.56-4.39)
Guinea Bissau	20	1.20 (0.78-1.86)	22	1.32 (0.77-1.87)
Mali	175	2.44 (2.10-2.83)	190	2.64 (2.26-3.31)
Nigeria	800	3.43 (3.20-3.68)	824	3.53 (3.29-3.77)
Senegal	10	2.67 (1.44-4.97)	11	2.93 (1.20-4.65)
Togo	63	3.26 (2.55-4.18)	66	3.41 (2.59-4.24)
Follow-up post-ART (years)				
1st year on ART	517	2.27 (2.07-2.46)	548	2.41 (2.21-2.62)
2nd year on ART	375	2.14 (1.92-2.36)	548	3.06 (2.80-3.32)
3rd year on ART	300	2.34 (2.07-2.60)	411	3.07 (2.77-3.37)
4th year on ART	404	4.49 (4.06-4.93)	351	3.67 (3.28-4.05)
5th year on ART and more	546	4.22 (3.87-4.58)	479	3.39 (3.08-3.69)
Age at ART initiation (years)				
40-49	48	0.34 (0.25-0.45)	49	0.34 (0.25-0.44)
35-39	263	1.66 (1.47-1.87)	277	1.74 (1.54-1.95)
30-34	697	3.48 (3.23-3.74)	758	3.76 (3.49-4.03)
25-29	816	4.70 (4.38-5.03)	898	5.12 (4.78-5.45)
16-24	318	4.70 (4.21-5.25)	355	5.20 (4.66-5.74)
Baseline clinical stage				
A, B/I, II	1,457	3.20 (3.04-3.36)	1,582	3.45 (3.28-3.62)
C/III, IV	413	2.33 (2.12-2.57)	458	2.57 (2.34-2.81)
Missing	272	2.32 (2.06-2.61)	297	2.53 (2.24-2.81)
Baseline CD4 count (cells/µl)				
<50	186	2.25 (1.95-2.60)	207	2.50 (2.16-2.84)
50-199	682	2.88 (2.67-3.10)	753	3.16 (2.93-3.39)
200-349	512	3.37 (3.09-3.67)	548	3.59 (3.29-3.89)
≥350	235	3.86 (3.40-4.39)	249	4.07 (3.57-4.58)
Missing	527	2.42 (2.22-2.63)	580	2.65 (2.43-2.86)
First ART regimen				
2NRTIs+NVP	1,568	3.47 (3.31-3.65)	1,694	3.73 (3.55-3.91)
2NRTIs+EFV	373	1.71 (1.54-1.89)	416	1.90 (1.71-2.08)
2NRTIs+PI	142	2.56 (2.17-3.02)	163	2.92 (2.47-3.37)
3NRTIs/Others	59	1.61 (1.02-2.52)	64	2.58 (1.95-3.22)
Baseline hemoglobin (g/dl)				
≥12	200	3.15 (2.74-3.61)	212	3.32 (2.88-3.77)
[10-12[	604	2.95 (2.69-3.24)	672	3.71 (3.43-3.99)
[8-10[	439	2.86 (2.43-3.36)	476	3.18 (2.89-3.47)
<8	146	3.36 (3.10-3.64)	162	3.15 (2.67-3.64)
Missing	753	2.45 (2.29-2.64)	815	2.65 (2.47-2.83)
Total	2,142	2.86 (2.74-2.98)	2,337	3.10 (2.97-3.23)

Conclusion

- In the West-African region, although probably underestimated, the incidence rate of pregnancy post-ART initiation was high.
- Importantly, this incidence was higher during the first year following ART initiation.
- Family planning services should be delivered to all women initiating ART accordingly to their desire of procreation.

Figure 1. Kaplan-Meier probability of pregnancy after antiretroviral therapy (ART) initiation according to age at ART initiation. The IeDEA West Africa Collaboration, 1998-2011.



Age at ART start (years)	1st Year	2nd Year	3rd Year	4th Year
16-24	0.031 (0.024-0.039)	0.074 (0.062-0.087)	0.119 (0.104-0.136)	0.179 (0.159-0.201)
25-29	0.036 (0.031-0.041)	0.082 (0.074-0.090)	0.126 (0.116-0.137)	0.171 (0.158-0.184)
30-34	0.028 (0.024-0.032)	0.063 (0.056-0.069)	0.097 (0.089-0.106)	0.134 (0.123-0.145)
35-39	0.021 (0.017-0.025)	0.040 (0.035-0.047)	0.055 (0.048-0.063)	0.068 (0.059-0.077)
40-49	0.005 (0.003-0.007)	0.007 (0.005-0.010)	0.008 (0.005-0.011)	0.010 (0.007-0.015)
Total	0.024 (0.022-0.026)	0.053 (0.050-0.056)	0.080 (0.076-0.084)	0.111 (0.106-0.116)