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RESEARCH

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# Incidence of unintended pregnancies and pregnancy experience among adolescents living with perinatally-acquired HIV in West Africa: a mixed-method study

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## Abstract

**Background** Sexual and reproductive health issues in adolescents living with HIV (ALHIV) have been left behind in HIV care programs. ALHIV are at risk of unintended pregnancy which jeopardizes their socio-economic future, health outcomes and exposes their newborn to HIV transmission. A better understanding of these events is needed. We studied the 18-month pregnancy incidence, and explored experiences of pregnancy among female ALHIV enrolled in the OPTIMISE-AO cohort, nested in the prospective paediatric leDEA cohort in Côte d'Ivoire and Burkina Faso.

**Methods** We conducted a mixed-method study nested in the OPTIMISE-AO-ANRS-12390 project, a stepped-wedge interventional trial launched in 2021 to support HIV-disclosure and antiretroviral treatment (ART) adherence in assenting ALHIV aged 10–17 years in Abidjan, Cote d'Ivoire and Ouagadougou, Burkina Faso. We estimated the 18-month incidence rate of pregnancy per 100 woman-years (WY) among those older than 14 years at inclusion. In Abidjan, semi-structured interviews were also conducted with eight adolescents who became pregnant since their inclusion to report their pregnancy experience.

**Results** After 18 months of follow-up, 12 pregnancies occurred among the 111 ALHIV followed up over 153 WY, yielding an overall pregnancy incidence of 7.8/100 WY (95% confidence interval [95%CI]: 4.4–13.7). Stratified by age at enrolment, it was 2.2 (95%CI: 0.3–15.5), 7.6 (95%CI: 2.8–20.3), 13.1 (95%CI: 5.4–31.4), 11.5 (95%CI: 2.8–45.8) per 100 WY in those aged 14, 15, 16, and 17 years, respectively. After birth, all the newborns (12/12) had received prevention of HIV mother-to-child transmission ART, and were HIV-negative at the 6-week early infant HIV diagnosis. The eight ALHIV interviewed shared that the discovery of their pregnancy, all unintended, was a shock, and led to negative consequences, such as rejection from their family, and stigmatisation. Most attempted to terminate their pregnancy unsuccessfully. They reported major financial challenges associated with their pregnancy that forced them to find a job rather than going back to school after delivery.

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**Conclusions** In West Africa, the incidence of unintended pregnancy was high among female ALHIV and resulted in negative socioeconomic outcomes. HIV care programs should include interventions that improve awareness and access to sexual and reproductive healthcare, including contraception, to meet the needs of ALHIV in West Africa.

**Trial registration** Registered with the Pan African Clinical Trials Registry on 13 February 2024 (reference no. PACTR202402863175053).

**Keywords** Sexual and reproductive health, Adolescent, HIV, Côte d'Ivoire, Burkina Faso, Pregnancy, Incidence, Qualitative research

## Background

Sub-Saharan Africa has the highest adolescent pregnancy rate in the world [1]. In this region, it is estimated that 20% of female adolescents, aged 15–19 became pregnant in 2019 [2, 3], and at least half of those pregnancies were unintended or unplanned [1]. Unplanned pregnancies can have negative consequences on the social well-being and health outcomes of adolescents and their offspring, including adverse birth outcomes, school dropout and economic hardship [4].

Over 85% of adolescents living with HIV (ALHIV) aged 10 to 19 years worldwide were living in sub-Saharan Africa in 2022 [5]. The sexual and reproductive health (SRH) needs of ALHIV are greater than those of their HIV-uninfected counterparts. At baseline, ALHIV face multiple challenges related to their HIV infection, such as stigma, gender inequality, discrimination, violence, low access and retention in HIV-care services. These existing challenges hinders their ability to access appropriate SRH services [6], as evidenced by low levels of knowledge about access to and use of SRH services, including condom use, among ALHIV [7]. Their social vulnerability (low socioeconomic level, low level of education, and inadequate housing conditions) is more severe with an increased risk of unintended pregnancy, and HIV transmission to their child [8]. In Côte d'Ivoire, the pregnancy incidence rate was estimated at 3.6 per 100 woman-years (WY), i.e. 3.6 pregnancies per 100 women followed for one year, among ALHIV aged 15–19 years followed in a cohort between 2009 and 2013 [9]. In Kenya an overall pregnancy incidence rate of 2.2 per 100 WY among ALHIV was reported [10]. The consequences of these adolescent pregnancies, mostly unintended, are exacerbated in the HIV context, affecting the socio-economic life of adolescent mothers living with HIV, but also their future, health outcomes, and that of their child [11]. In sub-Saharan Africa, ALHIV have lower access and adherence to antiretroviral treatment (ART) [12, 13], and lower uptake of services to prevent mother-to-child transmission (PMTCT) of HIV compared to their adult counterparts [14].

In West Africa, SRH needs are specifically unmet among the general adolescent population [6, 15]. In

addition, the adolescent birth rate and HIV incidence remain high [16, 17]. Data reporting the incidence and experience of unintended pregnancies among ALHIV are needed to better meet their specific needs. We therefore estimated the incidence of pregnancy and described the experience of pregnancy among ALHIV in Abidjan (Côte d'Ivoire) and Ouagadougou (Burkina Faso), enrolled in the OPTIMISE-AO cohort.

## Methods

### Study design and participants

This mixed-method study was part of the OPTIMISE-AO ANRS 12390 project launched in 2021 (PACTR202402863175053). OPTIMISE-AO is a stepped-wedge interventional trial implemented in five national referral paediatric HIV care centres in Abidjan, Côte d'Ivoire ( $n=3$ ), Ouagadougou, Burkina Faso ( $n=1$ ) and Lomé, Togo ( $n=1$ ), nested in the IeDEA West Africa paediatric cohort [16]. The design, implementation, and reporting of this study were guided by the Consolidated Standards of Reporting Trial checklist (CONSORT; Table S1 in Supplementary materials) [17]. The OPTIMISE-AO project is assessing the acceptability and effectiveness of a package of interventions aimed to improve the quality and frequency of complete HIV status disclosure to ALHIV (before the age of 12 years), and to support their adherence to antiretroviral treatment based on viral load monitoring. All adolescents living with perinatally-acquired HIV, aged 10–17 years, followed in one of the five national paediatric HIV care centres were included in the OPTIMISE-AO ANRS 12390 project with their assent and parental written consent. Adolescents were followed up clinically three-monthly over 24 months.

The quantitative component of the present study was nested in the above cohort study followed until 18 months: all female participants aged older than 14 years, enrolled were included in this analysis, except in Togo where participant enrolment was delayed. In the absence of data on puberty, we included adolescents aged over 14 under the assumption that all reached menarche by that age.

In the three Abidjan centres, in Côte d'Ivoire, we also conducted an exploratory qualitative study between May and July 2023, to assess the knowledge, practices and needs on SRH among ALHIV enrolled in the OPTIMISE-AO project [18]. All the ALHIV who became pregnant during their follow-up were interviewed about their pregnancy experience using semi-structured interviews. Prior to the interview phase, comprehensive information was provided to those eligible during individual or group meetings. Objectives and the topic of the qualitative study were presented by the healthcare professionals from the Abidjan centres and the two interviewers. Adolescents were invited to ask questions and at the end to give their oral consent to participate in this study.

### Data collection

At inclusion, an interview updating the sociodemographic data and adolescent knowledge of their own HIV status, a complete clinical examination, and a viral load (VL) test in the absence of recent viral load ( $\leq 90$  days) were performed for each adolescent. Full HIV-disclosure was defined as an adolescent reporting their HIV status at inclusion. Viral suppression was defined as  $VL < 50\text{cp/mL}$ . Adolescents included had 3-monthly clinical follow-up visits recording all clinical events, including adverse effects, and assessment of adherence. VL test was repeated 6-monthly.

In the absence of pregnancy tests availability, incident pregnancies were sought through medical visits and interviews with health professionals. In most cases, they were self-declared and recorded in patient's records. Date of conception was determined using date of last menstrual period (LMP), based on adolescent report.

The semi-structured interviews and the focus group discussion (FGD) were conducted by two trained qualitative researchers: CT, MSc in Public Health from France, mostly as observer and co-interviewer, and JFD, PhD student in Sociology from Côte d'Ivoire, mostly as interviewer. A semi-structured interview guide was developed in collaboration with the research team composed of experts in adolescent global health, HIV and SRH research, as well as the paediatric HIV care professionals and sociologists. Main topics specifically explored with the female adolescents during the interviews were the discovery of their pregnancy and their feelings, the announcement to the family, and their daily life experience as a young mother. The FGD guide was adapted from the interview guide after the interviews conducted with the peer-educators to get their perceptions on the topics to explore with ALHIV (Supplementary file 2).

To ensure confidentiality, the interviews took place in each paediatric centre and the FGD was conducted in a private meeting room. A secured digital audio recorder

was used to capture the discussions, along with the notes of the observer. All interviews started with "ice-breaker" activities to help build confidence and trust between adolescents and interviewers. The interviews lasted between 45 and 75 min, and the FGD lasted 4 h.

### Data analysis

For the quantitative component, baseline characteristics were defined as the participant characteristics at enrolment in the OPTIMISE cohort. Study participant characteristics are presented as frequencies (percentage) for categorical variables, and median and interquartile ranges (IQR) for continuous variables. We compared baseline characteristics between pregnant and nonpregnant participants using Chi-square or Fisher's exact test for categorical variables.

Pregnancy incidence was calculated per 100 woman-years (WY) of follow-up with their 95% confidence intervals (95% CI), stratified by age. The participant's time at risk started at the inclusion date and ended either at the first pregnancy (date of LMP) or was censored at 18 months defining the end of the follow-up for this study, or at the last visit for those lost to follow up, transfer out or death. All analyses were performed using SAS 9.4 (Cary, NC, USA).

The interviews and the FGD were carried out, transcribed and analysed in French under the leadership of CT and JFD. Transcripts were coded using the NVivo software (version 14). All interviews were transcribed by local professionals in Abidjan, and checked by the interviewers fluent in French. Separate thematic content analyses were performed using the inductive and deductive methods developed by Braun and Clarke [19]. Final codes were discussed and approved by both interviewers and the research team. Relevant direct quotes from the transcripts are displayed for each topic, indicating from which interview or FGD they originate. The illustrative quotes shown in this article for each topic are English translations that we ensured were as close as possible to the original meaning from the adolescents. We adhered to the Consolidated Criteria for Reporting Qualitative Research guidelines.

### Ethical considerations

The OPTIMISE-AO protocol has been approved by the National Research Ethics Review Board of each participating country (ref number: 112-19/MSHP/CNESV-kp for Cote d'Ivoire and 2020-3-052 for Burkina Faso). All adolescents included in OPTIMISE-AO have provided their written informed assent and their parents have provided their written consent. Measures to ensure confidentiality and address the possibility of distressed respondents were in place. All interviews were conducted

in an isolated room and interviewers offered to pause at any time if the participant felt uncomfortable. The study participants did not suffer any repercussions in their respective countries for expressing their reproductive wishes.

**Result**

From February to December 2021, among the 224 female ALHIV aged 10 to 17 years enrolled in the OPTMISE-AO project, 111 aged ≥ 14 years (50%) were included in the current analysis (Fig. 1).

Table 1 provides their baseline characteristics according to the pregnancy status. Overall, 78% were enrolled in Abidjan, 71% were older than 15 years, 63% had a middle school education level. Orphanhood was frequently observed at baseline, with overall 26% as paternal orphan, 34% maternal orphan, and 10% are double orphans. Access to tap water (91%) and electricity (85%) did not differ according to whether or not the teenager was pregnant. Most adolescents (83%) were treated with integrase inhibitors-based regimens, and 72% were virologically suppressed.

Among the 111 female ALHIV followed up over 18 months, 107 (96%) adolescents reached 18 months, three died (3%) and one (1%) was transferred out. Over the study period, 12 incident pregnancies were reported over 154 women-years of follow-up. The median age at pregnancy was 16 years (IQR: 15–16). Their partner median age was 21.5 years (IQR: 20.0–25.5). Overall, the pregnancy incidence rate was 7.81 per 100 WY (CI95%:

4.43–13.75). The incidence was highest among 16 year old ALHIV (Fig. 2).

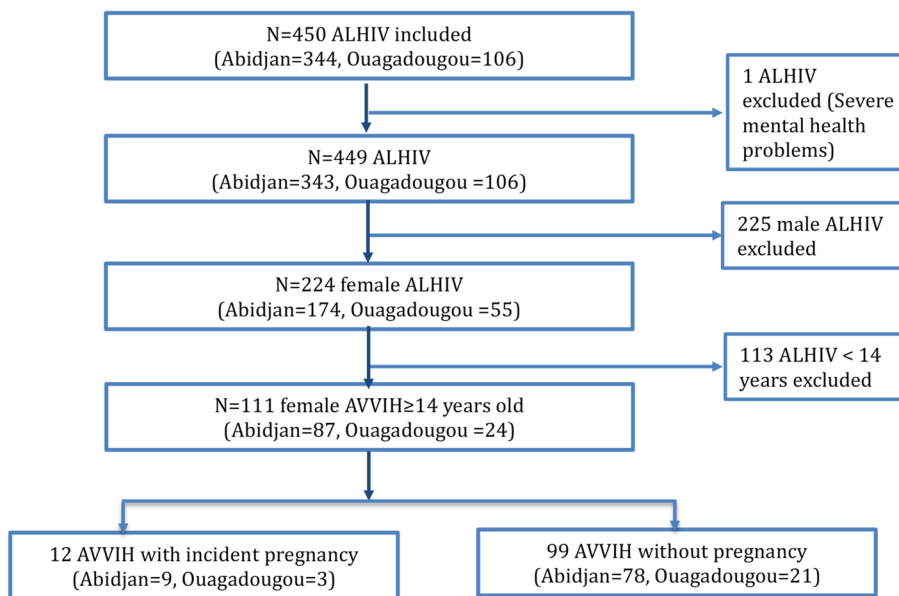
The pregnancy incidence was 2.19 (95%CI: 0.3–15.5), 7.6 (95%CI: 2.8–20.3), 13.1 (95%CI:5.4–31.4), 11.5 (95%CI: 2.8–45.8) per 100 WY in those aged 14, 15, 16, and 17 years, respectively. All adolescents declared that their pregnancy was unintended. All gave birth. All the infants received ART for prevention of HIV mother-to-child transmission, and all infants had a negative HIV test at 6 weeks old.

Overall, eight semi-structured interviews were conducted with the teenagers who experienced a pregnancy in Abidjan, aged between 16 and 19 years. All had given birth by the time of the interview. The FGD was conducted with five peer-educators. The five peer-educators, represented each participating centre in Côte d’Ivoire, and involved two young women, one of whom was a mother and three young men, all of whom had acquired HIV perinatally. The age of the FGD participants ranged between 19 and 31 years.

**Theme 1: discovering her pregnancy**

None of the eight teenage mothers interviewed said that they had wanted to have a child before they became pregnant. They all realised they were pregnant by observing physical changes, and then confirmed it with a pregnancy test.

*"One day, I realised that my breasts were getting bigger and my cheek was starting to pop out [...] so I took a test". (Teenager who got pregnant,*



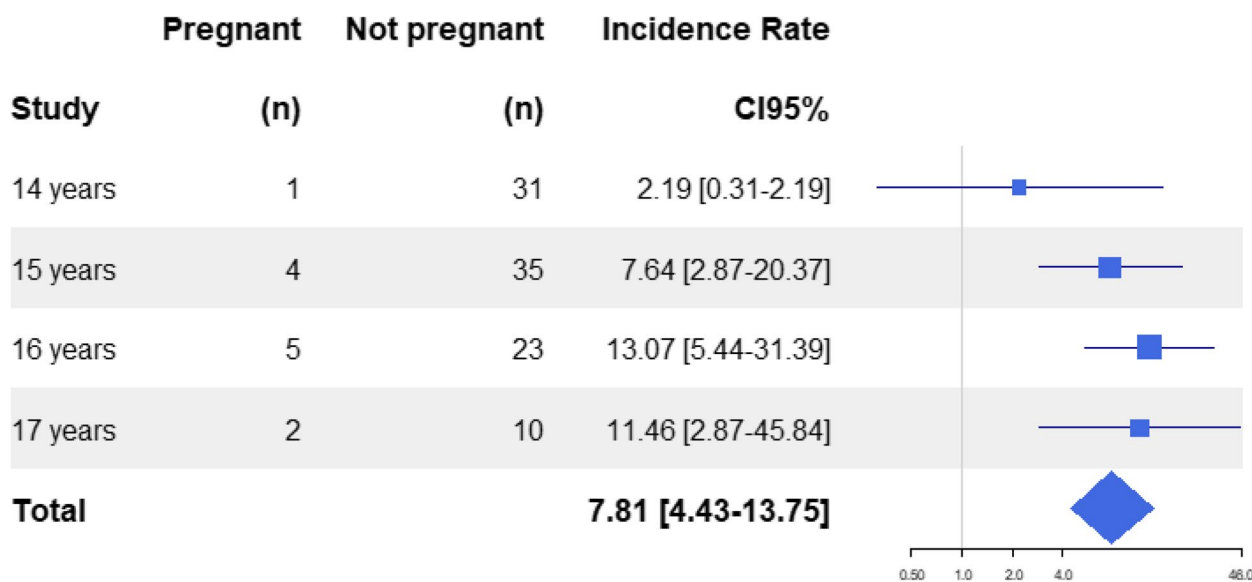
**Fig. 1** Flow chart of the inclusion process of female adolescents living with HIV (ALHIV) eligible for the analysis (Burkina Faso, Côte d’Ivoire, 2021–2022)

**Table 1** Baseline characteristics of female adolescents living with HIV included, overall and according to incident pregnancy status at the end of follow-up in the OPTIMISE-AO project (Burkina Faso, Côte d'Ivoire, 2021–2022;  $n = 111$ )

Baseline variables	Total		Pregnancy status				p-value
	N	%	Pregnant		Not pregnant		
	N	%	N	%	N	%	
<b>Age (years)</b>							0.09
[14–15]	32	28.8	1	8.3	31	31.3	
≥ 15	79	71.2	11	91.7	68	68.7	
<b>Country</b>							0.72
Burkina Faso	24	21.6	3	25.0	21	21.2	
Cote d'Ivoire	87	78.4	9	75.0	78	78.8	
<b>Education level, n (%)</b>							0.54
Primary school	15	13.5	1	8.3	14	14.1	
Middle school	70	63.1	8	66.7	62	62.7	
High school	23	20.7	2	16.7	21	21.2	
Out of school	3	2.7	1	8.3	2	2.0	
<b>Maternal orphan at baseline</b>							0.57
No	67	60.4	8	66.7	59	59.6	
Yes	38	34.2	3	25.0	35	35.4	
Unknown	6	5.4	1	8.3	5	5.0	
<b>Paternal orphan at baseline</b>							1.00
No	73	65.8	8	66.7	65	65.7	
Yes	29	26.1	3	25.0	26	26.3	
Unknown	9	8.1	1	8.3	8	8.0	
<b>Double orphans</b>							1.00
No	97	87.4	11	91.7	86	86.9	
Yes	11	9.9	1	8.3	10	10.1	
Unknown	3	2.7	0	0.0	3	3.0	
<b>With whom does the adolescent live?</b>							1.00
Two parents	24	21.6	2	8.3	22	91.7	
One parent	46	41.4	5	10.9	41	89.1	
Other	41	36.9	5	12.2	36	87.8	
<b>Adolescent main caregiver (N = 108)</b>							0.30
Mother	40	37.1	3	25.0	37	38.6	
Father	25	23.1	5	41.7	20	20.8	
Other	43	39.8	4	3.3	39	40.6	
<b>Type of housing (N = 107)</b>							0.56
Individual housing	70	65.4	6	54.6	64	66.6	
Shared housing	33	30.8	5	45.4	28	29.2	
Boarding school	4	3.8	0	0.0	4	4.2	
<b>Access to type tap water at home</b>							1.00
No	10	9.0	1	8.3	9	9.1	
Yes	101	91.0	11	91.7	90	90.9	
<b>Access to electricity at home</b>							0.39
No	17	15.3	3	25.0	14	14.1	
Yes	94	84.7	9	75.0	85	85.9	
<b>WHO clinical stage (N = 106)</b>							0.72
1 or 2	79	74.5	10	83.3	69	73.4	
3 or 4	27	25.4	2	16.7	25	26.6	
<b>Antiretroviral regimen</b>							0.49
INS-based	92	82.8	11	91.7	81	81.8	
NNRTI-based	12	10.9	0	0.0	12	12.1	
PI-based	7	6.3	1	8.3	6	6.1	
<b>Viral load at baseline status (N = 110)</b>							0.31
Undetectable (< 50cp/mL)	79	71.8	7	58.3	72	73.5	
Detectable	31	28.2	5	41.7	26	26.5	

INS integrase inhibitors, NNRTI non-nucleoside reverse transcriptase inhibitors, PI protease inhibitor





**Fig. 2** Incidence of pregnancy per 100 WY stratified by age among female adolescents living with HIV, Abidjan, Côte d'Ivoire and Ouagadougou, Burkina Faso, OPTIMISE-AO project (n = 154 person-years)

*17-year-old*)

When the teenagers realised they were pregnant, they reported conflicting thoughts. Most wondered whether or not they wanted to keep the child, with the desire to be a mother on the one hand, and the fear of this new role, unpreparedness, and their HIV status on the other.

*"No, I've never given myself a moment to have a child, I told myself that, as soon as the child came along, I was ready to have it. But, when I saw the circumstances of the thing, I was afraid, at first, I wanted to remove it and then I remembered what I told myself. So, I decided to keep it." (Teenager who got pregnant, 17-year-old)*

The majority of participants stated that they had tried to have an abortion after discovering their pregnancy. Abortion or attempted abortion is punishable under Ivorian law, but clandestine abortion is widespread in Côte d'Ivoire [20]. However, the pregnancies were discovered too late to get an abortion. These teenagers therefore had no choice but to accept their pregnancy.

*"I paid for a test and then I did it, but it was already 3 months, I couldn't take it off any more, I couldn't." (teenager who got pregnant, 17-year-old)*

The discovery of pregnancy had an impact on adherence to antiretroviral treatment. Teenagers were in a phase of doubt and lack of knowledge, and had to take new prenatal drugs, which they nicknamed "pregnancy

drugs" (dietary supplements with iron and folic acid). As a result, some of them stopped taking antiretrovirals for several weeks, like this teenager:

*"When I found out, I stopped taking the medicines, [...] because I was confused, mixed up. I didn't know what to do, in fact I stopped taking the medicines" (teenager who got pregnant, 18-year-old)*

**Theme 2: announcing her pregnancy**

Announcing their pregnancy was a difficult situation for teenagers. All participants were unmarried and pregnancy out of wedlock did not align with the various cultural traditions and social norms in the region. All the teenagers said they feared their parents' reaction, and most of them did not announce their pregnancy for several weeks, or even months. Some said that the secret of their pregnancy had been broken by people living in the neighbourhood, particularly community women and grandmothers, who had told to their parents:

*"My mum didn't know, someone told her [...]. Well, it was one of her friends. It talked, it gossiped, like other people, when they see pregnant women, they know" (teenager who got pregnant, 16-year-old)*

There were also many accounts of the judgment and stigmatisation of people living near the adolescents' home:

*"People in my neighbourhood, there are even parents who have taken their children away from the neigh-*

*bourhood because of me, because if they stay with me, they'll get pregnant". (Teenager who got pregnant, 17-year-old)*

Already rejected by some people in the community, some of the teenagers also had to face relationship difficulties and rejection of their parents, especially their fathers:

*"My mom was angry, she wanted to kill me, she talked and talked, they had family reunions more than five times because of that [...]. My dad was angry, he didn't even speak to me, it's only now that he's started to speak to me, he didn't speak to me "* (Teenager who got pregnant, 19-year-old)

With the shock of the discovery and the violent verbal reactions encountered, especially from the father, teenagers shared their feelings of unease during their pregnancy. Half reported having had a difficult time during their pregnancy. The constant judgment, especially within the family circle, was described by adolescents as a real barrier to happiness. Some adolescents even reported having suicidal thoughts:

*"For someone who is not going to school and who also has a family that counts a lot on the person who is pregnant but is disappointed in them and who is also asking for money, it's devastating [...] You feel like killing yourself [...], I've thought about it a lot."* (Teenager who got pregnant, 18-year-old)

### Theme 3: life as a young mother

After the childbirth, the adolescent's family played a central role in bringing up the newborn and the adolescent began to regain her status as a child. The adolescent's mother and grandmother looked after the newborn, giving the teenager a chance to rest and start a new activity:

*"And now you're able to look after him, feed him, dress him? Well, he's thinking. Well, that's all the old lady does."*(teenager who got pregnant, 18-year-old)

Pregnancy and childbirth came with a significant economic impact for teenagers. Most of them became financially dependent on the father of the child, asking him for money to cover the costs of pregnancy care, baby supplies and food. However, most fathers did not maintain their financial support, putting the mother in a difficult financial situation.

*"My child's father didn't even care. He stopped sending me money for food. One morning, I got up, I left, he wasn't my boyfriend anymore, he didn't want to have sex with me anymore "*(teenager who got pregnant, 17-year-old)

*"He (my baby) doesn't suckle, it's the money that feeds him. So, I go to the Espoir centre in Grand Bas-sam, they give me food". (teenager who got pregnant, 16-years-old)*

Young mothers sometimes had no choice but to turn to their family to ask for money, but sometimes to no avail:

*"My dad says, I have money for you, not for your baby" (Teenager who got pregnant, 19-year-old)*

Another major impact of early pregnancy was school dropout. All teenagers were attending school before their pregnancy, and had to drop out from school for about a year because of their pregnancy. Childbirth and the first post-partum months were obstacles to the return at school:

*"I left until the end, until my time came, it was the school itself that asked me to stay at home" (teenager who got pregnant, 16-year-old).*

*"Normally, I'd have to go back to school this year, my older sister would have had to pay for me to go to secondary school. It was the pregnancy that stopped it "(teenager who got pregnant, 18-year-old).*

Even if adolescents had expressed their desire to return to school, some of them had no other choice to leave school for financial reasons. They had to work to cover their own and newborn's needs:

*"Why don't you go to school anymore? Because of my pregnancy[...] I had to start again, but I didn't have any money, so I had to work" (teenager who got pregnant, 16-year-old)*

*"I'm looking for a job to be able to take care of my child."*(teenager who got pregnant, 18-year-old)

### Discussion

Our prospective cohort conducted in West-African settings, reveals a high incidence of pregnancy among ALHIV, reaching 8 per 100 WY overall, and peaked at 13 per 100 WY at age 16. Using qualitative methods, we found that all these pregnancies were unintended, and had negatively impacted the adolescent social and economic well-being. Our data also highlight that ALHIV do not have an adequate knowledge of or access to sexual and reproductive (SRH) services, including pregnancy prevention, as part of their HIV care.

First, our study reports a high rate of adolescent and unintended pregnancy in these West African teenagers living with HIV followed up in 2021–2022. This pregnancy incidence rate was significantly higher than the



one reported previously in the same context ten years ago in Côte d'Ivoire among ALHIV (1.8/100 WY (95% CI: 1.1–2.9) [9], and also in the IeDEA adult cohort in West Africa (incidence rates of 4.8 (4.4–5.2)/100 WY among those aged 25–29) [21]. As a result, we observed a significant trend of increasing unintended pregnancies among ALHIV that reflects the global failure to meet their SRH needs combining several mechanisms. Indeed, female ALHIV lack of awareness regarding their pregnancy risk, and knowledge regarding the contraceptive methods when they become sexually active contribute to this. In addition, limited access to SRH services was common across these cohorts facing growing number of ALHIV [6]. In both countries, some interventions aimed to improve adolescent SRH, although these are not always adapted to their needs. These interventions included school-based comprehensive sexual education program [22]. However, the implementation of this program is not yet effective in some settings because of socio-cultural and religious barriers. Moreover, even when the school-based comprehensive sexual education program is implemented, its impact in real life is still not assessed.

Second, in our study, the qualitative interviews showed that the adolescents who became pregnant were all shocked while discovering their pregnancies and faced with the dilemma of accepting their unwanted pregnancy: their lives were turned upside down by a sudden transition from teenager to the status of young mother [12]. The extent of the trauma experienced by teenagers on discovering their pregnancy reflects once again their lack of preparation, partly due to limited sexual and reproductive health education combined with a lack of access to family planning services [23]. Adolescents who became pregnant also reported rejection by their family and social environment. From the first signs of pregnancy, teenage girls felt insecure about their new situation, which weakened their social relationships. After their pregnancy's announcement, family conflicts and community judgements about their pregnancy outside marriage were major factors in the stigmatisation and isolation of adolescent girls. These reactions have been frequently documented in similar contexts, such as Uganda, where adolescent girls living with HIV become a shame for the family and have often been banished from their homes and families after becoming pregnant [12]. This situation is also found in the general adolescent population, in Ghana, where adolescents girls find themselves immediately disowned by their fathers when they tell him about their sexual experiences, or pregnancy outside marriage [24], which he considers immoral, disrespectful and even illegal [25].

In Swaziland [26] and South Africa [27], as in our study, the incidence of teenage pregnancy strained relationships

with fathers, while mothers still provided emotional and material support to their daughters. Our study showed that rumours and discrimination against pregnant adolescents had a strong impact on the relationships they could have, particularly with their friends, especially when rumours and discrimination were associated with the disclosure of their HIV status [28]. Community norms consider pregnancy and sexual experiences as diseases that can be transmitted, and especially that young mothers will teach other girls bad morals [29]. The consequences of these thoughts are that adolescent mothers are excluded from their community. In our study, the parents of the teenagers' friends did not allow their children to get close to them, which is a practice that has been reported elsewhere in a qualitative study carried out in South Africa [23]. Adolescent girls living with HIV and having unintended pregnancy have therefore difficulties in assuming their responsibilities and coping with stigmatization, as reported in our study. In South Africa, this stigma continues even after the birth of the child, adding to the challenges of motherhood and life with HIV [23].

Consequently, adolescents who become pregnant in such a context are at high risk to face challenges affecting their mental health and well-being. In our study, some participants shared that they had suicidal thoughts when discovering they were pregnant. Parental exclusion, community isolation and feelings of shame during pregnancy are factors that led to suicidal thoughts for some adolescent girls [30]. Few results are available in the literature regarding the mental health of adolescent mothers in the HIV context, however, a number of studies have shown that poor mental health is prevalent among teenagers girls living with HIV [31, 32], specifically, among those who became pregnant [4, 33]. Therefore, further actions are needed to also support mental health difficulties among adolescent mothers affected by HIV in West African settings.

Our study highlights the immediate negative impact and challenges for adolescents who became pregnant to care for themselves during their pregnancy. As shown in our study, some have interrupted their antiretroviral therapy, which has also been reported in other studies [12]. Consequently, pregnant and breastfeeding adolescents living with HIV are more likely to be at high risk for mother-to-child HIV transmission compared to adults [24]. Although the absolute number of pregnancies is relatively low, our study showed that fortunately no case of HIV mother-to-child transmission had occurred at 4–8 weeks after birth, a reassuring outcome in the short term that needs to be confirmed in the long-term once breastfeeding exposure has ended [34].

After their pregnancy, adolescent had also to face new challenges regarding child custody, relationship

difficulties with the father of their child and economic hardship, while living with HIV. In our study context, the adolescent mothers were not married, and were not living within the same household as the father of their child, who were in median, five years older than her. Each lived respectively with their parents. Female teenagers shared that they were alone in taking on the responsibilities of parenthood, the father of their child having no active role in the child's education and not providing enough economic support for the mother [35]. Studies carried out in sub-Saharan Africa among adolescents in the general population have also shown that adolescent mothers face a refusal from the child's father to support them economically, which can have a direct impact on the well-being of adolescent mothers [12].

In addition to the economic difficulties associated with supporting teenage mothers and their infants, these pregnancies can also lead to damaging long-term economic changes, as this motherhood is difficult to reconcile with schooling, which compromises the long-term empowerment of these teenagers. Despite support from the adolescent's mother and other female family members to help with childcare, returning to school can be challenging [36]. For the adolescents in our study, pregnancy should not be a handicap, and they had expressed this by wishing to return to school as soon as possible [37]. However, family relationships differ for each adolescent, especially in the context of HIV. Some do not have the support of their peers to overcome the economic, educational and social challenges of motherhood. Consequently, as our results show, a number of adolescent girls had to drop out of school to find a job. Pregnancy and motherhood then become obstacles to the fundamental right of access to schooling and to the empowerment of adolescent girls.

To our knowledge, this mixed-methods study is the first to include a qualitative component exploring the experiences and care of these pregnancies among adolescents living with HIV in West Africa. The combination of quantitative data and qualitative interviews enabled us to better understand the challenges faced by pregnant teenagers living with HIV. The limitation of our estimate is that the pregnancies were self-reported by the adolescents, so the incidence may be underestimated either by clandestine abortion aimed at ending pregnancy, or due to undiagnosed and unreported pregnancies still in progress. Indeed, high rates of abortion are reported as abortion is penalised in Burkina Faso and Côte d'Ivoire. In Cote d'Ivoire, where annual incidence of abortion was estimated at 28 to 41 per 1000 women aged 15–49 in 2020 [38], medical abortion is allowed in two cases: interruption of pregnancy to safeguard the life of the mother if seriously threatened, and in case of rape. In Burkina

Faso, where annual incidence of abortion in women aged 15–19 is estimated at 30 per 1000 women [39], medical abortion is only authorised in the following cases: the pregnancy endangers the woman's health; there are foetal anomalies recognised as incurable by a doctor at the time of diagnosis; in case of rape or incest. In addition, our sample size was small, limiting the comparison of ALL-HIV according to their pregnancy status. The ALHIV included were selected from paediatric centres specialised in the care of HIV from urban areas. Our population is therefore probably not representative of adolescents living with HIV in Côte d'Ivoire and Burkina Faso. Furthermore, the teenagers' responses during interviews may have been subject to social desirability bias, as sexuality is a particularly taboo subject in this study context, which could lead to judgments. The present study enabled a multicultural approach. However, it is necessary to take account of the influence that the presence of two culturally different interviewers may have had on the participants' responses.

## Conclusion

Our study revealed a high incidence of unintended pregnancies among ALHIV in Côte d'Ivoire and Burkina Faso. Such pregnancies are a source of considerable stigmatization by the community and rejection by parents, forcing some adolescents to drop out of school and having a lasting impact on their future and empowerment capacity. These results highlight the consequences of unplanned pregnancies for adolescent girls, leading to the risk of exclusion from school as well as social and economic insecurity. They also highlight adolescent girls' lack of knowledge about contraceptive methods, and their lack of early access to effective contraceptives and SRH services. It is urgent to explore innovative interventions to develop and improve SRH education, communication, and access to SRH tools and services to reduce risk of unwanted teenagers' pregnancies, contributing to the effort to reduce gender inequalities in West Africa.

## Abbreviations

ALHIV	Adolescents living with HIV
FGD	Focus Group Discussion
IQR	Interquartile Range
LMP	Last menstrual period
PMTCT	Prevention of mother-to-child transmission
WY	Woman-Year
SRH	Sexual and Reproductive Health

## Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s12889-025-21595-w>.

Supplementary Material 1.

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## Authors' contributions

DLD and VL are the co-principal investigators conceived and co-wrote the protocol of the OPTIMISE project. DLD conducted the quantitative analysis. CT and JD conducted the qualitative interviews and analyses, under the supervision of JJ and VL. CT and DLD wrote the first draft of the manuscript which was subsequently reviewed, edited and approved by all authors. VL was involved in the pediatric leDEA cohort coordination and fund raising. KM and JCA were involved in the database management. DLD, CT, CY presented intermediate results in conferences. MSN, KK, FE and CY were in charge of the cohort of patients and the data collection in each clinic involved in the study. CM, PN, BB are psychologists involved in the OPTIMISE-AO project, they especially provided their expertise and support for the development and conduct of the qualitative component. EK and ET are responsible for monitoring the quality of quantitative data. PM contributed to the development of OPTIMISE-AO project and supervised the study activities in Abidjan. All authors reviewed the manuscript.

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## Data availability

The datasets generated and/or analysed during the current study are not publicly available due to data ownership remains with the participating sites. Reasonable request for access to data can be addressed to the corresponding author.

## Declarations

### Ethics approval and consent to participate

The OPTIMISE-AO protocol has been approved by the National Research Ethics Review Board of each participating country (ref number: 112–19/MSPH/CNESV-kp for Cote d'Ivoire and 2020–3-052 for Burkina Faso). All adolescents included in OPTIMISE-AO have provided their written informed assent and their parents have provided their written consent. Measures to ensure confidentiality and address the possibility of distressed respondents were in place.

### Consent for publication

Not applicable.

### Competing interests

The authors declare no competing interests.

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