Recurrence of unintended pregnancies among HIV-positive adolescent girls in Kenya: Extent and implications for birth outcomes

Francis Obare, Anke van der Kwaak, Harriet Birungi

Introduction

In many parts of sub-Saharan Africa, the majority of pregnancies among adolescents aged 19 years and below result from unplanned and unprotected sexual acts and are therefore mostly unintended (Ilika and Anthony 2004; Manzini 2001; Okereke 2010). In settings with high HIV prevalence such as Eastern and Southern parts of sub-Saharan Africa, this further predisposes the adolescents to the risk of acquiring sexually transmitted infections (STIs) including HIV/AIDS. HIV infection may in turn influence the fertility of individual women, including adolescents. For example, fertility among HIV-infected women may be reduced due to diminished fecundity, increased condom use to prevent further spread of infection, or reduced sexual activity, and it may increase especially when infected individuals are under societal pressure to have sex, reproduce, or replace those children who have died (Magadi and Agwanda 2010; Ntozi 2002; Siegel et al. 2006). The possible pathways through which HIV/AIDS may influence fertility could also have different implications for fertility intentions of HIV-infected women. For instance, intention to have children might be reduced for individuals who experience diminished sexual activity while it might increase for those who want to replace infants who die.

Empirical evidence indicates that in some settings, individuals who test HIV-positive reduce their childbearing intentions (Taulo et al. 2009; Yeatman 2009). It

therefore seems reasonable to suppose that in such settings, births to HIV-positive women are more likely to be unintended. In other settings, the increased availability of antiretroviral treatment (ART) has been found to have a positive impact on future fertility intentions of HIV-positive individuals (Laher et al. 2009; Maier et al. 2009; Peltzer et al. 2009). Thus, it should be expected that all factors constant, births to HIV-positive women in these settings are more likely to be intended. Nonetheless, despite the increased availability of ART in parts of sub-Saharan Africa, there are reasons to suggest that unintended births might just be as common among HIV-infected adolescents as other young people in the region. For instance, recent evidence shows no significant difference in the sexual behaviour and childbearing experiences and intentions of those who were infected with HIV at birth and know their sero-status and their counterparts in the general population (Birungi et al. 2009a, 2009b; Obare and Birungi 2010). Moreover, reproductive health services in many parts of the region are not oriented towards adequately addressing the needs of adolescents partly because of weak health care systems and partly due to cultural disapproval of teenage sexuality (Katz and Naré 2002; Warenius et al. 2006; Wood and Jewkes 2006).

Furthermore, there have been increased efforts to provide integrated reproductive health and HIV services in parts of the region as a means of improving clients' access to both types of services (Family Health International 2006; Liambila et al. 2008, 2009; Rutenberg and Baek 2005; Yoder and Amare 2008). This should in theory lead to improved reproductive health outcomes for HIV-positive clients, especially those who are on ART. However, most HIV services continue to be organized around paediatric or adult care (Birungi et al 2008, 2011), which implies that where the services are

integrated, they rarely benefit adolescent clients. This is also supported by recent evidence indicating that for HIV-positive adolescents who have regular contacts with clinics where they can obtain sexual and reproductive health (SRH) information and services, providers/counsellors often emphasize postponement of or restraint from sexual intercourse and do not screen for SRH needs in order to offer appropriate services (Birungi et al. 2008, 2009b). As a result, a large proportion of those who are sexually active do not use preventive methods to avoid undesired consequences such as unintended pregnancies (Bakeera-Kitaka et al. 2008; Birungi et al. 2008, 2009a, 2009b).

Unintended pregnancies have in turn been associated with low use of maternal health care services and poor birth outcomes among some population sub-groups. Marston and Cleland (2003) for instance found that in Peru, children unwanted at conception had poor outcomes while in the other countries considered in the study, unintended pregnancies were associated with low use of prenatal care. There is also evidence that in many parts of sub-Saharan Africa, adolescent girls who experience unintended pregnancies resort to unsafe abortion (Magadi 2006; Mturi and Moerane 2001; Okereke 2010; Singh et al. 2006). For HIV-positive individuals, however, poor birth outcomes might result from advanced infection rather than from unintended pregnancies especially among those who are not on ART. Moreover, the recurrence of unintended pregnancies suggests repeated exposure to unprotected sexual intercourse, which has health implications for HIV-positive individuals in terms of increased risk of re-infection with another strain of the virus.

Although the experiences and implications of unintended pregnancies among teenagers in the general population are well documented, there is limited understanding

of the same among HIV-positive adolescents. This paper therefore uses data on pregnancy histories of HIV-positive adolescent girls aged 15-19 years in Kenya to examine the experiences of unintended pregnancies among this population sub-group and the implications of these experiences for birth outcomes. It specifically explores the extent of recurrence of unintended pregnancies among the adolescents by comparing the experiences across different pregnancies. It further examines whether experiencing an unintended pregnancy is associated with poor birth outcomes among HIV-positive adolescent girls. On the basis of the foregoing discussion, the outcomes for HIV-positive adolescents might depend on how HIV infection, ART, and SRH information and services available to them affect their sexual behaviour, fertility intentions and childbearing experiences.

Context

Estimates from the 2008-2009 KDHS show that 18% of adolescent girls aged 15-19 years in Kenya had begun childbearing with marked variations between regions and by education level (Kenya National Bureau of Statistics [KNBS] and ICF Macro 2010). For instance, the proportion of adolescent girls who had begun childbearing was more than twice as high in Nyanza and Coast provinces compared to Central region (27%, 26% and 10% respectively). The corresponding figures for Rift Valley, North Eastern, Western, and Nairobi provinces are 17%, 16%, 15% and 14%. In addition, the proportion of adolescent girls with no education who had begun childbearing was three times higher than that of those with secondary and above education (32% versus 10%).

Results of the 2008-2009 KDHS further show that the national HIV prevalence among adults aged 15-49 years was 6% (KNBS and ICF Macro 2010). Prevalence was

twice as high among women compared to men (8% versus 4%) and in Nyanza compared to Nairobi or Western provinces (14% in Nyanza versus 7% in Nairobi and Western regions). The adult prevalence in the other regions was 5% in Rift Valley and Central, 4% in Coast and Eastern, and 1% in North Eastern province. The prevalence among adolescent boys and girls aged 15-19 years was much lower (2%) but still three times higher among girls compared to boys (3% versus 1%). It was also highest in Nyanza compared to other regions (6% in Nyanza compared to less than 1% in Nairobi and Eastern provinces, 1% in Central, Coast, Rift Valley and Western provinces, and 2% in North Eastern province).

Although ART was introduced in Kenya in the 1990s, the 2010 Kenya Service Provision Assessment (KSPA) found that only 16% of all health facilities were offering ART services (National Coordinating Agency for Population and Development [NCAPD] et al. 2010). The proportion of facilities offering the services ranged from 9% in North Eastern to 24% in Coast, 31% in Nyanza, and 33% in Nairobi partly reflecting the prevalence of HIV in these regions. Nonetheless, only 11% of the health facilities in Rift Valley offered the services despite the fact that HIV prevalence in the region is comparable to that of Coast province. The number of adults and children living with HIV in the country was estimated at 1.5 million by the end of 2009 with 48% of those in need of ART receiving the services (Joint United Nations Programme on HIV/AIDS [UNAIDS] 2010). Despite the low ART coverage, a higher proportion of health facilities in the country offer HIV testing services (74%) while nearly two-thirds (64%) offer care and support services for HIV-positive clients (NCAPD et al. 2010).

The process of integrating reproductive health and HIV services started in Kenya more than a decade ago with initial efforts focusing on integrating counselling and testing for HIV into prenatal care services (Family Health International 2006; Republic of Kenya 2009). Subsequent efforts included integrating family planning into voluntary and counselling and testing for HIV as well as integrating counselling and testing into family planning services. However, it was not until 2009 that the Government finalized a national strategy for integrating the two types of services with the aim of improving the coordination and collaboration among key agencies and organizations involved in the provision of the services (Republic of Kenya 2009). In spite of these efforts, the 2010 KSPA shows that of the health facilities offering prevention of mother-to-child transmission (PMTCT) of HIV services, for instance, only 33% offered the minimum package that includes testing, ART, counselling on maternal nutrition and infant feeding as well as family planning counselling or referral (NCAPD et al 2010).

Data

The data used in this paper are on pregnancy histories of HIV-positive adolescent girls aged 15-19 years in four regions (Coast, Nairobi, Nyanza and Rift Valley provinces) of Kenya, which are characterized by high rates of HIV prevalence and teenage childbearing. The information was collected through structured interviews as part of a diagnostic study to assess the SRH information and service needs of HIV-positive adolescent boys and girls in the country. Study participants were identified and recruited through the existing HIV/AIDS treatment, care and support programs with the help of service providers/counsellors. Only those who were aware of their HIV sero-status and were willing to talk about their inner lives were targeted for inclusion in the study.

Written parental/guardian consent and individual assent to participate in the study were obtained for respondents aged 15-17 years while individual written consent was obtained from those aged 18-19 years and those aged below 18 years who were living alone, married, or taking care of siblings.

A total of 1,059 adolescents completed the individual interviews with girls comprising 78% (757). Slightly more than half (394) of the girls had ever been pregnant with 24% (of 394) reporting multiple pregnancies. Those who had ever been pregnant provided detailed information on each pregnancy regarding whether it was intended, the relationship to the person responsible, prenatal care services including PMTCT, pregnancy outcome, place of delivery or pregnancy termination, assistance during delivery or pregnancy termination, post-natal care, and use of contraception after delivery or pregnancy termination. For live births, respondents were further asked whether the child was tested for HIV, their willingness to share the results of the test, the outcome of the test, and the survival status of the child. The study obtained ethical and research clearance from the Institutional Review Board of the Population Council, the Research Ethics Committee of the Royal Tropical Institute, the Ethics Review Committee of the Kenya Medical Research Institute (KEMRI), and the Kenya National Council for Science and Technology (KNCST). Further details about the study procedures are provided in Birungi et al. (2011) and Obare et al. (2010).

Analysis

Analysis entails the estimation of multi-level random-intercept logit models (Rabe-Hesketh and Skrondal 2008). The choice of the analysis technique is informed by the fact that pregnancies and births are nested within individual adolescent girls identified from

the same HIV/AIDS facility. The analysis therefore needs to take into account unobserved characteristics of pregnancies or births to the same mother as well as of individuals identified from the same facility. The empirical model is of the form:

$$\log it(\pi_{ijk}) = X_{ijk}\beta + \mu_{jk} \qquad (1)$$

The parameters in equation (1) are as follows: π_{ijk} is the probability of a given outcome for pregnancy or birth i to individual mother j identified from facility k; X_{ijk} is the vector of covariates; β is the associated vector of fixed parameters; and μ_{jk} are the unobserved characteristics of individual mothers from the same facility that might be correlated with the outcomes.

Two models are estimated. The first model explores the extent of recurrence of unplanned pregnancies among HIV-positive adolescent girls. It specifically predicts the likelihood of experiencing an unplanned pregnancy across different pregnancies. Individuals are considered to experience repeated unplanned pregnancies if there is no significant difference in the likelihood of reporting that a pregnancy was unintended between higher and lower order pregnancies. In contrast, significant variations in the likelihood of reporting unintended pregnancies by pregnancy order imply that HIV-positive adolescents in the study did not experience repeated unplanned pregnancies. The model controls for respondents' age at first pregnancy (in single years), study site (Coast, Nairobi, Nyanza and Rift Valley), maternal education level (no schooling, primary, and secondary and above), and paternity status (boyfriend/fiancé, husband, and friend/acquaintance/stranger).

The second model examines whether having an unintended pregnancy is associated with the likelihood of experiencing poor birth outcomes including miscarriage,

stillbirth or abortion among HIV-positive adolescent girls. It controls for age at first pregnancy, study site, maternal education, paternity status, and pregnancy order. The results are presented as odds ratios with 95% confidence intervals.

Results

Characteristics of ever pregnant HIV-positive adolescent girls

More than 80% of ever pregnant HIV-positive adolescent girls were aged 18-19 years (Table 1). However, most (76%) of the girls experienced their first pregnancies at the age of 17 years and below. Besides, the majority had primary-level education. Nearly one-in-four was married or living with a man at the time of the interview while 24% had been pregnant more than once. About three-quarters of the pregnancies and a similar proportion of live births were unintended.

<Insert Table 1 about here>

Recurrence of unintended pregnancies

The results from the multi-level logit model predicting the likelihood of experiencing an unintended pregnancy by pregnancy order are presented in Table 2. There was no significant difference between higher and lower order pregnancies in their likelihood of being unintended. There were also no significant differences in the likelihood of having an unintended pregnancy by study site or maternal education level. However, pregnancies were significantly less likely to be unintended if the husband rather than the boyfriend/fiancé or friend/acquaintance/stranger was responsible ($p<0.01$).

<Insert Table 2 about here>

Implications of unintended pregnancies for birth outcomes

Experiencing an unintended pregnancy was not significantly associated with the likelihood of experiencing adverse birth outcomes (miscarriage, stillbirth or abortion) among HIV-positive adolescents (Table 3). Rather, higher order pregnancies were significantly more likely to result in adverse outcomes compared to lower order ones. Moreover, pregnancies were significantly less likely to result in adverse outcomes if they occurred within rather than outside marital unions. The likelihood of experiencing poor pregnancy outcomes was also significantly higher in Coast and Nairobi than in Nyanza and Rift Valley provinces. This could partly be attributed to the high rates of abortion reported in Coast and Nairobi (7%) compared to the other two provinces (2%).

<**Insert Table 3 about here**>

Discussion

The objective of this article was to examine the extent of recurrence of unintended pregnancies among HIV-positive adolescent girls in Kenya and how these experiences relate to birth outcomes. One important finding is that HIV-positive adolescent girls who had begun childbearing experienced recurrence of unintended pregnancies. The finding is consistent with emerging evidence from parts of sub-Saharan Africa that programs for HIV-positive young people have not provided pragmatic solutions for those who are or intend to be sexually active beyond emphasizing that they postpone or refrain from sexual intercourse (Bakeera-Kitaka et al. 2008; Birungi et al. 2008, 2009a, 2009b). The programmatic gaps could largely be attributed to the orientation of HIV services towards paediatric or adult care, lack of provider training in SRH counselling for HIV-positive

adolescents, inadequate financial and human resources, as well as the socio-cultural challenges associated with addressing adolescent sexuality in general (Birungi et al. 2008, 2011; Obare et al. 2010).

The second important finding of the article is that unintended pregnancies were not significantly associated with adverse birth outcomes among HIV-positive adolescent girls. Rather, higher order pregnancies were significantly more likely to result in poor outcomes compared to lower order ones. This could be due to the impact of advanced HIV infection or the use of abortion rather than contraception to space or limit births as is the case among other adolescents (Magadi 2006; Mturi and Moerane 2001; Okereke 2010). The findings suggest that despite efforts to integrate reproductive health and HIV services in the country as a means of improving clients' access to both services (Liambila et al. 2008, 2009; Family Health International 2006; Republic of Kenya 2009), HIV-positive adolescents do not seem to benefit from such integration. This could partly be attributed to the small number of facilities that provide integrated services and partly to service orientation towards adult care. It, however, underscores the need to strengthen the provision of SRH information and services to HIV-positive adolescent clients within HIV/AIDS programs in the country in order to reduce the risk of undesired consequences of unplanned and unprotected sex—including the high levels of unintended pregnancies—among this population sub-group.

It is worth noting that the study had a number of limitations that might have influenced the findings of this article. First, since the sample of HIV-positive adolescents was not randomly selected from the population, their experiences may only reflect the experiences of those who obtain services from the clinics but not of all HIV-positive

adolescents in Kenya. The process of identifying and recruiting respondents was, however, necessitated by the sensitive nature of the study, hence the need to avoid exposing them to psychological or other harm. Second, the study did not collect information on other factors that might affect pregnancy intentions and birth outcomes such as the individual's socio-economic status at the time of the pregnancy. Nonetheless, it is hoped that the estimation of multi-level logit models minimized the biases attributable to such unobserved characteristics. Third, it could be that the adolescent girls under-reported pregnancies that resulted in abortion, stillbirths and early neonatal deaths. This could affect the observed association between unintended pregnancies and birth outcomes. Fourth, the study did not capture information on when or how HIV infection occurred (perinatally, through sexual intercourse or other means such as injecting drug use). Birth outcomes could, for instance, be different for those with perinatally acquired HIV and those who were infected much later, and for the latter group, for conceptions that occurred before and after infection.

Acknowledgements

The study among HIV-positive adolescents was funded by the United States Agency for International Development (USAID), Plan Netherlands, the Royal Tropical Institute of Netherlands, and the Dutch Ministry of Foreign Affairs. The component in Coast and Rift Valley provinces was implemented by APHIA II Operations Research (Population Council), APHIA II Rift Valley and Coast (Family Health International), APHIA II Nairobi and Central (Pathfinder International), and the National AIDS and STI Control Programme (NASCOP) in the Ministry of Health. Plan International- Kenya and the Royal Tropical Institute implemented the component in Nairobi and Nyanza provinces

through technical and logistical support from Population Council, the Nyanza Provincial Medical Office, the Nairobi Provincial Children's Office, the District Children's Officers- Nairobi, and the Medical Officer of Health- City Council of Nairobi. The Institutional Review Board of the Population Council, the Research Ethics Committee of the Royal Tropical Institute, the Ethics Review Committee of the Kenya Medical Research Institute (KEMRI), and the Kenya National Council for Science and Technology granted ethical and research clearance for the study.

References

Bakeera-Kitaka, Sabrina, Nicolette Nabukeera-Barungi, Christiana Nöstlinger, Kekitiinwa Addy, and Robert Colebunders. 2008. "Sexual risk reduction needs of adolescents living with HIV in a clinical care setting." *AIDS Care* 20(4):426-433.

Birungi, Harriet, Francis Obare, Jane Harriet Namwebya, Ibrahim Mohammed, and Margaret Gitau. 2011. *Sexual and reproductive health needs of adolescents living with HIV in Kenya*. Nairobi: APHIA II OR Project in Kenya/Population Council.

Birungi, Harriet, Francis Obare, John Frank Mugisha, Humphres Evelia, and Juliana Nyombi. 2009a. "Preventive service needs of young people perinatally infected with HIV in Uganda." *AIDS Care* 21(6):725-731.

Birungi, H., Mugisha, J.F., Obare, F. and Nyombi, J. 2009b. "Sexual behaviour and desires among adolescents perinatally infected with HIV in Uganda: Implications for programming." *Journal of Adolescent Health* 44(2):184-187.

Birungi, Harriet, John Frank Mugisha, Juliana Nyombi, Francis Obare, Humphres Evelia,

and Hannington Nyinkavu. 2008. “Sexual and reproductive health needs of adolescents perinatally infected with HIV in Uganda.” *FRONTIERS Final Report*. Washington, DC: Population Council.

Family Health International. 2006. *Integrating family planning into HIV voluntary counseling and testing services in Kenya: Progress to date and lessons learned*. Research Triangle Park: Family Health International.

Ilika, Amobi and Igwegbe Anthony. 2004. “Unintended pregnancy among unmarried adolescents and young women in Anambra State, South East Nigeria.” *African Journal of Reproductive Health* 8(3):92-102.

Joint United Nations Programme on HIV/AIDS [UNAIDS]. 2010. *UNAIDS Report on the Global AIDS Epidemic 2010*. Geneva: UNAIDS.

Katz, K. and C. Naré. 2002. “Reproductive health knowledge and use of services among young adults in Dakar, Senegal.” *Journal of Biosocial Science* 34(2):215-231.

Kenya National Bureau of Statistics (KNBS) and ICF Macro. 2010. *Kenya Demographic and Health Survey 2008-09*. Calverton, MD: KNBS and ICF Macro.

Laher, Fatima, Catherine S. Todd, Mark A. Stibich, Rebecca Phofa, Xoliswa Behane, Lerato Mohapi, and Glenda Gray. 2009. “A qualitative assessment of decisions affecting contraceptive utilization and fertility intentions among HIV-positive women in Soweto, South Africa.” *AIDS and Behavior* 13(Suppl 1):47-54.

Liambila, Wilson, Ian Askew, Juma Mwangi, Robert Ayisi, Josephine Kibaru, and Saiqa Mullick. 2009. “Feasibility and effectiveness of integrating provider-initiated testing and counselling within family planning services in Kenya.” *AIDS* 23(Suppl 1):S115-S121.

Liambila, W., I. Askew, R. Ayisi, M. Gathitu, J. Mwangi, R. Homan, et al. 2008. *Feasibility, acceptability, effect and cost of integrating counseling and testing for HIV within family planning services in Kenya*. FRONTIERS Final Report. Washington, DC: Population Council.

Magadi, Monica Akinyi and Alfred O. Agwanda. 2010. "Investigating the association between HIV/AIDS and recent fertility patterns in Kenya." *Social Science and Medicine* 71(2):335-344.

Magadi, Monica. 2006. "Poor pregnancy outcomes among adolescents in South Nyanza region of Kenya." *African Journal of Reproductive Health* 10(1):26-38.

Maier, Marissa, Irene Andia, Nneka Emenyonu, David Guzman, Angela Kaida, Larry Pepper, Robert Hogg, and David R. Bangsberg. 2009. "Antiretroviral therapy is associated with increased fertility desire, but not pregnancy or live birth, among HIV+ women in an early HIV treatment program in rural Uganda." *AIDS and Behavior* 13(Suppl 1):28-37.

Manzini, Ntsiki. 2001. "Sexual initiation and childbearing among adolescent girls in KwaZulu Natal, South Africa." *Reproductive Health Matters* 9(17):44-52.

Marston, Cicely and John Cleland. 2003. "Do unintended pregnancies carried to term lead to adverse outcomes for mother and child? An assessment in five developing countries." *Population Studies* 57(1):77-93.

Mturi, Akim J. and William Moerane. 2001. "Premarital childbearing among adolescents in Lesotho." *Journal of Southern Africa Studies* 27(2):259-275.

National Coordinating Agency for Population and Development (NCAPD) [Kenya],

Ministry of Medical Services [Kenya], Ministry of Public Health and Sanitation [Kenya], Kenya National Bureau of Statistics [Kenya], and ICF Macro. 2010. *Kenya Service Provision Assessment Survey: Preliminary Report*. Nairobi: NCAPD.

Ntozi, James P.M. 2002. "The impact of HIV/AIDS on fertility in sub-Saharan Africa." *African Population Studies* 17(1):103-124.

Obare, Francis and Harriet Birungi. 2010. "The limited effect of knowing they are HIV-positive on the sexual and reproductive experiences and intentions of infected adolescents in Uganda." *Population Studies* 64(1):97-104.

Obare, Francis, Anke van der Kwaak, Bwibo Adieri, David Owuor, Stephen Okoth, Samuel Musyoki, Emily Muga, and Harriet Birungi. 2010. "HIV-positive adolescents in Kenya: Access to sexual and reproductive health services." *Bulletin 393*. Amsterdam: KIT Publishers.

Okereke, Chukwunenye Iheanacho. 2010. "Assessing the prevalence and determinants of adolescents' unintended pregnancy and induced abortion in Owerri, Nigeria." *Journal of Biosocial Science* 42(5):619-632.

Peltzer, Karl, Li-Wei Chao, and Pelisa Dana. 2009. "Family planning among HIV-positive and negative prevention of mother to child transmission (PMTCT) clients in a resource poor setting in South Africa." *AIDS and Behavior* 13(5):973-979.

Rabe-Hesketh, Sophia and Anders Skrondal. 2008. *Multilevel and Longitudinal Modeling Using Stata*, 2nd ed. College Station, TX: Stata Corp LP.

Republic of Kenya. 2009. *National Reproductive Health and HIV and AIDS Integration Strategy*. Nairobi: Republic of Kenya.

Rutenberg, Naomi and Carolyn Baek. 2005. "Field Experiences Integrating Family Planning into Programs to Prevent Mother-to-Child Transmission of HIV." *Studies in Family Planning* 36(3):235-245.

Siegel, Karolynn, Eric W. Schrimshaw, Helen-Maria Lekas. 2006. "Diminished sexual activity, interest, and feelings of attractiveness among HIV-Infected women in two eras of the AIDS epidemic." *Archives of Sexual Behavior* 35(4):437-449.

Singh, Susheela, Ann M. Moore, Akinrinola Bankole, Florence Mirembe, Deidre Wulf, and Elena Prada. 2006. *Unintended pregnancy and indiuced abortion in Uganda: Causes and consequences*. New York: Guttmacher Institute.

Taulo, Frank, Mark Berry, Amy Tsui, Bonus Makanani, George Kafulafula, Qing Li, Chiwawa Nkhoma, Johnstone J. Kumwenda, Newton Kumwenda, and Taha E. Taha. 2009. "Fertility intentions of HIV-1 infected and uninfected women in Malawi: A longitudinal study." *AIDS and Behavior* 13(Suppl 1):20-27.

Warenius, L.U., E.A. Faxelid, P.N. Chishimba, J.O. Musandu, A.A. Ong'any, and E.B. Nissen. 2006. "Nurse-midwives' attitudes towards adolescent sexual and reproductive health needs in Kenya and Zambia." *Reproductive Health Matters* 14(27):119-128.

Wood, K and R. Jewkes. 2006. "Blood blockages and scolding nurses: Barriers to adolescent contraceptive use in South Africa." *Reproductive Health Matters* 14(27):109-118.

Yeatman, Sara. 2009. "The impact of HIV status and perceived status on fertility intentions in rural Malawi." *AIDS and Behavior* 13(Suppl 1):12-19.

Yoder, P. Stanley, and Yared Amare. 2008. *Integrated Family Planning and VCT*

Services in Ethiopia: Experiences of Health Care Providers. Qualitative Research Studies No. 14. Calverton, Maryland, USA: Macro International Inc.

Table 1: Percent distribution of ever pregnant HIV-positive adolescent girls by various characteristics

Characteristics	Percent
Current age (years)	(N=394)
15-17	17.0
18-19	83.0
Age at first pregnancy (years)	(N=394)
<15	9.4
15-17	66.5
18-19	23.6
Don't know/missing	0.5
Education level	(N=394)
No schooling	4.3
Primary education	69.8
Secondary and above	25.1
Missing	0.8
Region	(N=394)
Nairobi	36.0
Coast	14.0
Nyanza	35.5
Rift Valley	14.5
Currently married/living together	22.8
	(N=394)
Number of times pregnant (%)[a]	(N=394)
1	75.9
2	20.3
3	3.3
4	0.5
Percentage of births that are unintended[b]	74.0
	(N=430)
Percentage of pregnancies that are unintended[a]	73.9
	(N=506)

[a]Include current and those pregnancies that ended in miscarriage, stillbirth and abortion; [b]Among live births only.

Table 2: Odds ratios from the multi-level logit models predicting the recurrence of unintended pregnancies among HIV-positive adolescent girls by pregnancy order

Covariate	Odds ratio	95% confidence interval
Pregnancy order (ranges from 1 to 4)	1.3	0.8 – 2.3
Age at first pregnancy (single years)	0.9	0.8 – 1.1
Study site (ref=Nyanza)		
Coast	0.8	0.4 – 1.7
Nairobi	0.9	0.5 – 1.6
Rift Valley	0.9	0.4 – 2.3
Maternal education level (ref=No schooling)		
Primary education	0.7	0.2 – 2.5
Secondary and above	0.8	0.2 – 2.9
Relationship to person (ref=Boyfriend/fiancé)		
Husband	0.1**	0.0 – 0.2
Other[a]	3.3	0.7 – 14.9
Intra- and inter-class correlations		
Intra-class (within-mother)	0.10	
Inter-class (between-mother)	0.00	
Number of cases		
Pregnancies/births	496	
Mothers	389	
Facilities	56	

[a]Refers to friend, acquaintance or stranger; Estimates are based on equation (1) in the text; ref: reference category; *p<0.05; **p<0.01.

Table 3: Odds ratios from the multi-level logit models predicting the association between unintended pregnancy and poor birth outcomes among HIV-positive adolescent girls

Covariate	Odds ratio	95% confidence interval
Pregnancy was unintended (Yes=1)	1.3	0.5 – 3.3
Pregnancy order (ranges from 1 to 4)	2.5**	1.6 – 4.0
Age at first pregnancy (single years)	1.1	0.9 – 1.3
Study site (ref=Nyanza)		
Coast	3.1*	1.1 – 8.8
Nairobi	3.1*	1.3 – 7.2
Rift Valley	0.4	0.0 – 3.1
Maternal education level (ref=No schooling)		
Primary education	1.2	0.3 – 4.7
Secondary and above	1.4	0.3 – 6.5
Relationship to person (ref=Boyfriend/fiancé)		
Husband	0.3*	0.1 – 0.9
Other[a]	0.8	0.3 – 2.4
Intra- and inter-class correlations		
Intra-class (within-mother)	0.00	
Inter-class (between-mother)	0.00	
Number of cases		
Births	467	
Mothers	370	
Facilities	54	

[a]Refers to friend, acquaintance or stranger; Estimates are based on equation (1) in the text; ref: reference category; *p<0.05; **p<0.01.